# AOAC Official Methods Board
# November 10, 2016
# Teleconference

**AOAC INTERNATIONAL**
**2275 Research Blvd, Suite 300**
**Rockville, MD 20850**
**1.301.924.7077**

**TELECONFERENCE INFORMATION**
**Conference Call Dial In:**
**1-877-647-3411 (US/Canada)**

**For additional international locations,**
**please see the Outlook Appointment**

**PASSCODE: 373 523 5702 #**

# OFFICIAL METHODS BOARD MEETING

## Thursday, November 10, 2016

**1:00pm – 2:30pm ET**

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# AOAC INTERNATIONAL
# OFFICIAL METHODS BOARD
# 2016 –2017
# APPOINTED

| | | | |
|---|---|---|---|
| *Chair* | **Erin Sutphin Crowley**<br>Q Laboratories, Inc.<br>ecrowley@qlaboratories.com<br>Term 2+: September 22, 2016 - September 11, 2019 | *Member* | **Don Gilliland**<br>Abbott Nutrition<br>don.gilliland@abbott.com<br>Term 1: October 1, 2015 - September 29, 2018 |
| *Member* | **Doug Abbott**<br>Independent Consultant<br>douglas.abbott@gmail.com<br>Term 2: September 11, 2014 - September 27, 2017 | *Member* | **Katerina Mastovska**<br>Covance Laboratories<br>Katerina.Mastovska@covance.com<br>Term 1: October 1, 2015 - September 29, 2018 |
| *Member* | **Joe Boison**<br>Canadian Food Inspection Agency<br>Joe.Boison@inspection.gc.ca<br>Term 2: September 22, 2016 – September 11, 2019 | *Member* | **Wendy McMahon**<br>Mérieux NutriSciences<br>wendy.mcmahon@mxns.com<br>Term 1: September 22, 2016 – September 11, 2019 |
| *Member* | **Amy Brown**<br>Florida Department of Agriculture and Consumer Services<br>Amy.Brown@freshfromflorida.com<br>Term 1: September 22, 2016 – September 11, 2019 | *Member* | **Melissa Phillips**<br>US National Institute of Standards and Technology<br>melissa.phillips@nist.gov<br>Term 1: September 22, 2016 – September 11, 2019 |
| *Member* | **Esther Campos Gimenez**<br>Nestle Research Centre<br>esther.campos-gimenez@rdls.nestle.com<br>Term 1: September 22, 2016 – September 11, 2019 | *Member* | **Yvonne Salfinger,** Independent Consultant<br>*AOAC Committee on Safety, Chair*<br>Yhale@aol.com<br>Term 2: September 22, 2016 – September 11, 2019 |
| *Member* | **Sidney Sudberg,** Alkemist Labs<br>*AOAC Committee on Statistics, Chair*<br>Sidney@alkemist.com<br>Term 1: September 22, 2016 – September 11, 2019 | *Member* | **Bradley Stawick**<br>Microbac Laboratories, Inc.<br>brad.stawick@microbac.com<br>Term 2: October 1, 2015 - September 29, 2018 |
| *Past Chair (Ex-officio Member)* | **Shauna Roman**<br>Reckitt Benckiser, Inc.<br>Shauna.Roman@reckittbenckiser.com<br>Term 4: September 22, 2016 – September 11, 2019 | | |

***AOAC Staff Liaisons***

| | | |
|---|---|---|
| | Deborah McKenzie<br>Sr. Director, AOAC Standards Development<br>Sr. Director, AOAC Research Institute<br>dmckenzie@aoac.org | Delia Boyd<br>Program Manager, AOAC Standards Development<br>dboyd@aoac.org |

# AOAC INTERNATIONAL
# BYLAWS

**As Amended September 26, 2010**

## ARTICLE I
## Name

The name by which this Association shall be known is "AOAC INTERNATIONAL" (hereinafter referred to as the "Association").[1]

## ARTICLE II
## Purpose

The primary purpose of the Association is to promote methods validation and quality measurements in the analytical sciences.

## ARTICLE III
## Membership

***Section 1. Types of Membership***

There shall be three (3) types of membership in the Association: Individual Members, Sustaining Member Organizations, and Organizational Affiliates.

A. Individual Members

There shall be four (4) categories of Individual Members in the Association: Members, Retired Members, Student Members, and Honorary Members.

B. Sustaining Member Organizations

There shall be one (1) category of Sustaining Member Organizations.

C. Organizational Affiliate

There shall be one (1) category of Organizational Affiliate.

***Section 2. Qualifications for Membership***

A. Individual Members

[1] Members

Qualifications for Members shall be a degree in science, or equivalent as approved by the Board of Directors, and interest in supporting and furthering the purpose and goals of the Association. Such scientists shall be eligible for membership provided they are engaged, or have been engaged, directly or indirectly, in a field relevant to the purpose of the Association.

[2] Retired Members

[1] AOAC INTERNATIONAL was incorporated in the District of Columbia on January 20, 1932, as the Association of Official Agricultural Chemists. On November 10, 1965, the name of the corporation was changed to the Association of Official Analytical Chemists, and on September 12, 1991, the current name was adopted.

A current Member who is no longer actively engaged, directly or indirectly, in a field relevant to the purpose of the Association but who has served the Association as a Member for at least ten (10) years shall be eligible for Retired Member status upon written request and payment of the annual Retired Member dues. Any special benefits accorded Retired Members shall be determined by the Executive Director.

[3] Student Members

Any full-time student working toward an undergraduate or graduate degree in the areas of chemistry, microbiology, food science or other related science shall be eligible for Student Membership in AOAC INTERNATIONAL.

[4] Honorary Members

Honorary Members shall be persons recognized for their substantial contribution toward the achievement of the objectives of the Association. They shall be nominated by the Board of Directors and may be elected by a two-thirds vote of the Individual Members voting.

B. Sustaining Member Organizations

A Sustaining Member Organization shall be any agency of a local, state, provincial, national, or international government; a university, college, or academic department; or any firm, business, or organization with an interest in supporting and furthering the purpose of the Association. Every Sustaining Member Organization must have a designated representative(s). All such Sustaining Member Organization representatives must meet the qualifications for Members and become Individual Members with all the rights and privileges thereof.

C. Organizational Affiliate

An Organizational Affiliate Organization shall be any agency of a local, state, provincial, national, or international government; a university, college, or academic department; or any firm, business, or organization with an interest in supporting and furthering the purpose of the Association. Every Organizational Affiliate must have a designated representative(s). All such Organizational Affiliate representatives must meet the qualifications for Members and become Individual Members with all the rights and privileges thereof.

***Section 3. Application for Membership***

Applications or requests for membership shall be submitted to the Association's headquarters office. Membership shall become effective upon approval of the application or request, payment of any required membership dues, entry on the membership rolls, and assignment of a member number.

***Section 4. Expulsion***

The Board of Directors, at any duly called meeting of the Board, by a two-thirds vote of those holding office, may terminate the membership of any member who in its judgment has violated the Bylaws or has been guilty of conduct detrimental to the best interests of the Association. Any member convicted of a felony is subject to immediate expulsion from the Association. Expulsion of a member by the Board of Directors shall be final and shall cancel all rights, interest, or privileges of such member in the services or resources of the Association. Any member, for whom expulsion is proposed, for reasons other than conviction of a felony, shall be entitled to not less than 60 days advance notice of the charges, the date upon which a hearing will be scheduled, and the right to present evidence in defense. The date and place of any such hearing, if held other than at the headquarters or annual meeting site of the Association, must be reasonable with respect to the location of any individual so charged.

***Section 5. Dues, Membership Year, and Waivers***

A. Annual dues for membership in the Association shall be fixed by the Board of Directors, subject to approval by the majority of the Individual Members voting by ballot by any of the following means (whichever is deemed appropriate by the Board at the time): mail, telephone call, telegram, cablegram, electronic mail or other means of electronic or telephonic transmission.

B. Honorary Members of the Association shall be exempt from payment of dues and annual meeting registration fees.

C. The membership year and the delinquency date shall be determined by the Board of Directors.

D. The authority to grant waivers of membership dues rests with Executive Director.

E. Student Member dues shall be one-third of regular Member dues, rounded up to the nearest $5.00 increment.

***Section 6. Members in Good Standing; Rights and Privileges***

All Individual Members who maintain their membership by payment of dues as required under these Bylaws and who otherwise qualify shall be considered in good standing and entitled to full privileges of membership.

**ARTICLE IV**
**Officers**

***Section 1. Elected Officers***

The elected officers of the Association shall be Individual Members and shall consist of a President, President-Elect, Secretary, Treasurer, and Immediate Past President.

A. President

The President shall be the principal elected officer of the Association, shall preside at meetings of the Association and of the Board of Directors and of the Executive Committee, and shall be a member ex-officio, with right to vote, of all committees except the Nominating Committee. He or she shall also, at the annual meeting of the Association and at such other times as he or she shall deem proper, communicate to the Association or the Board of Directors such matters and make such suggestions as may in his or her opinion tend to promote the welfare and further the purpose of the Association and shall perform such other

duties as are necessarily incident to the office of President or as may be prescribed by the Board of Directors.

B. President-Elect

In the absence of the President, or in the event of the President's inability or refusal to act, the President-Elect shall perform the duties of the President, and, when so acting, shall have all the powers of and be subject to all the restrictions upon the President. The President-Elect shall perform such other duties as from time to time may be assigned to him or her by the President or by the Board of Directors.

C. Secretary

The Secretary shall give notice of all meetings of the Association, keep a record of all proceedings, attest documents, and, in general, perform such other duties as are usual of the office of Secretary and such other duties as may be assigned by the President or by the Board of Directors.

D. Treasurer

The Treasurer shall be responsible for the funds and securities of the Association; serve as financial officer of the organization and as Chairperson of the Finance Committee; manage the Board of Director's review of and action related to the Board of Director's financial responsibilities; serve as the chief Board liaison in overseeing and reviewing the annual audit, and in general, perform such other duties as are usual of the office of Treasurer and such other duties as may be assigned by the President or by the Board of Directors.

E. Immediate Past President

The Immediate Past President shall serve as advisor to the President and Directors and perform such other duties as may be assigned from time to time by the President or by the Board of Directors.

***Section 2. Appointed Officers***

The appointed officers shall include the Executive Director and such other appointed officers as may be designated by the Board of Directors from time to time.

A. Executive Director

The day-to-day administration and management of the Association's offices shall be vested in a salaried manager employed or appointed by, and directly responsible to, the Board of Directors. This manager shall have the title of Executive Director with responsibility for the management and direction of all operations, programs, activities, and affairs of the Association, as approved or delegated by the Board of Directors. The Executive Director shall have direct responsibility for employment and termination of employment and the determination of compensation for staff members within the budgetary framework determined by the Board of Directors. The Executive Director functions as the chief operating officer of the Association within the guidelines established by the policies and procedures of the Board of Directors and, as necessary, with the concurrence of the President. The Executive Director shall have such other duties as may be prescribed by the Board.

B. Other Appointed Officers

Other appointed officers shall have such duties as may be prescribed by the Board.

**ARTICLE V**
**Nominations, Elections, Terms, and Appointments to the Board of Directors**

***Section 1. Nominating Committee***

The Nominating Committee shall annually recommend to the Board of Directors a slate of Individual Members as potential nominees for the elected positions where vacancies will occur. The Nominating Committee shall consist of five (5) members who shall be three (3) immediate Past Presidents, as available, and two (2) Individual Members-at-Large of the Association. If three Past Presidents are not available to serve, other Individual Members-at-Large shall be appointed by the President to the extent necessary to form the five (5)-member committee.

***Section 2. Elections and Terms of Office***

The President-Elect, the Secretary, Treasurer, and the Directors of the Board of Directors shall be elected by a majority of Individual Members voting, from a slate of nominees recommended annually by the Board of Directors.

Terms of office for all Officers and Directors shall begin with the adjournment of the annual meeting following their election and shall end with the adjournment of the annual meeting occurring nearest the expiration of their term. The six (6) Directors shall be elected to staggered three-year terms with two Directors elected to full three-year terms each year, but not to more than two (2), consecutive, three-year terms. Appointment or election to fill an unexpired term shall not affect the eligibility of a person to subsequently be elected to two (2) full terms. The Secretary shall be elected to a one-year term and may be re-elected to successive one-year terms. The Treasurer shall be elected for a one-year term and may be re-elected to successive one-year terms. The President-Elect shall be elected to a one-year term; whereupon the current President-Elect shall become President and the current President shall become the Immediate Past President, each serving a one-year term.

***Section 3. Appointments***

Directors-at-Large are appointed by the Board in accordance with Article VI, Section 2. Directors-at-Large are appointed for one (1) year terms, renewable at the discretion of the elected Board.

**ARTICLE VI**
**Board of Directors**

***Section 1. Composition***

The Board of Directors shall consist of eleven (11) elected members to include the President, President-Elect, Secretary, Treasurer, Immediate Past President, six (6) Directors, and up to three (3) appointed Directors-at-Large, all of whom shall be Individual Members of the Association. The elected Board shall reflect the makeup of the Association membership and shall not be dominated by any single interest.

***Section 2. Powers and Duties***

The Board of Directors shall provide supervision, control, and direction of the affairs of the Association, shall determine the Association's policies or changes therein within the limits of the Bylaws, shall actively prosecute

its purpose, and shall have discretion in the disbursement of its funds. It may adopt such rules and procedures for the conduct of its business as shall be deemed advisable, and may, in the execution of the powers granted, appoint such agents as it may consider necessary. The Board of Directors may appoint up to three (3) Directors-at-Large, if, in their opinion, such appointments advance the purpose of the Association. Directors-at-Large shall be accorded the same voting privileges as elected Directors.

***Section 3. Meetings***

Except that the Board shall have a regular meeting at the time and place of the annual meeting, the Board shall meet, in person or via telephone conference call, upon call of the President at such times and places as he or she may designate within the policies adopted by the Board, and shall be called to meet upon demand of a majority of its members. Notice of all meetings of the Board of Directors shall be sent by any of the following means (whichever is deemed appropriate by the President at the time): mail, telephone call, telegram, cablegram, electronic mail or other means of electronic or telephonic transmission to each member of the Board at his or her last recorded address or number at least fourteen (14) days in advance of in-person meetings or forty-eight (48) hours in advance of conference call meetings.

***Section 4. Quorum***

A quorum for any meeting of the Board is six (6) Board members elected in accordance with Article V (1). Any less number may: (1) set a time to adjourn, (2) adjourn, (3) recess, or (4) take measures to obtain a quorum.

***Section 5. Absence***

Any member of the Board of Directors unable to attend a meeting of the Board shall notify the President and state the reason for his or her absence. If a member of the Board is absent from two (2) consecutive meetings, he or she may be removed by a two-thirds vote of the Board Members then in office.

***Section 6. Compensation***

Members of the Board of Directors, as such, shall not receive any compensation for their services as Board members, but the Board may, by resolution under policies it may adopt, authorize reimbursement of expenses incurred in the performance of members' duties. Such authorization may prescribe conditions and procedures for approval and payment of such expenses. Nothing herein shall preclude a Board member from serving the Association in any other capacity and receiving compensation for such services, if compensation is customarily paid for such services.

***Section 7. Resignation or Removal***

Any member of the Board may resign at any time by giving written notice to the President, Secretary, Treasurer, or to the Board of Directors. Such resignation shall take effect at the time specified therein, or, if no time is specified, at the time of acceptance thereof as determined by the President or the Board.

Any member of the Board may be removed by a three-fourths vote of the Board members then in office and present at any regular or special meeting of the Board.

***Section 8. Vacancies: Members of the Board***

If a vacancy should occur in the membership of the elected Board of Directors, any Past President may be appointed by action of the remaining members of the Board to temporarily fill such vacancy until the next

regularly scheduled election. At the next regularly scheduled election nominations will be presented to fill the vacancy for the unexpired portion of the term remaining.

***Section 9. Vacancies: President and Other Officers***

If the office of the President shall become vacant, the President-Elect shall thereupon become President of the Association for the unexpired term, followed by his or her duly elected term. In the event the office of President becomes vacant at a time when the office of President-Elect is also vacant, the Presidency shall be filled for the remainder of the term by the action of the Board of Directors. If any other officer position shall become vacant, the office may be filled for the remainder of the term by action of the Board.

**ARTICLE VII**
**Committees**

***Section 1. Committee Formation***

The Board of Directors shall form and adopt terms of reference for such standing or special boards, committees, subcommittees, task forces, or task groups as may be required by these Bylaws or as the Board may determine necessary to carry out the affairs of the Association.

***Section 2. Committee Appointments***

Subject to the requirements of these Bylaws and the specific terms of reference adopted by the Board, the President shall make the appointments to fill the vacancies occurring in the Association's standing or special boards, committees, subcommittees, task forces, or task groups.

**ARTICLE VIII**
**Official Methods of Analysis**

The Board of Directors (BoD) is empowered to develop written policies and procedures for the study, adoption, and change in status of the Official Methods of Analysis of AOAC INTERNATIONAL. Implementation of the policies and procedures shall be delegated to an Official Methods Board (OMB).

***Section 1. Composition of the Official Methods Board***

The Official Methods Board shall consist of a chair and a vice chair, and members who are recommended by the chair. The chair, vice chair and members are appointed by the President of AOAC INTERNATIONAL. The OMB shall be composed of members representing a balance of government, industry, and academia as appropriate to the scope of the group and shall not be dominated by any single interest.

***Section 2. Purpose of the Official Methods Board***

The OMB shall serve the Association in a scientific and advisory capacity on methods and the process of their adoption. The OMB shall be responsible for implementation of procedures adopted by the BoD, according to the principles in section 3 below.

***Section 3. Principles of the Official Methods Program***

A. Adequate records of technical data, discussions, and decisions on the study, adoption, and change of status of Official Methods of Analysis shall be maintained for a reasonable time.

B. Timely notice of proposed method studies, adoption, or change in status shall be published in an Association publication that is circulated to the members.

C. Opportunity shall be provided for materially interested parties to submit input during method study and adoption procedures and to submit comments on the adoption, use of, or change in status of specific methods.

D. Methods submitted to the OMB for inclusion in the OMA shall be thoroughly studied, scientifically reviewed, and available in published form prior to adoption as Final Action by the OMB.

E. The OMB shall adopt methods as Final Action.

## ARTICLE IX
## Meetings

***Section 1. Annual Meeting***

The annual business meeting of the Association shall be held at the time and place decided by the Board of Directors. A special meeting of the entire Association may be called by the Board of Directors; announcement thereof shall be made at least thirty (30) days prior to the time of said meeting.

***Section 2. Quorum***

One hundred Individual Members who are present in person or by proxy and entitled to vote shall constitute a quorum at any meeting of the Association which is duly called pursuant to the provisions of these Bylaws.

## ARTICLE X
## Voting

***Section 1. Voting by Ballot***

By direction of the Board of Directors, unless otherwise required by these Bylaws or conducted under alternative procedures established under these Bylaws, voting on any matter, including the election of officers and directors, the election of Honorary Members, amendment of the Bylaws, and the approval of dues, may be conducted by ballot of the voting membership by any of the following means (whichever is deemed appropriate at the time): mail, telephone call, telegram, cablegram, electronic mail or other means of electronic or telephonic transmission, and the question(s) thus presented shall be determined according to the votes received, provided in each case votes of at least five (5) percent of the voting membership shall be received. Any and all action taken in pursuance of a vote by any of the means indicated above (whichever the Board deemed appropriate at the time)

in each case shall be binding upon the Association in the same manner as would be action taken at a duly called meeting and shall become effective, unless otherwise provided for in these Bylaws or otherwise stated in the ballot, on the day following certification of the vote.

***Section 2. Voting by Proxy***

At any duly called meeting of Individual Members, a member-of-record, as determined thirty (30) days prior to any meeting and who is entitled to vote, may vote by proxy executed in writing by the Individual Member or his or her duly authorized attorney-in-fact. No proxy shall be valid for more than eleven (11) months after the date of its execution unless otherwise provided in the proxy.

## ARTICLE XI
## Earnings and Assets

***Section 1. Non-Profit Status***

A. Regardless of any provision of the Bylaws which may be construed otherwise:

[1] No part of the net earnings of the Association shall under any circumstances inure to the benefit of any member or individual.

[2] The Association shall not be operated for a private profit.

B. On lawful dissolution of the Association and after settlement of all just obligations of the Association, the Board of Directors shall distribute all remaining assets of the Association to one (1) or more organizations selected by the Board of Directors which have been held exempt from Federal Income Tax as organizations described in section 501(c)(3) of the Internal Revenue Code of 1954.

***Section 2. Political Activities***

A. No substantial part of the Association's activities shall consist of carrying on propaganda or otherwise attempting to influence local, state, or national legislation. All activities of the Association shall be determined by the Board of Directors.

B. The Association shall not participate or intervene in any manner in any campaign on behalf of any candidate for a political office.

## ARTICLE XII
## Sections

***Section 1. Sections***

The Board of Directors shall set geographic limits and grant authority to groups of Individual Members of the Association residing or working in the same geographical areas for the establishment of Sections.

***Section 2. Purpose of Sections***

The purpose of Sections shall be to promote and further the purpose of the Association.

***Section 3. Membership in Sections***

Individuals interested in the purpose of the Section shall be eligible for Section membership. Only Individual Members of the Association shall be eligible for election to the Executive Committee of the Section.

***Section 4. Bylaws of Sections***

Subject to approval of the Board of Directors, each Section shall adopt, for its own governance, bylaws not inconsistent with these Bylaws.

***Section 5. Dissolution of Sections***

When any Section shall cease to function as a Section for a period of more than one year, or if its membership shall be less than ten (10) Individual Members of the Association for a period of one (1) year, the Board of Directors may terminate the existence of such Section.

***Section 6. Actions of Sections***

No act of a Section or its members shall be considered an act of the Association unless expressly authorized, ratified, or affirmed by the Board of Directors.

## ARTICLE XIII
## Technical Divisions

***Section 1. Purpose***

Technical Divisions shall represent communities of interest within the Association which have the purpose of furthering the purpose of the Association through the development of the analytical sciences either in a commodity-based or scientific discipline-based field. Their activities shall not duplicate the organizational structure nor conflict with the policies or procedures for the adoption of official methods of analysis by the Association.

***Section 2. Creation, Combination, Discontinuance, or Change***

Technical Divisions may be created, existing Technical Divisions may be combined or discontinued, or the name of a Technical Division may be changed under policies and procedures adopted by the Board of Directors. Each Technical Division shall adopt bylaws not inconsistent with these Bylaws. The jurisdiction of each Technical Division shall be described in its bylaws. No act of any Technical Division or its members shall be considered an act of the Association unless expressly authorized, ratified, or affirmed by the Board of Directors.

## ARTICLE XIV
## Indemnification

The Association shall have the power to pay, by indemnity, reimbursement, or otherwise, to or for the use of any person designated by resolution of the Board of Directors who was or is a party or is threatened to be made a party to any threatened, pending, or completed action, suit, or proceeding, whether civil, criminal, administrative, or investigative (other than an action by or on behalf of the Association), by reason of the fact he or she is or was a director, officer, committee member, employee or agent of the Association, or was serving as such for another at the request of the Association, against expenses (including legal, accounting, witness and other), judgments, fines, and amounts paid in settlement so long as such person was not found by a court of competent jurisdiction to have been willfully negligent of the interests of the Association or such person had reasonable cause to believe that his or her conduct was lawful.

**ARTICLE XV**
**Parliamentary Authority**

The rules contained in the current edition of *Robert's Rules of Order Newly Revised* shall govern the Association in all cases in which they are applicable and in which they are not inconsistent with these Bylaws or any special rules of order the Association may adopt.

**ARTICLE XVI**
**Amendments to the Bylaws**

These Bylaws may be amended, repealed, or altered, in whole or in part, by a three-fourths vote: (a) of the Individual Members at any annual business or duly called special meeting of the Association, provided notice of any amendment proposed for consideration shall be sent by any of the following means (whichever may be deemed appropriate at the time): mail, telephone call, telegram, cablegram, electronic mail or other means of electronic or telephonic transmission to the last recorded address or number of each Individual Member at least thirty (30) days prior to the date of the meeting; or (b) by approval of the Individual Members through ballot sent by any means indicated above in accordance with the provisions of Article X, Voting.

All proposed amendments of these Bylaws shall be presented in writing to the Board of Directors. The Board shall present the proposals to the Association membership, with recommendations. All amendments to the Bylaws, unless otherwise stated, will become effective at the adjournment of the meeting where action is taken or on the day following the certification of a vote by mail ballot.

# AOAC INTERNATIONAL
# POLICY ON THE USE OF THE
# ASSOCIATION NAME, INITIALS,
# IDENTIFYING INSIGNIA, LETTERHEAD, AND BUSINESS CARDS

## Introduction

The following policy and guidelines for the use of the name, initials, and other identifying insignia of AOAC INTERNATIONAL have been developed in order to protect the reputation, image, legal integrity and property of the Association.

The name of the Association, as stated in its bylaws, is "AOAC INTERNATIONAL". The Association is also known by its initials, AOAC, and by its logo, illustrated below, which incorporates the Association name and a representation of a microscope, book, and flask. The AOAC logo is owned by the Association and is registered with the U.S. Patent and Trademark Office.

AOAC INTERNATIONAL

The full Association insignia, illustrated below, is comprised of the logo and the tagline, "The Scientific Association Dedicated to Analytical Excellence," shown below. The typeface used is Largo. The AOAC tagline is owned by the Association and is registered with the U.S. Patent and Trademark office.

AOAC INTERNATIONAL

*The Scientific Association Dedicated to Analytical Excellence®*

## Policy

Policy on the use of the Association's name and logo is established by the AOAC Board of Directors as follows:

> "The Board approves and encourages reference to the Association by name, either as AOAC INTERNATIONAL or as AOAC; or reference to our registered trademark, AOAC®, in appropriate settings to describe our programs, products, etc., in scientific literature and other instances so long as the reference is fair, accurate, complete and truthful and does not indicate or imply unauthorized endorsement of any kind.
>
> The insignia (logo) of AOAC INTERNATIONAL is a registered trade and service mark and shall not be reproduced or used by any person or organization other than the Association, its elected and appointed officers, sections, or committees, without the prior written permission of the Association. Those authorized to use the AOAC INTERNATIONAL insignia shall use it only for the purposes for which permission has been specifically granted.
>
> The name and insignia of the Association shall not be used by any person or organization in any way which indicates, tends to indicate, or implies AOAC official endorsement of any product, service, program, company, organization, event or person, endorsement of which, has not been authorized by the Association, or which suggests that membership in the Association is available to any organization."

The Executive Director, in accordance with the above stated policy, is authorized to process, approve, fix rules, and make available materials containing the Association name and insignia.

It should be noted that neither the Association's name nor its insignia nor part of its insignia may be incorporated into any personal, company, organization, or any other stationery other than that of the Association; nor may any statement be included in the printed portion of such stationery which states or implies that an individual, company, or other organization is a Member of the Association.

## Instructions

1. Reproduction or use of the Association name or insignia requires prior approval by the Executive Director or his designate.

2. Association insignia should not be altered in any manner without approval of the Executive Director or his designate, except to be enlarged or reduced in their entirety.

3. Artwork for reproducing the Association name or insignia, including those incorporating approved alterations, will be provided on request to those authorized to use them (make such requests to the AOAC Marketing Department). Examples of the types of alterations that would be approved are inclusion of a section name in or the addition of an officer's name and address to the letterhead insignia.

4. When the Association name is used without other text as a heading, it should, when possible, be set in the Largo typeface.

5. Although other colors may be used, AOAC blue, PMS 287, is the preferred color when printing the AOAC insignia, especially in formal and official documents. It is, of course, often necessary and acceptable to reproduce the insignia in black.

6. Do not print one part of the logo or insignia in one color and other parts in another color.

7. The letterhead of AOAC INTERNATIONAL shall not be used by any person or organization other than the Association, its elected and appointed officers, staff, sections, or committees; except by special permission.

   Correspondence of AOAC official business should be conducted using AOAC letterhead. However, those authorized to use AOAC letterhead shall use it for official AOAC business only.

   Copies of all correspondence using AOAC letterhead or conducting AOAC official business, whether on AOAC letterhead or not, must be sent to the appropriate office at AOAC headquarters.

8. AOAC INTERNATIONAL business cards shall not be used by any person or organization other than the Association, its staff, and elected officials, except by special permission.

   Those authorized to use AOAC business cards shall use them for official AOAC business only and shall not represent themselves as having authority to bind the Association beyond that authorized.

**Sanctions**

1. Upon learning of any violation of the above policy, the Executive Director or a designate will notify the individual or organization that they are in violation of AOAC policy and will ask them to refrain from further misuse of the AOAC name or insignia.

2. If the misuse is by an Individual Member or Sustaining Member of the Association, and the misuse continues after notification, the Board of Directors will take appropriate action.

3. If continued misuse is by a nonmember of the Association or if a member continues misuse in spite of notification and Board action, ultimately, the Association will take legal action to protect its property, legal integrity, reputation, and image.

* * * * * *

Adopted by the AOAC Board of Directors: September 24, 1989
Revised: June 13, 1991; February 26, 1992; March 21, 1995; October 1996

# AOAC INTERNATIONAL
# ANTITRUST POLICY
# STATEMENT AND GUIDELINES

## Introduction

It is the policy of AOAC INTERNATIONAL (AOAC) and its members to comply strictly with all laws applicable to AOAC activities. Because AOAC activities frequently involve cooperative undertakings and meetings where competitors may be present, it is important to emphasize the on_going commitment of our members and the Association to full compliance with national and other antitrust laws. This statement is a reminder of that commitment and should be used as a general guide for AOAC and related individual activities and meetings.

## Responsibility for Antitrust Compliance

The Association's structure is fashioned and its programs are carried out in conformance with antitrust standards. However, an equal responsibility for antitrust compliance __ which includes avoidance of even an appearance of improper activity __ belongs to the individual. Even the appearance of improper activity must be avoided because the courts have taken the position that actual proof of misconduct is not required under the law. All that is required is whether misconduct can be inferred from the individual's activities.

Employers and AOAC depend on individual good judgment to avoid all discussions and activities which may involve improper subject matter and improper procedures. AOAC staff members work conscientiously to avoid subject matter or discussion which may have unintended implications, and counsel for the Association can provide guidance with regard to these matters. It is important for the individual to realize, however, that the competitive significance of a particular conduct or communication probably is evident only to the individual who is directly involved in such matters.

## Antitrust Guidelines

In general, the U.S. antitrust laws seek to preserve a free, competitive economy and trade in the United States and in commerce with foreign countries. Laws in other countries have similar objectives. Competitors (including individuals) may not restrain competition among themselves with reference to the price, quality, or distribution of their products, and they may not act in concert to restrict the competitive capabilities or opportunities of competitors, suppliers, or customers.

Although the Justice Department and Federal Trade Commission generally enforce the U.S. antitrust laws, private parties can bring their own lawsuits.

Penalties for violating the U.S. and other antitrust laws are severe: corporations are subject to heavy fines and injunctive decrees, and may have to pay substantial damage judgments to injured competitors, suppliers, or customers. Individuals are subject to criminal prosecution, and will be punished by fines and imprisonment.
Under current U.S. federal sentencing guidelines, individuals found guilty of bid rigging, price fixing, or market allocation must be sent to jail for at least 4 to 10 months and must pay substantial minimum fines.

Since the individual has an important responsibility in ensuring antitrust compliance in AOAC activities, everyone should read and heed the following guidelines.

1. Don't make any effort to bring about or prevent the standardization of any method or product for the purpose or intent of preventing the manufacture or sale of any method or product not conforming to a specified standard.

2. Don't discuss with competitors your own or the competitors' prices, or anything that might affect prices such as costs, discounts, terms of sale, distribution, volume of production, profit margins, territories, or customers.

3. Don't make announcements or statements at AOAC functions, outside leased exhibit space, about your own prices or those of competitors.

4. Don't disclose to others at meetings or otherwise any competitively sensitive information.

5. Don't attempt to use the Association to restrict the economic activities of any firm or any individual.

6. Don't stay at a meeting where any such price or anti_competitive talk occurs.

7. Do conduct all AOAC business meetings in accordance with AOAC rules. These rules require that an AOAC staff member be present or available, the meeting be conducted by a knowledgeable chair, the agenda be followed, and minutes be kept.

8. Do confer with counsel before raising any topic or making any statement with competitive ramifications.

9. Do send copies of meeting minutes and all AOAC_related correspondence to the staff member involved in the activity.

10. Do alert the AOAC staff to any inaccuracies in proposed or existing methods and statements issued, or to be issued, by AOAC and to any conduct not in conformance with these guidelines.

**Conclusion**

Compliance with these guidelines involves not only avoidance of antitrust violations, but avoidance of any behavior which might be so construed. Bear in mind, however, that the above antitrust laws are stated in general terms, and that this statement is not a summary of applicable laws. It is intended only to highlight and emphasize the principal antitrust standards which are relevant to AOAC programs. You must, therefore, seek the guidance of either AOAC counsel or your own counsel if antitrust questions arise.

* * * * *

Adopted by the AOAC Board of Directors: September 24, 1989
Revised: March 11, 1991
Revised October 1996

**AOAC INTERNATIONAL**

**POLICY AND PROCEDURES ON**

**VOLUNTEER CONFLICT OF INTEREST**

## Statement of Policy

While it is not the intention of AOAC INTERNATIONAL (AOAC) to restrict the personal, professional, or proprietary activities of AOAC members nor to preclude or restrict participation in Association affairs solely by reason of such activities, it is the sense of AOAC that conflicts of interest or even the appearance of conflicts of interest on the part of AOAC volunteers should be avoided. Where this is not possible or practical under the circumstances, there shall be written disclosure by the volunteers of actual or potential conflicts of interest in order to ensure the credibility and integrity of AOAC. Such written disclosure shall be made to any individual or group within the Association which is reviewing a recommendation which the volunteer had a part in formulating and in which the volunteer has a material interest causing an actual or potential conflict of interest.

AOAC requires disclosure of actual or potential conflicts of interest as a condition of active participation in the business of the Association. The burden of disclosure of conflicts of interest or the appearance of conflicts of interest falls upon the volunteer.

A disclosed conflict of interest will not in itself bar an AOAC member from participation in Association activities, but a three-fourths majority of the AOAC group reviewing the issue presenting the conflict must concur by secret ballot that the volunteer's continued participation is necessary and will not unreasonably jeopardize the integrity of the decision-making process.

Employees of AOAC are governed by the provision of the AOAC policy on conflict of interest by staff. If that policy is in disagreement with or mute on matters covered by this policy, the provisions of this policy shall prevail and apply to staff as well.

## Illustrations of Conflicts of Interest

1. A volunteer who is serving as a committee member or referee engaged in the evaluation of a method or device; who is also an employee of or receiving a fee from the firm which is manufacturing or distributing the method or device or is an employee of or receiving a fee from a competing firm.

2. A volunteer who is requested to evaluate a proposed method or a related collaborative study in which data are presented that appear detrimental (or favorable) to a product distributed or a position supported by the volunteer's employer.

3. A referee who is conducting a study and evaluating the results of an instrument, a kit, or a piece of equipment which will be provided gratis by the manufacturer or distributor to one or more of the participating laboratories, including his or her own laboratory, at the conclusion of the study.

4. Sponsorship of a collaborative study by an interest (which may include the referee) which stands to profit from the results; such sponsorship usually involving the privilege granted by the investigator to permit the sponsor to review and comment upon the results prior to AOAC evaluation.

5. A volunteer asked to review a manuscript submitted for publication when the manuscript contains information which is critical of a proprietary or other interest of the reviewer.

The foregoing are intended as illustrative and should not be interpreted to be all-inclusive examples of conflicts of interest AOAC volunteers may find themselves involved in.

## Do's and Don'ts

Do avoid the appearance as well as the fact of a conflict of interest.

Do make written disclosure of any material interest which may constitute a conflict of interest or the appearance of a conflict of interest.

Do not accept payment or gifts for services rendered as a volunteer of the Association without disclosing such payment or gifts.

Do not vote on any issue before an AOAC decision-making body where you have the appearance of or an actual conflict of interest regarding the recommendation or decision before that body.

Do not participate in an AOAC decision-making body without written disclosure of actual or potential conflicts of interest in the issues before that body.

Do not accept a position of responsibility as an AOAC volunteer, without disclosure, where the discharge of the accepted responsibility will be or may appear to be influenced by proprietary or other conflicting interests.

## Procedures

Each volunteer elected or appointed to an AOAC position of responsibility shall be sent, at the time of election or appointment, a copy of this policy and shall be advised of the requirement to adhere to the provisions herein as a condition for active participation in the business of the Association. Each volunteer, at the time of his or her election or appointment, shall indicate, in writing, on a form provided for this purpose by AOAC, that he or she has read and accepts this policy.

Each year, at the spring meeting of the AOAC Board of Directors, the Executive Director shall submit a report certifying the requirements of this policy have been met; including the names and positions of any elected or appointed volunteers who have not at that time indicated in writing that they have accepted the policy.

Anyone with knowledge of specific instances in which the provisions of this policy have not been complied with shall report these instances to the Board of Directors, via the Office of the Executive Director, as soon as discovered.

* * * * * *

Adopted: March 2, 1989
Revised: March 28, 1990
Revised: October 1996

The Scientific Association Dedicated to Analytical Excellence®

# AOAC INTERNATIONAL

## TERMS OF REFERENCE

**I. NAME:**

OFFICIAL METHODS BOARD (OMB)

**II. MISSION:**

*To serve the Association in a scientific and advisory capacity on standards and methods with ethical, timely, open and independent scientific oversight for the implementation of standards development and conformity assessment policies and procedures of AOAC INTERNATIONAL.*

**III. RESPONSIBILITIES:**

To provide ethical, timely, open and independent scientific oversight for the policies and procedures of AOAC INTERNATIONAL.

To approve "Final Action" status for First Action Methods (new and revised) following a proactive review;

To repeal methods, if necessary, in accordance with established policies and procedures;

To participate in addressing appeals and requests for action or guidance, and in resolving disputes;

To endorse and monitor all voluntary consensus panels for appropriate representation and balance of stakeholders' perspectives;

To endorse and monitor all volunteer subject matter experts for volunteer conformity assessment activities;

To adopt and monitor scientific and technical guidance and references;

To acknowledge outstanding scientific and technical volunteer activity and achievement within AOAC;

To actively participate in AOAC standards development activities and maintain and communicate explicit knowledge of AOAC standards development and conformity assessment;

**IV. COMPOSITION AND ORGANIZATION:**

The Official Methods Board shall consist of up to 13 voting members including a Chair, a Vice-chair, the Chair of the Committee on Safety and the Chair of the Committee on Statistics. The Committee on Safety and the Committee on Statistics may contain co-chairs. The co-chairs for these committees represent one vote on the OMB. Members of the OMB may serve in multiple volunteer roles for the benefit of the Association. The Chair of the Official Methods Board shall have previously served as a member of the Official Methods Board. The Chair, Vice-chair, and members of the Official Methods Board including the chairs of standing committees shall be appointed for a term of three years. A member of the OMB may be reappointed upon the recommendation of the Chair of the Official Methods Board with a maximum term of service of six (6) years. Exceptions may be made at the discretion of the President. The Chair of the Official Methods Board is eligible to serve an additional post chair term of up to three (3) years as an *ex-officio* member. Members of the Official Methods Board must be members of AOAC.

All members of the Official Methods Board are recommended by the Chair and appointed by the President. All Official Methods Board members serve at the pleasure of the President.

The Official Methods Board represents the membership of AOAC INTERNATIONAL. It shall be composed of members representing a balance of scientific expertise, government, industry, and academia as appropriate to the scope of the Board. Every effort should be made to include international representation on the Board.

Additional working groups, task forces, and other appropriate subgroups shall be appointed as needs arise by the Chair of the Official Methods Board.

**V. STAFF LIAISON:**

The Executive Director shall assign a member of the staff to serve as staff liaison.

**VI. REVIEW SCHEDULE:**

Every three years.

**VII. DATE ESTABLISHED:**

Renamed in 1981

**VIII. DATES REVIEWED**

01/08,

**IX. DATES REVISED:**

9/89; 5/90; 1/91; 8/06;
02/07; 07/07; 2/08; 4/13; 8/13

*OMB consensus on January 29, 2013*
*AOAC INTERNATIONAL Board of Directors: Approval on April 26, 2013*
*OMB consensus on August 8, 2013*
*AOAC INTERNATIONAL Board of Directors Approval on August 25, 2013*

# OFFICIAL METHODS BOARD TELECONFERENCE

## Thursday, November 10, 2016

***1:00pm – 2:30pm ET***

## DRAFT MEETING AGENDA

**I. PRELIMINARY ITEMS**

a. Welcome and Introductions *(Crowley)*
b. Welcome New Members *(Crowley)*
c. Call to Order /Announcements *(Crowley)*
d. Review of Policy Documents/Terms of Reference *(Crowley)*
e. Review of Draft Agenda* *(Crowley)*
f. Review of September 22, 2016 OMB Meeting Draft Minutes* *(Crowley)*
g. Review of October 13, 2016 OMB Teleconference Draft Minutes* *(Crowley)*

**II. AOAC STANDARDS DEVELOPMENT & CONFORMITY ASSESSMENT ACTIVITIES**

a. Proposal for ERP for SPDS Methods – Lutein and Turmeric *(Crowley/Coates)*
b. OMB Liaison's Report to OMB *(Crowley/McKenzie)*
c. Proposal for AOAC Experts in AOAC *Performance Tested Methods*$^{SM}$ Program *(Crowley/McKenzie)*

**III. ADJOURNMENT**

**Upcoming Meetings**

*AOAC ERP for Microbiology Methods for Foods and Environmental Surfaces*
*December 12, 2016*
*AOAC Headquarters*
*Rockville, MD*

*AOAC ERP for Gluten Assays*
*December 12, 2016*
*AOAC Headquarters*
*Rockville, MD*

*AOAC INTERNATIONAL Board of Directors*
*December 13-14, 2016*
*AOAC Headquarters*
*Rockville, MD*

*AOAC SPDS Advisory Panel*
*December 15, 2016*
*AOAC Headquarters*
*Rockville, MD*

*AOAC ERP for SPDS Methods – Lutein and Turmeric*
*December 15, 2016*
*AOAC Headquarters*
*Rockville, MD*

*AOAC INTERNATIONAL Mid-Year Meeting*
*March 13-17, 2017*
*Gaithersburg Marriott Washingtonian Center*
*Gaithersburg, MD*

**** Items that require or may require a vote***

# AOAC OFFICIAL METHODS BOARD
# MEETING IN DALLAS, TEXAS (AOAC ANNUAL MEETING)
**September 22, 2016**
*10:00pm – 6:00pm ET*
## DRAFT MEETING MINUTES

**OMB MEMBERS** *(present during all or part of the meeting)*

| | | |
|---|---|---|
| Erin Crowley | Q Laboratories | Chair |
| Douglas Abbott | Independent Consultant | Member |
| Joe Boison | Canadian Food Inspection Agency | Member |
| Amy Brown | Florida Dept. of Agriculture and Consumer Services | Member |
| Esther Campos Giménez | Nestlé Research Centre | Member |
| Don Gilliland | Abbott Nutrition | Member |
| Katerina Mastovska | Covance | Member |
| Wendy McMahon | Mérieux NutriSciences | Member |
| Yvonne Salfinger | Independent Consultant | Member |
| Brad Stawick | Microbac | Member |

**OMB MEMBERS ABSENT** *(without proxy)*

| | | |
|---|---|---|
| Melissa Phillips | US NIST | Member |
| Shauna Roman | Reckitt Benckiser | Past Chair (ex officio) |

**GUESTS, OBSERVERS, AND BOARD OF DIRECTORS** *(present during all or part of the meeting)*

| | | |
|---|---|---|
| Qian Graves | US FDA CFSAN | Former OMB Liaison |
| Darryl Sullivan | Covance | Board Secretary |
| John Szpylka | Mérieux NutriSciences | Observer |
| Sarwar Gilani | Health Canada (Ret'd) | Editorial Board Chair |
| Joe Betz | US National Institutes of Health | Editorial Board Member |
| Paula Brown | British Columbia Institute of Technology | Editorial Board Member |
| Steven Dentali | Herbalife | Editorial Board Member |
| Anthony Hitchins | US FDA (retired) | Editorial Board Member |
| Nancy Thiex | SDSU (retired) | Section Editor |

**AOAC STAFF** *(present during all or part of the meeting)*

| | |
|---|---|
| Delia Boyd | Deborah McKenzie |
| Scott Coates | Robert Rathbone |
| Jennifer Diatz | |

**I. INTRODUCTORY ITEMS**

a. Call to Order/Introductions/Announcements
Crowley called the meeting to order at 10:05am CT.

b. Crowley called OMB's attention to the AOAC policy documents and reminded all attendees to review the documents and that the meeting will be held according to these policies.

c. Review and Approval of Draft Meeting Agenda
**MOTION:** For OMB to approve the agenda as presented.
Abbott moved and Salfinger seconded. Consensus: Unanimous.

d. Review and Approval of September 8, 2016 OMB teleconference minutes.

**MOTION:** For OMB to approve the minutes as presented.
Salfinger moved and Gilliland seconded. Consensus: Unanimous.

e. Update on OMB Report to the Board of Directors.
Crowley shared the update on the OMB Report to the AOAC INTERNATIONAL Board of Directors.

f. Update on OMB Report to the Annual Business Meeting.
Crowley shared the update on the OMB Report to the AOAC Annual Business Meeting.

g. Update from Executive Office and AOAC INTERNATIONAL Board of Directors.
Sullivan and McKenzie provided an update on the AOAC INTERNATIONAL Board of Directors meeting and Executive Office affairs.

## II. OMB ORIENTATION

a. McKenzie reviewed the Section VIII (Official Methods Board) of the Bylaws and the OMB Terms of Reference. Additionally, she provided an orientation for OMB of AOAC policies, procedures, and processes for standards development and conformity assessment activities and OMB Awards.

b. McKenzie noted the following documents that will require revision by OMB:
   a. Selection of New OMB Members policy document
   b. Selection of Vice Chair

**ACTION ITEMS:**

a. Staff to add Orientation to a future OMB agenda to finish reviewing.
b. Staff to discuss internally the concerns raised by Editorial Board members regarding submission of quality manuscripts to the journal resulting from stakeholder panels and ERP efforts and the ERP members' participation in Journal peer review process of method papers.
c. Staff will then be discuss the status and any proposals to address any new or unresolved issues with OMB and Editorial Board.

## III. OFFICIAL METHODS BOARD MEETINGS

a. OMB Meeting Times

- OMB discussed if the second Thursday of the month worked for OMB teleconferences. OMB agreed to try it for October 13, 2016 at 1:00pm – 2:30pm ET
  **ACTION ITEM**: Schedule OMB teleconference for October 13, 2016 at 1:00pm ET

- OMB discussed the timing of in person meetings and options to the current set up. OMB decided on the following:
  - Winter meeting
  - Spring/Summer (June) meeting that may be optional
  - Annual Meeting – half day (9am – 1pm)

b. **OFFICIAL METHODS BOARD & EDITORIAL BOARD**

c. OMB Working Group on Method Format
Coates provided an update and offered to reinitiate the working group; however, a volunteer champion would be needed.
Members volunteered included: Roman, Brown (Paula), Gilliland, Betz, Boison, Mastovska, Crowley, Brown (Amy), and Coates.
**ACTION ITEMS:**

- Invite chair of Committee on Statistics to participate on working group.
- Paula Brown agreed to chair the working group.

d. OMB Working Group on Candidate Methods

e. Crowley and McKenzie briefed the group on the topic and the work of the working group to date. Both groups discussed some of the concerns which ranged from needing to clarify SMPRs, to length

of time to optimize and submit methods, to including working group chairs in ERP discussions, to implementing a method author webinar as in support of the issued Call for Methods. McKenzie reminded the group that multiple approaches will be needed to support the goals of increasing method submissions and increasing the number of eligible First Action OMA candidates.

**ACTION ITEMS:**

- Confirm Roman chairing the group and reconvene working group
- Include examples in the documentation for each situation
- Staff to consider offering a method author webinar to accompany Call for Methods

**IV. ADJOURNMENT**

a. Meeting adjourned on Thursday, September 22, 2016 at 3:38pm CT with unanimous consent.

# AOAC OFFICIAL METHODS BOARD TELECONFERENCE

**October 13, 2016**

*1:00pm – 2:30pm ET*

## DRAFT MEETING MINUTES

**OMB MEMBERS** *(present during all or part of the meeting)*

| | | |
|---|---|---|
| Erin Crowley | Q Laboratories | Chair |
| Douglas Abbott | Independent Consultant | Member |
| Joe Boison | Canadian Food Inspection Agency | Member |
| Amy Brown | Florida Dept. of Agriculture and Consumer Services | Member |
| Esther Campos Giménez | Nestlé Research Centre | Member |
| Don Gilliland | Abbott Nutrition | Member |
| Katerina Mastovska | Covance | Member |
| Wendy McMahon | Mérieux NutriSciences | Member |
| Yvonne Salfinger | Independent Consultant | Member |
| Brad Stawick | Microbac | Member |

**OMB MEMBERS ABSENT** *(without proxy)*

| | | |
|---|---|---|
| Melissa Phillips | US NIST | Member |
| Shauna Roman | Reckitt Benckiser | Past Chair-Ex-Officio |

**GUESTS, OBSERVERS, AND BOARD OF DIRECTORS** *(present during all or part of the meeting)*

| | | |
|---|---|---|
| Sneh Bhandari | Mérieux NutriSciences | Former OMB Liaison |

**AOAC STAFF** *(present during all or part of the meeting)*

Delia Boyd
Deborah McKenzie

**I. INTRODUCTORY ITEMS**

a. Call to Order/Introductions/Announcements
Roman called the meeting to order at 1:03pm ET.

b. Crowley called OMB's attention to the AOAC policy documents and reminded all attendees to review the documents and that the meeting will be held according to these policies.

c. Review and Approval of Draft Meeting Agenda
**MOTION:** For OMB to approve the agenda as amended.
Abbott moved and Brown seconded. Consensus: Unanimous.
**ACTION ITEM**: To add SPDS ERP Proposal.

d. Update on September 22, 2016 OMB meeting minutes.
McKenzie briefed the OMB that the OMB minutes were still being drafted and would be ready for the November teleconference.
**ACTION ITEM**: Add this item to November teleconference.

**II. AOAC STANDARDS DEVELOPMENT & CONFORMITY ASSESSMENT**

a. Brown and Bhandari provided an update on the activities that took place as part of SPDS meeting.

b. Bhandari, Gilliland, and McKenzie provided an update on the activities that took place as part of the SPIFAN Meeting.

c. McKenzie provided and update on the SPDS WG Meetings for free amino acids, ginger, and vitamin K.

d. Brown, Bhandari, and McKenzie provided an update on the activities that took place as part of the SPSFAM Meeting.

e. Crowley and McKenzie provided an update on the activities that took place as part of the ISPAM Meeting.

f. Bhandari provided an update on the ERP meeting for SPSFAM Ethanol in Kombucha Methods.

g. Bhandari provided an update on the ERP meeting for SPSFAM Select Food Allergen Methods.

h. Bhandari and Boison provided updates on the ERP meeting for Gluten Assays.

i. McKenzie provided an update on the ERP meeting for Fertilizer Methods.

j. Bhandari, Gilliland, and Boyd provided updates on the ERP meeting for SPIFAN Nutrient Methods. McKenzie and Boyd provided an update on the ERP meeting for SPIFAN Whey Protein-Casein Ratio Methods.

k. Salfinger and McMahon provided an updated on the ERP meeting for Microbiology Methods.

l. McKenzie provided an update on activities of the Committee on Statistics during the Annual Meeting.

**III. REVISED ROSTER**

a. McKenzie presented a revised Official Methods Board roster to include Sidney Sudberg of Alkemist Labs as Chair of the Committee on Statistics for OMB consensus approval.
**MOTION:** For OMB to approve the revised OMB roster as presented.
Stawick moved and Mastovska seconded. Consensus: Unanimous.
**ACTION ITEM**: Staff to present revised roster to AOAC President for review and appointment of Sudberg.

**IV. PROPOSAL FOR ERP FOR SPDS METHODS**

a. McKenzie introduced the proposal for the formation of an AOAC ERP for SPDS Methods – Lutein and Turmeric.
**ACTION ITEM**: Staff to ask Scott Coates to review the recommended candidates with OMB.

**V. ADJOURNMENT**

a. Meeting adjourned on Thursday, October 13, 2016 at 2:29pm ET with unanimous consensus on the following motion.
**MOTION:** To adjourn the meeting.
Salfinger moved and McMahon seconded. Consensus: Unanimous

# Stakeholder Panel on Dietary Supplements

## Expert Review Panel for SPDS Ingredients:

## Collagen, Lutein, Turmeric

## PROPOSED CANDIDATES

Expected to Convene:
December 15, 2016
**AOAC INTERNATIONAL HEADQUARTERS**
Rockville, Maryland

**AOAC INTERNATIONAL**
2275 Research Blvd, Suite 300
Rockville, Maryland 20850
Phone: (301) 924-7077

# Stakeholder Panel on Dietary Supplements

# Expert Review Panel for Set 4 Ingredients

**TABLE OF CONTENTS**

**AOAC INTERNATIONAL: Expert Review Panel for SPDS Ingredients: Collagen, Lutein and Turmeric**

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**LIST OF METHODS:**

**LUT-01:** *Determination of Lutein and Zeaxanthin Esters and Their Geometric Isomers in Carotenoid Ester Concentrates Used as Ingredients in Nutritional Supplements: Validation of a Combined Spectrophotometric-HPLC Method.*
Wagner O. Lombeida, FernandoRubio, and Luis W. Levy. INEXA, Industria Extractora C.A., PO Box 17-03-4581, Quito, Ecuador

**TUR-01:** *Curcuminoids in Turmeric Roots and Supplements: Method Optimization and Validation*
Elizabeth Mudge, Michael Chan, Sylesh Venkataraman, Paula Brown

Note: As of 10/12/2016, no methods have been submitted for Collagen. The call for Methods ends on Friday, October 14 so we would ask that the OMB please consider the collagen ERP proposed below as well as we are expecting at least one submission.

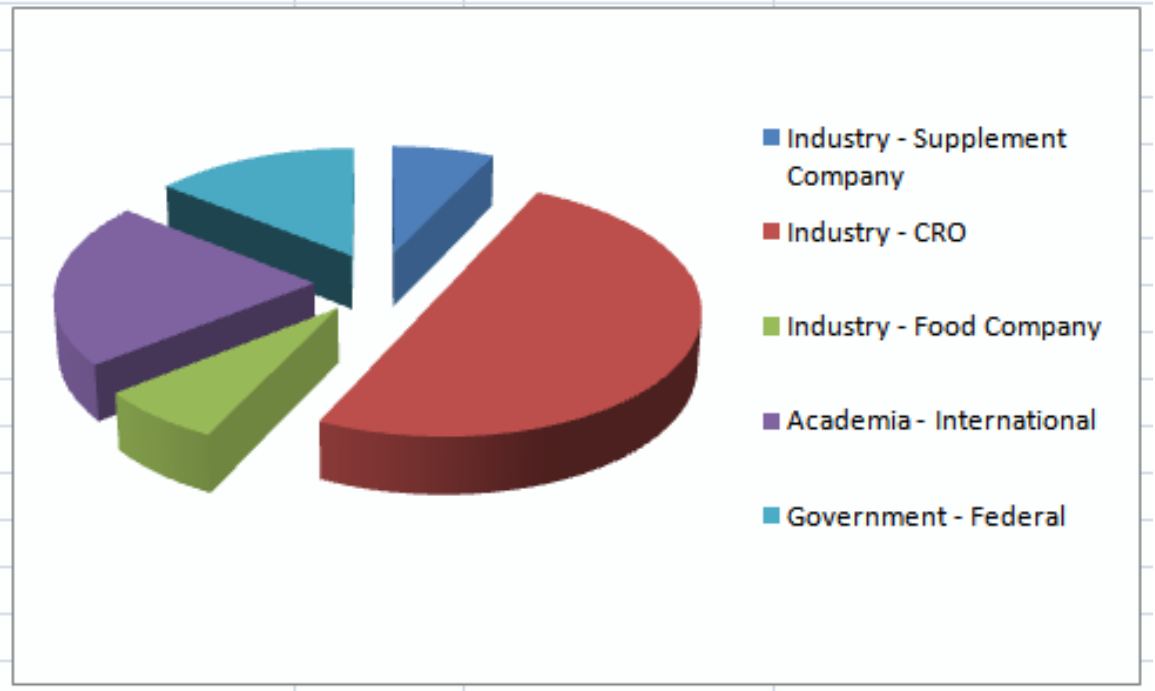
**All Applicants**

| First | Last | Organization | Country |
|---|---|---|---|
| Jason | Cooley | BioCell Technology, LLC | USA |
| Neal | Craft | Craft Technologies, Inc | USA |
| Nour Eddine | ES-SAFI | Mohammed V University in Rabat | MOROCCO |
| AJAI | GUPTA | INDIAN INSTITUTE OF INTEGRATIVE MEDICINE (IIIM-CSIR), CANAL ROAD, | INDIA |
| Holly | Johnson | Alkemist Labs | USA |
| Melissa | Phillips | NIST | USA |
| Elizabeth | Mudge | BCIT | Canada |
| Lars | Reimann | Eurofins | USA |
| Catherine | Rimmer | nist | USA |
| Aniko | Solyom | GAAS Analytical | USA |
| Darryl | Sullivan | Covance | USE |
| Hong | You | Eurofins | USA |
| Yang | Zhou | Eurofins | USA |

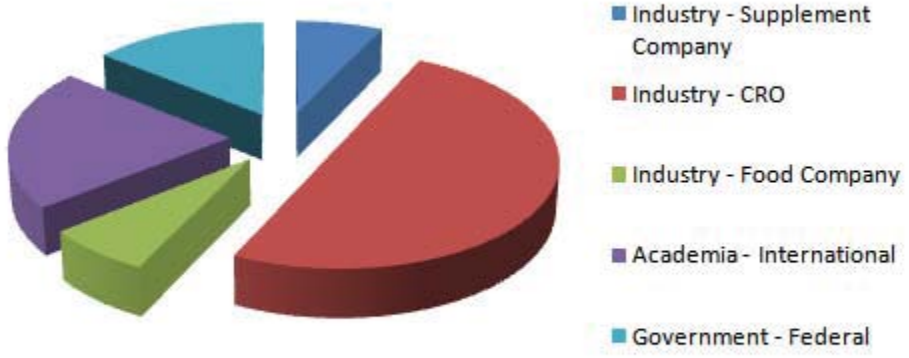
# Proposed ERP Rosters

| 1 | **Chair: Darryl Sullivan, Covance** | | |
|---|---|---|---|
| | Collagen | Lutein | Turmeric |
| 2 | Jason Cooley | Neal Craft | Neal Craft |
| 3 | Nour Eddine Es-Safi | Nour Eddine Es-Safi | Nour Eddine Es-Safi |
| 4 | Ajai Gupta | Ajai Gupta | Ajai Gupta |
| 5 | Lars Reimann | Holly Johnson | Holly Johnson |
| 6 | Yang Zhou | Elizabeth Mudge | Melissa Phillips |
| 7 | | Catherine Rimmer | Elizabeth Mudge |
| 8 | | Aniko Solyom | Catherine Rimmer |
| 9 | | Hong You | Aniko Solyom |
| 10 | | Yang Zhou | |
| 11 | | | |
| | | | |

# Major Perspectives




# Specific Perspectives



## AOAC SPDS ERP: Collagen, Lutein, and Turmeric: Statements of Expertise

(Clickable Page Nos)

| First | Last | Org | Collagen/Lutein/Turmeric? | Please provide a brief (1-2 paragraph)summary of your expertise below. | Full CV On Page |
|---|---|---|---|---|---|
| Jason | Cooley | BioCell Technology, LLC | Collagen | I have worked at Biocell Technology for almost a year now with a primary thrust in my job being understanding collagen from a biochemical, analytical and regulatory standpoint. | 8 |
| Neal | Craft | Craft Technologies, Inc | Lutein<br>Turmeric | I own a laboratory that specializes in these types of analysis. I have 30 years of carotenoid and pigment analysis, method development, and publications. Previously employed at USDA-BHNRC and NIST. Have served on many AOAC ERPs, CDC methods review, and NIH ODS program review. CTI Nutrition Lab performs thousands of these samples annually, often for other contract labs. | 17 |
| Nour Eddine | ES-SAFI | Mohammed V University in Rabat | Collagen<br>Lutein<br>Turmeric | I am currently working as a full professor at Mohammed V University in Rabat, Morocco. I am the head of the Team of Organic Chemistry and the Physico-Chemical Studies.and the Deputy Director of the Ecole Normale Supérieure, Rabat, Morocco. My research focuses on natural products, especially polyphenols, their antioxidant activity and their role in food technology, their organoleptic properties and their beneficial effects for human health. As an analytical chemist, my expertise is with the technologies and the methods used for the detection, the qualitative and the quantitative analysis of the ingredients. | 19 |
| AJAI | GUPTA | INDIAN INSTITUTE OF INTEGRATIVE MEDICINE (IIIM-CSIR), CANAL ROAD, JAMMU-180001 | Collagen<br>Lutein<br>Turmeric | I did my PhD from Central Institute of Medicinal Plants, (CIMAP-CSIR), Lucknow, India under the guidance of Dr Madan M. Gupta. My research work abreasted me with method development for bioactive constituents of various medicinal and aromatic plants. During my research, I got hands on training on LCMS, HPLC, HPTLC, NMR, GC-MS etc. I am working in the area of method development, validation & analysis of tissue culture samples and bioactive constitutions of microbes and medicinal plants. My area of expertise also includes pharmo-kinetics & pharmo-dynamics (PKPD) studies of samples, drug metabolites, mechanistic study, through HPLC, HPTLC and LC-MS/MS. I am Jammu & Kashmir FDA approved Quality Assurance person till 2019. I am also involved in quality assurance of nine cGMP grade herbal formulations and monograph preparations for various Pharmacopeia. During my eighteen years of post doctorate scientific tenure, I have published more than 85 papers in refereed journals with a total citation of 1331, written 8 book chapters credited with and 7 patents. I have attended 23 national & International Conferences and delivered 18 invited talks in various fields in India and abroad. Beside knowledge and satisfaction, my work has fetched 10 best paper awards and Editorial board member and reviewer of various International Journals of repute. | 80 |
| Holly | Johnson | Alkemist Labs | Lutein<br>Turmeric | I took my Ph.D. in Pharmacognosy at University of Illinois - Chicago's College of Pharmacy and have been working in natural products chemistry for 19 years. I was awarded an NIH NRSA Fellowship in the NIH/UIC Center for Botanical Dietary Supplements and have a special interest in development & validation of analytical methods to meet the regulatory needs of the complex modern supplements industry. I am the Laboratory Director for Alkemist Labs, an independent testing lab serving the natural products industry. AOAC's SPDS is playing a vital role in vetting valid methods for rugged routine Quality & Safety testing and I am happy to contribute to the process. | 32 |
| Melissa | Phillips | NIST | Turmeric | Extensive experience in analytical method development and bias evaluation. Co-advisor on NIST methods for determining curcuminoids in turmeric SRMs, and provided oversight for the certification of these materials. | 35 |

## AOAC SPDS ERP: Collagen, Lutein, and Turmeric: Statements of Expertise

| First | Last | Org | Collagen/Lutein/Turmeric? | Please provide a brief (1-2 paragraph)summary of your expertise below. | Full CV On Page |
|---|---|---|---|---|---|
| Lars | Reimann | Eurofins | Collagen | I have over the past 40 years worked with varying ways of characterizing proteins ranging from sizing, antigenic properties, enzymatic susceptibility and amino acid sequences to mention a few. | 53 |
| Catherine | Rimmer | nist | Lutein<br>Turmeric | Regularly involved in AOAC standards development activities. | 54 |
| [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | 102 |
| Aniko | Solyom | GAAS Analytical | Lutein<br>Turmeric | I have more than 30 years of comprehensive experience in analytical method development and validation, using a wide variety of analytical techniques. My expertise is in development and validation of analytical methods with particular emphasis on HPLC, LC-MS applications and bioactivity guided preparative separation of complex mixtures and analysis of biological samples and dietary supplements. In addition to HPLC technique I have significant experience with atomic absorption spectroscopy (AA), inductively coupled plasma emission spectroscopy (ICP), photoacoustic spectroscopy (PA), UV-Vis spectroscopy, elemental analysis, mass spectrometry (MS), gas chromatography (GC), GC-MS, LC-MS, NMR and wet techniques.<br>Before founding GAAS Corporation/GAAS Analytical, I served as director of the Analytical Core at an NIH funded Botanical Center (Arizona Center for Phytomedicine Research). The Facility focused on quantitation and identification of natural products and dietary supplements, particularly anti-inflammatory compounds from turmeric, ginger and boswellia. I developed methods to analyze these compounds from the plant materials, extracts, commercially available dietary supplements and from different biological matrices. I also developed and validated new assay methods according to cGLP regulations, to quantify novel cancer drugs in plasma and urine using QQQ LC/MS technique; identifying metabolites of new cancer drugs in plasma and urine using TOF LC/MS technique and calculating pharmacokinetic parameters.<br>I am an active member of AOAC International; I joined the organization in 2002. Currently I am member of AOAC's Stakeholder Panel on Dietary Supplements and member of various working groups. I have participated in multiple AOAC organized collaborative studies (glucosamine, ginkgo, saw palmetto) in order to validate analytical methods to be used by the dietary supplement industry. I was Horwitz advisor of AOAC until the restructuring the Official Methods of Analysis (OMA) process in January 2008, when the role of method advisors and Horwitz advisors was retired. For 5 years I have been serving as member of the Presidential Task Force on Dietary Supplements of AOAC, and also served as member of Expert Review Panels of AOAC. I was selected in June 2015 to serve a 5 year term as the member of USP's Non-botanical Dietary Supplements Expert Committee. | 65 |
| Hong | You | Eurofins | Lutein | My name is Dr. Hong You and I am a principal scientist at Eurofins Dietary Supplement Analysis Center. I am willing to serve the ERP of Lutein and provide my opinions to the method developers as a reviewer. I have 5 years of experience in analyzing provitamin A carotenoids and non-provitamin xanthrophylls in different matrices. I am one of the carotenoid analysts of the Africa Biofortified Sorghum (ABS) Project. I also have developed HPLC methods which can simultaneously separate, identify and quantify colored (xanthophylls, carotenes, and their isomers) and colorless (phytoene, phytofluene and their isomers) carotenoids in one run. I believe I am a well-qualified candidate for this role, and I look forward to hearing from you. | 93 |
| Yang | Zhou | Eurofins Scientific Inc. | Collagen<br>Lutein | I have a Ph.D. degree in biochemistry & biophysics plus three years postdoc and five years industry experience in analytical and nutrition analysis. I developed quantitative methods for collagen and carotenoids (including lutein) analysis in various matrices. I served as stakeholder of SPSFAM during 13-15 and am very familiar with various analytical techniques including HPLC, UV/VIS, ELSD/FLD, LC-MSMS etc. | 97 |

| | | | | | |
|---|---|---|---|---|---|
| Darryl | Sullivan | Covance Laboratories | Collagen, Lutein, Turmeric | Darryl Sullivan is a Fellow of AOAC and has been an active member since 1980. He has served terms as secretary, president-elect, president, past president, and director of the Board of Directors, and previously served a three-year term as chair of the Official Methods Board, and is currently serving as Chair of the AOAC Stakeholder Panel on Infant Formula and Adult Nutritionals. In 2012 Darryl lead a very successful AOAC engagement with government and industry thought leaders in India and China on behalf of SPIFAN. He is also active with the Stakeholder Panel for Strategic Food Analytical Methods and the Stakeholder Panel for Agent Detection Assays. Sullivan also served a three-year term as a director on the AOAC Research Institute Board of Directors. He was a founding member and chair of the Presidential Task Force on Dietary Supplements and a member of the Task Force on Bacillus anthracis, as well as the AOAC Task Force on Nutrition Labeling and the AOAC Task Force on Sulfites. Prior to chairing the OMB, he served as a member and chair of the Methods Committee on Commodity Foods and Commodity Products. Sullivan was a founding member of the AOAC Technical Division on Reference Materials and served three terms on the Division's Executive Board. He has also presented a significant number of papers on behalf of AOAC at other scientific meetings in many different parts of the world. | | 113 |
| Elizabeth | Mudge | BCIT | Lutein, Turmeric | I have been working in the natural product industry for over five years. I am currently a Research Associate with the British Columbia Institute of Technology's Natural Health & Food Products Research Group. I have a strong background in analytical chemistry and instrumental analysis and my work focuses on the development, optimization and validation of methods for natural health products, dietary supplement and natural plant toxins. I have extensive experience in evaluating method performance and determining suitable characteristics according to AOAC requirements for validations. During my appointment at BCIT, I have completed several single laboratory validations according to AOAC protocols. | | 120 |

**Jason W. Cooley, PhD** **Curriculum Vitae**


CONTACT INFORMATION

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*E-mail:* Jason@biocelltechnology.com


RESEARCH INTERESTS

**Collagen Research and regulatory issue**, Analysis of membrane protein structure and function: intramembrane proteolysis, Alzheimer's disease, Photosynthesis, Bioenergetics, deep-UV resonance Raman, electron paramagnetic spectroscopy, lateral membrane equilibration, lipid raft formation, plant host defense responses, cyanobacterial physiology.

NON-ACADEMIC APPOINTMENTS

**Research and Business Development Scientist** Nov 2015 to present
BioCEll Technology, LLC

ACADEMIC APPOINTMENTS

**Assistant Professor** July 2007 to August 2015
Department of Chemistry, University of Missouri
- Other Affiliations:
  - Interdisciplinary Plant Sciences Core Faculty

**Postdoctoral Researcher** June 2001 to September 2006
Department of Biology, University of Pennsylvania
Supervisor: Professor Fevzi M. Daldal
- National Institute of Health-NIGMS (Individual Postdoctoral Research Award (NRSA))
  - "Factors Affecting the Domain Movement in the $bc_1$ Complex" (grant #1F32GM065791)
- American Heart Association (Individual Postdoctoral Research Fellowship)
  - "Protein Dynamics Mediated Regulation of the Cytochrome $bc_1$ Complex" (grant #0425515U)

EDUCATION

**Doctoral Studies: Arizona State University** September 1996 to April 2001

Ph.D., Plant Biology (now: School of Life Sciences (SOLS)), August 2001
- Thesis Topic: *Characterization of a succinate dehydrogenase complex and respiratory electron transport in Synechocystis sp. PCC 6803*
- Adviser: Professor Willem F. J. Vermaas, Wim@asu.edu
- Area of Study: Photosynthesis/Molecular Biology

**Bachelor Studies: Humboldt State University**, Arcata, CA

B.S., Botany/Biology, June 1996

AWARDS

**National Science Foundation**
- Graduate Research Trainee Fellowship (now IGERT), Early Events in Photosynthesis, 1996–2001
- NSF/DOE award to attend Microbial Physiology Workshop at Ohio State University, Summer 1999

**National Institute of Health**
- Individual Postdoctoral Research Award (NRSA), 2002–2004

**American Heart Association**
- Individual Postdoctoral Research Fellowship, 2005–2007

AWARDS (CONTINUED)

**University of Missouri**

- MU Research Council Award; $10,000, The Role of Helix Dynamics in a Membrane Signal Transmission Event, 2009-2010
- MU Research Board Award; $69,000, Deep-UV Resonance Raman Spectroscopy of Membrane Proteins for Structural Analysis, 2011-2012

**NIST Center for Neutron Research (NCNR)**

NG-2 – HFBS, High-flux backscattering spectrometer (CHRNS) Beam time Award
Studies of Water Diffusion on Charged Single-Supported Membranes; PI: Haskell Taub

**ONRL Center for Neutron Research**

BL-2 Backscattering Spectrometer (BASIS) at the Spallation Neutron Source (SNS) Beam time Award
Studies of Water Diffusion on Charged Single-Supported Membranes; PI: Haskell Taub

PROFESSIONAL ACTIVITIES

**Professional Memberships**

International Society of Photosynthesis Researchers, 1997–present

American Chemical Society, Member, 2009–present

Biophysical Society, Member, 2002–present

**Editorial Service**

- www.Frontiers.org, Editorial review board-Microbial Physiology & Metabolism.
- ISRN Structural Biology, Editorial Board.

**Other Professional Service Activities**

- Organizer and host of **Science Cafe Columbia**. A monthly informal science chat over beer and food, which typically draws >100 people from the local community.
- Faculty advisor MU Science Communication & Public Engagement graduate organization
- Local Organizing Committee Member, International Photosynthesis Congress, St. Louis, MO, Aug 2013
- Midwestern/Southeastern Regional Photosynthesis Meeting, Co-Organizer, Turkey Run, IN, Oct. 2008
- Manuscript review: Biochemistry, Journal of American Chemical Society, Journal of Biological Chemistry, Frontiers, Spectrochimica Acta, Photosynthesis Research, Journal of Physical Chemistry B, Biophysical Journal.
- *Ad hoc* review: NSF-MCB, NSF-CHE, DOE, MU-Research Board

COURSES TAUGHT **Undergraduate**

- *Quantitative Chemical Analysis (average enrollment 70-100 students)*:
  The course material covers error analysis, in-depth volumetric analysis and a brief survey of electrochemical, spectrophotometric and chromatographic analyses.
- *Principles of Instrumental Analysis with Laboratory (10-20 students)*:
  The course covers the principles/theoretical basis of instruments for atomic, fluorescence and absorption spectroscopies, as well as those for mass spectrometry, electrochemistry, and chromatography.
- *Introduction to communicating your research (summer course for REU students)*:
  Techniques for communicating with broad audiences and figure making were emphasized to help students present their summer research at a large interdisciplinary poset session at the summers terminus.
- Undergraduate research experience

**Graduate**

- *Principles of Electron Paramagnetic Resonance Spectroscopy*:
  The course introduced students to basic continuous wave EPR instrumentation, the theory behind the instrument response and basic data interpretation. Additionally more advanced modern techniques were covered including pulsed EPR methods (e.g. electron spin envelope echo modulation (ESEEM) and electron-electron double resonance (DEER)), as well as electron-nuclear double resonance techniques.
- *Bioanalytical Chemistry*:
  This course introduced graduate students to historical and modern methodologies for quantitative and qualitative analysis of biological macromolecules. Emphasis is placed on understanding the chemical and instrumental theories upon which these techniques are based.
- *Biological Spectroscopy*:
  I teach 1/3 of this interdisciplinary course covering vibrational and polarimetric analysis of protein structure.
- *Science Communication*:
  This course covered topics related to strategies for communicating science in general. Specifically, how to craft an oral messages for both formal and informal discourse, how to sell your science, elevator pitch training, telling your science as a story to engage your audience, introduction to advanced figure making and how to communicate science visually, as well as a rigorous weekly back and forth of writing and editing between the PI and the students.

TEACHING ASSISTANT EXPERIENCE

- *Intro Biology Laboratories*
- *Plant Physiology Laboratories*
- *Plant Genetic Engineering Lecture/Laboratory*

## Publications

SUBMITTED PUBLICATIONS

[1] ‡ Zhang, L., Brown, M., **Cooley, J. W.** and R. L. Koder. Water Penetration Limits the Oxyferrous State Lifetime of an Artificial Oxygen Transport Protein. *Proteins*. 2014

PAPERS IN PREPARATION

[1] ‡ Brown, M. C., JiJi., R. D., Ubarrextena-Bilandia, I., and **J. W. Cooley** Transmembrane helices adopt local *3,10*-helical structure rather than more extended non-helical structures during interactions with the Rhomboid protease GlpG. *Biochemistry*.

[2] ‡ Brown, M. C., Xiong, J., Roach, C. A., Oshokoya, O. O., Hasley, C. M., JiJi., R. D. and **J. W. Cooley** Isotope-assisted Vibrational Interrogation of Bilayer Embedded-macromolecules (iVIBE) for regio-specific membrane protein analysis. *Journal of Raman Spectroscopy*.

[3] Eagleburger, M. K., **Cooley, J. W.**and R. D. JiJi. Quantifying cholesterol, lipid saturation and protein content in blood sample fractions by deep-UV resonance Raman. *Biochemistry*.

[4] Eagleburger, M. K., Brown, M. C., Vo, A., Halsey, C. M., Roach, C. A., Oshokoya, O. O., **J. W. Cooley** and R. D. JiJi. The influence of helical packing and membrane environment on the hydration sensitive amide I mode of membrane solubilized proteins. *ChemBioChem*.

REFEREED PUBLICATIONS

[1] ‡ King J. D., Harrington L., Lada, B. M., He G., **Cooley, J. W.** and R. E. Blankenship. Site-directed mutagenesis of the highly perturbed copper site of auracyanin D. *Archives in Biochemistry and Biophysics*. 2014. *Accepted*

[2] Miskowiec, A., Buck, Z. N., Brown, M. C., Kaiser, H., Hansen, F. Y. , King, G. M., Taub. H., Jiji, R., **Cooley, J. W.**, Tyagi, M., Diallo, S. O., Mamontov, E., and K. W. Herwig. On the freezing behavior and diffusion of water in proximity to single supported zwitterionic and anionic bilayer lipid membranes. *Europhysics Lett.*. 107: 28008
***Article chosen as EPL editors choice for 2014***

[3] Xiong, J., Roach, C. A., Oshokoya, O. O., Schroell, R. P., Yakubu, R. A., Eagleburger, M. K., **Cooley, J. W.** and R. D. JiJi. The Role of Bilayer Characteristics on the Structural Fate of A$\beta$(1-40) and A$\beta$(25-40). *Biochemistry*. 53:3004-11. 2014.

[4] Eagleburger, M. K., **Cooley, J. W.**and R. D. JiJi. Effects of fluidity on the ensemble structure of a membrane embedded $\alpha$-helical peptide. *Biopolymers*. 101: 895-902. 2014.

[5] Brown, M. C., Yakubu, R. A., Taylor, J., Halsey, C. M., JiJi., R. D. and **J. W. Cooley**. Bilayer surface association of the pHLIP peptide promotes extensive backbone desolvation and helically-constrained structures. *Biophysical Chemistry*. 187: 1-6 . 2014.

[6] King J. D., McIntosh, C. L., Halsey, C. M., Lada, B. M., **Cooley, J. W.** and R. E. Blankenship. Metalloproteins diversified–The auracyanins are a family of cupredoxins which stretch the spectral and redox limits of blue copper proteins. *Biochemistry*. 52: 8267-8275. 2013.

[7] **J. W. Cooley**. Protein conformational changes involved in the cytochrome $bc_1$ complex catalytic cycle. *Biochimica et Biophysica Acta-Bioenergetics*. 1827: 1340-1345. 2013.

[8] Brown, M. C., Mutter, A. C., Koder, R. L., JiJi, R. D. and **J. W. Cooley**. Observation of persistent $\alpha$-helical content and discrete types of backbone disorder during a molten globule to ordered peptide transition via deep-UV resonance Raman spectroscopy. *Journal of Raman Spectroscopy*. 44(7):957–962. 2013. doi:10.1002/jrs.4316

[9] Mrutu, A., Lane, A. C., Drewett, J. M., Yourstone, S. D., Barnes, C. L., Halsey, C. M., **Cooley, J. W.** and J. R. Walensky. Molecular Structure and Spectroscopy of Divalent First Row Transition Metals, Mn-Zn, with Salicylaldiminate Ligands. *Polyhedron*, 54:300–308. 2013. doi:10.1016/j.poly.2013.02.011

[10] Halsey, C. M., Benham, D., JiJi, R. D., and **J. W. Cooley**. Influence of the lipid environment on valinomycin structure and cation complex formation. *Spectrochimica Acta Part A*, 96:200–206, 2012. doi:10.1016/j.saa.2012.05.022

[11] Halsey, C. M., Oshokoya, O. O., JiJi, R. D., and **J. W. Cooley**. Deep-UV Resonance Raman Analysis of the Rhodobacter capsulatus Cytochrome $bc_1$ Complex Reveals a Potential Marker for the Transmembrane Peptide Backbone. *Biochemistry*, 50(30):6531–6538, 2011. ***article chosen to be highlighted on the journal webpage*** doi:10.1021/bi200596w

[12] Halsey, C. M., Xiong, J., Oshokoya, O. O., Johnson, J. A., Shinde, S., Beatty, J. T., Ghirlanda, G., JiJi, R. D., and **J. W. Cooley**. Simultaneous Observation of Peptide Backbone Lipid Solvation and $\alpha$-Helical Structure by Deep-UV Resonance Raman Spectroscopy. *ChemBioChem*, 12(14):2125–2128, 2011. doi:10.1002/cbic.201100433

[13] Lee, D. W., Selamoglu, N., Lanciano, P., **Cooley, J. W.**, Forquer, I., Kramer, D. M, and F. Daldal. Loss of a conserved tyrosine residue of cytochrome *b* induces reactive oxygen species production by cytochrome $bc_1$. *Journal of Biological Chemistry*, 286(20):18139–18148, 2011. doi:10.1074/jbc.M110.214460

[14] **J. W. Cooley**. A structural model for across membrane coupling between the $Q_o$ and $Q_i$ active sites of cytochrome $bc_1$. *Biochimica et Biophysica Acta-Bioenergetics*, 286(20):18139–18148, 2010. doi:10.1016/j.bbabio.2010.05.013

[15] **Cooley, J. W.**, Lee, D. W. and F. Daldal. Across membrane communication between the $Q_o$ and $Q_i$ active sites of cytochrome $bc_1$. *Biochemistry*, 48(9):1888–1899, 2009. doi:10.1021/bi802216h

[16] Kramer, D. M., Nitschke, W. **Cooley, J. W.**. The cytochrome $bc_1$ and related *bc* complexes: the Rieske/cytochrome *b* complex as the functional core of a central electron/proton transfer complex. *In Advances in Photosynthesis and Respiration*, Ed. Blankenship, B. 28:451–473, 2008. doi:10.1007/978-1-4020-8815-5_23

[17] Lee, D.W., Özturk, Y., Osyczka, A. **Cooley, J. W.** and F. Daldal. Cytochrome $bc_1$-$c_y$ fusion complexes reveal the distance constraints for functional electron transfer between photosynthesis components. *Journal of Biological Chemistry*, 283(20):13973–13982, 2008. doi:10.1074/jbc.M800091200

[18] Lee, D.W., Özturk, Y., Osyczka, A. **Cooley, J. W.** and F. Daldal. A functional hybrid between the cytochrome $bc_1$ complex and its physiological membrane-anchored electron acceptor cytochrome $c_y$ in *Rhodobacter capsulatus*. *Journal of Biological Chemistry*, 1757(5):346–352, 2006.doi:10.1016/j.bbabio.2006.04.025

[19] **Cooley, J. W.**, Ohnishi, T. and F. Daldal. Binding dynamics at the quinone reduction $Q_i$ site influence the equilibrium interactions of the iron sulfur protein and the hydroquinone oxidations $Q_o$ site of the cytochrome $bc_1$ complex. *Biochemistry*, 44(31):10520–10532, 2005. doi:10.1021/bi050571

[20] Mather, M. W., Darrouzet, E., Valchova-Valchanova, M., **Cooley, J. W.**, McIntosh, M., Daldal., F. and A. B. Vaida. Uncovering the molecular mode of action of the antimalarial drug atovaquone using a bacterial system. *Journal of Biological Chemistry*, 280(29):27458–27465, 2005. doi:10.1074/jbc.M502319200

[21] **Cooley, J. W.**, Roberts, A. G., Bowman, M. K., Kramer, D. M., and F. Daldal. The raised midpoint potential of the [2Fe-2S] cluster of the cytochrome $bc_1$ is mediated by both the $Q_o$ site occupants and the head domain position of the Fe-S protein subunit. *Biochemistry*, 43(8):2217–2227, 2004. doi:10.1021/bi035938u

[22] **Cooley, J. W.**, Darrouzet, E., and F. Daldal. Bacterial Hydroquinone: Cytochrome c Oxidoreductases. Physiology, Structure and Function. *In Advances in Photosynthesis and Respiration*, Ed. Zannoni, D. 15:41–55, 2004.

[23] Darrouzet, E., **Cooley, J. W.**, and F. Daldal. The cytochrome $bc_1$ complex and its homologue the $b_6f$ complex: similarities and differences. *Photosynthesis Research*, 79(1):25–44, 2004. doi:10.1023/B:PRES.0000011926.47778.4e

[24] Howitt, C. A., **Cooley, J. W.**, Wiskich, J. T., and W. F. J. Vermaas. A strain of *Synechocystis* sp. PCC 6803 without photosynthetic oxygen evolution and respiratory oxygen consumption: implications for the study of cyclic photosynthetic electron transport. *Planta*, 214(1):46–56, 2001. doi:10.1007/s004250100578

[25] **Cooley, J. W.**, and W. F. J. Vermaas. Succinate dehydrogenase and other respiratory pathways in thylakoid membranes of *Synechocystis* sp. strain PCC 6803: capacity comparisons and physiological function. *Journal of Bacteriology*, 183(14):4251–4258, 2001. doi:doi: 10.1128/JB.182.3.714-722.2000

[26] **Cooley, J. W.**, Howitt, C. A., and W. F. J. Vermaas. Succinate: quinol oxidoreductases in the cyanobacterium *Synechocystis* sp. strain PCC 6803: presence and function in metabolism and electron transport. *Journal of Bacteriology*, 182(3):714–722, 2000. doi:doi: 10.1128/JB.182.3.714-722.2000

MISCELLANEOUS OTHER PUBLICATIONS

[1] ‡ Blankenship, R., Musik, J., **Cooley, J.**, and S. Dutcher. An invitation to the 16th international congress on photosynthesis research in 2013: opportunities and challenges in the 21st century. *Photosynthesis Research*, 115(2-3):215–218. 2013. doi:10.1007/s11120-013-9847-9

REPRESENTATIVE CONFERENCE PRESENTATIONS

presenters are underlined

[1] Brown, M. C., Mutter, A., Zhang, L., JiJi, R., Koder, R. and **Cooley, J. W.** Peptide-Water Interactions and other Tricks Towards Regionspecific structural Information using deep-UV resonance Raman. *International Conference on Raman Spectroscopy, Jena, Germany* Oral Abstract. 2014.

[2] Brown, M. C., Mutter, A., Zhang, L., JiJi, R., Koder, R. and **Cooley, J. W.** Peptide-Water Interactions and other Tricks Towards Regionspecific structural Information using deep-UV resonance Raman. *International Conference on Raman Spectroscopy, Jena, Germany* Oral Abstract. 2014.

[3] Miskowiec, A., Brown, M. C., **Cooley, J. W.**, Taub, H., Grayer, J., King, G., Kaiser, H., Hansen, F., and Tyagi, M. Deposition of Homogeneous Single-supported DMPG Lipid Membranes onto a Silica Substrate for Quasielastic Neutron Scattering Experiments. *Bulletin of the American Physical Society* Oral Abstract. 2013.

[4] ∗ Brown, M. C., Xiong, X. Mutter, A. Koder, R. L., JiJi, R. D., and **Cooley, J. W.** Persistent $\alpha$-Helical Content and Local Helical Structural Fluctuations from a Molten Globule to Ordered Peptide Transition. *Biophysical Journal* 102(3):444a. Poster Abstract. 2012.

[5] ∗ Halsey, C. M., Benham, D., JiJi, R. D., and **Cooley, J. W.** Spectroscopic Insights into the Structural Dynamics and Mechanism of Ionophore Function of Valinomycin in Lipid Membranes. *Biophysical Journal* 102(3):266a. Poster Abstract. 2012.

[6] ∗ Brown, M. C., Xiong, X. Mutter, A. Koder, R. L., JiJi, R. D., and **Cooley, J. W.** Persistent $\alpha$-Helical Content and Local Helical Structural Fluctuations from a Molten Globule to Ordered Peptide Transition. Poster Abstract. Midwestern Southeastern Regional Photosynthesis Meeting, Turkey Run, IN. 2012.

[7] ∗ Brown, M. C., Xiong, X. Mutter, A. Koder, R. L., JiJi, R. D., and **Cooley, J. W.** Persistent $\alpha$-Helical Content and Local Helical Structural Fluctuations from a Molten Globule to Ordered Peptide Transition. Poster Abstract. MU-Life Science symposium, Columbia, MO. 2012.

[8] Halsey, C. M., Oshokoya, O. O., Xiong, J., JiJi, R. D. and **J. W. Cooley** Exploring structural consequences of lipid-protein interactions. Gordon Research Conference-Proton & Membrane Reactions. Ventura, CA. 2012

[9] ∗ Halsey, C. M., Xiong, J., JiJi, R. D., and **Cooley, J. W.** Resolving the lipid solvated protein backbone of membrane proteins using deep-UV excited resonance Raman spectroscopy. American Chemical Society Meeting, 2011.

[10] Halsey, C. M., Xiong, J., Oshokoya, O. O., Shinde, S., Roach, C. A., Ghirlanda, G., JiJi, R. D., and **Cooley, J. W.** Simultaneous analysis of protein structure and lipid solvation. Gordon Research Conference-Photosynthesis, 2011.

[11] ∗ Yakubu, R. A., Halsey, C. M., **Cooley, J. W.** and R. D. JiJi. Monitoring protein association with a membrane bilayer using UV resonance Raman spectroscopy. Annual Biomedical Research Conference for Minority Students, 2011.

[12] ∗ Halsey, C. M., Benham, D., JiJi, R. D., and **Cooley, J. W.** Structural analysis of a depsipeptide in the lipid membrane. Midwestern Southeastern Regional Photosynthesis Meeting, Turkey Run, IN. 2010. Oral Presentation

[13] ∗ Halsey, C. M., JiJi, R. D., and **Cooley, J. W.** Relationship of transmembrane helix content and carbonyl stretch modes responses in deep-UV resonance Raman. Poster Abstract. Midwestern Southeastern Regional Photosynthesis Meeting, Turkey Run, IN. 2010.

[14] ∗ Halsey, C. M., JiJi, R. D., and **Cooley, J. W.**. Pioneering the use of multi-excitation UV resonance Raman spectroscopy as applied to structure function questions in a model transmembrane redox protein., Poster Abstract. Midwestern Southeastern Regional Photosynthesis Meeting, Turkey Run, IN. 2009.

INVITED TALKS

[1] Cooley, J. W. Peptide-Water Interactions and other Tricks Towards Regionspecific structural Information using deep-UV resonance Raman. *International Conference on Raman Spectroscopy, Jena, Germany* August 10. 2014.

[2] Cooley, J.W. Measuring ensemble substrate structures in the enzyme-substrate complex using isotope-assisted vibrational interrogation of bilayer embedded proteins (iVIBE). In: *SciX13 Symposium*, WI, September 14, 2013.

[3] Cooley, J. W. The elevator pitch in zero words: improving scientific graphics. In: MU-SciComm Network Workshop, June 2013

[4] Cooley, J.W. The elevator pitch in zero words: improving scientific graphics. In: EXPRESS fellows symposium, April 2013

[5] Cooley, J. W. Differentiating super complexes from large monomeric protein complexes using deep-UV resonance Raman. Midwestern Southeastern Regional Photosynthesis Meeting, Turkey Run, IN. 2012.

[6] Cooley, J. W. Simultaneous analysis of membrane protein structural and solvation regimes by deep-UV excited resonance Raman. In: *Biophysics Colloquium*, University of Missouri Physics Department, December, 2011.

[7] Cooley, J.W. Simultaneous analysis of membrane protein structural and solvation regimes by deep-UV excited resonance Raman. In: *Chemistry Colloquium*, Arizona State University November 14, 2011.

[8] Cooley, J. W. A structural model for across membrane communication in the cytochrome $bc_1$ complex. *Chemistry Colloquium*, Missouri S & T. 2010

[9] Cooley, J. W. How does one catalytic site of quinone redox chemistry influence another in the cytochrome $bc_1$ complex, the kitchen sink of inhibitors, mutations and structure gazing. Quinones Binding and Catalysis (Satellite meeting to the 15th European Bioenergetics Conference. Dublin, Ireland. 2008

STUDENTS MENTORED

**Graduate Students(degree conferred)**

- Dr. Christopher Halsey (PhD '12)(Currently Assistant Prof. at Westminster College)
- Ms. Mia Brown (expected PhD F '15)
- Mr. Bryan Lada (expected PhD F '15)

**Undergraduate Students(Major)**

- Amanda Vo (Chemistry, Honors Thesis) Publications = 1
- Lauren Goeddel (Chemistry, Honors Thesis)
- Brian Weiss (Biochemistry, Honors Thesis)
- Elizabeth Reardon (Biology, Honors Thesis)
- Derek Benham (Biochemistry, Honors Thesis), Publications = 1
- Melissa Harlan (Biology)
- Colt Canepa (Biology, Honors Thesis)
- Michael Eagleburger (Chemistry)
- Sara Vassmer (Chemistry)
- James Vogt (Biology)
- Cynthia Koehler-Flores (Mechanical Engineering, NIH-EXPRESS Fellow)
- James Rhodes (Biochemistry, NIH-EXPRESS fellow)
- Erik Renne (Biochemistry)
- Connor Bodeman (Chemistry)
- Charles Laber (College of the Ozarks, Chemistry)
- Ian Hammer (Gonzaga University, Chemistry)
- Meagan Eatwell (Minnesota State University, Chemistry)

# CURRICULUM VITAE

## Neal E. Craft, PhD

**Personal Data**

Home:
5453 Minnie Trail
Elm City, NC 27822
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Office:
Craft Technologies, Inc.
4344 Frank Price Church Road
Wilson, NC 27893
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**Education and Training**

| | | |
|---|---|---|
| B.S. Human Nutrition | Ohio State University<br>Columbus, OH | 1978 |
| M.S. Human Nutrition and Foods | Virginia Tech<br>Blacksburg, VA | 1981 |
| Ph.D. Nutritional Sciences | University of Maryland<br>College Park, MD | 1991 |

**Professional Experience**

| Date | Employer | Title |
|---|---|---|
| 9/94-Present | Craft Technologies, Inc.<br>4344 Frank Price Church Road<br>Wilson, NC 27893 | President |
| 4/93-9/94 | Southern Testing & Research Labs<br>3809 Airport Drive<br>Wilson, NC 27896 | Manager<br>Food Chemistry Dept. |
| 9/86-4/93 | National Institute of<br>Standards and Technology<br>Gaithersburg, MD 20899 | Biologist,<br>Acting Food and Clinical<br>SRM Coordinator (1991),<br>Clinical Coordinator (1992-93) |
| 1/83-9/86 | USDA<br>Vitamin and Mineral<br>Nutrition Laboratory<br>Beltsville Human Nutrition<br>Research Center<br>Beltsville, MD | Research Chemist |

**Professional Stature**

Awards

*Bruce M. Anderson Award* - Outstanding First Year Graduate Student, Biochemistry Department, Virginia Tech.

U.S. Department of Commerce Performance Awards - 1987, 1988, 1989, 1990, 1991, 1992.

Societies and Committees

American Association of Clinical Chemists (AACC)

American Association of Oil Chemists (AOCS)

Association of Official Analytical Chemists (AOAC)

AOAC Task Force on Nutritional Methods

AOAC Technical Division on Reference Materials

American Society for Nutrition (ASN)

Carotenoid Research Interaction Group (CaRIG)

*Steering Committee* - (1989-94, 99, 2000-3) Carotenoid Research Interactive Group

*Associate Editor* - (1990-94) Carotenoid News

*Cochair* - Carotenoid Analytical Methods Session, Carotenoid Research Interaction Group Annual Meeting, April 20 and 21, 1991, Atlanta, GA

*Conference Chair* - Carotenoid Research Interactive Group Annual Meeting, March 28, 1993, New Orleans, LA

Institute of Food Technologists (IFT)

**Research Interests**

Current interests include: (1) novel and improved methods of micronutrient analysis; (2) association of nutrients and phytochemicals with acute and chronic disease; (3) dietary supplements and natural products; (4) methods to assess nutritional deficiencies

# Curriculum Vitae

**Nour-Eddine ES-SAFI**

Date of birth: 04/20/1962

Place of birth: Morocco.

**ADDRESS**

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E-mail: nouressafi@yahoo.fr

## ACADEMIC EDUCATION

1997 : Ph.D in Organic Chemistry. Mohammed V University in Rabat, Morocco. Thesis entitled "**Phenolic compounds of red vine (*Vitis vinifera* L.) cultivated in Morocco: Structure, reactivity and pharmacological properties**".

1990 : Master of Science in Organic Chemistry. Ecole Normale Supérieure, Rabat, Morocco. Thesis entitled "**Contribution to the study of essential oils and tanins of Eucalyptus trees cultivated in Morocco**"

1986 : Certificate for teaching chemistry in training centers frames. Ecole Normale Supérieure Rabat, Morocco.

1984 : Graduate of the Ecole Normale Supérieure, Option Physique – Chimie, Rabat, Morocco.

**EMPLOYMENT**

July 2014- Present: Deputy Director of the Ecole Normale Supérieure. Mohammed V University in Rabat – Morocco.

Jan 2001-Present: Professor at Mohammed V University in Rabat. Ecole Normale Supérieure, Rabat – Morocco (Chemisty department).

Jan 1997- 2001: Associate Professor at the same department.

1986-1997 : Assistant Professor at the same department.

1984-1986 : Assistant at the same department.

**PROFESSIONAL EXPERIENCE**

*Research Competence:*

- Expertise in synthesis of natural bioactive molecules.
- Dexterous in isolation and characterization of natural bioactive molecules.
- Endured in minor natural products purification.
- Familiar with HPLC and related chromatographic techniques.
- Adept in analyzing spectral data like $^{1}H$, $^{13}C$, 2D NMR (COSY, NOESY, HMBC and HMQC), IR and MS (ESI-MS, Tandem MS-MS, Maldi-Tof MS).
- Design and synthesis of biologically active compounds.
- Development of synthetic methodologies for natural/modified compounds synthesis.
- Isolation and characterization of naturally occurring bio-active compounds, hemisynthesis of isolated natural products for the confirmation of their chemical structures, transformations of natural products into their novel derivatives.
- Isolation of novel compounds (polyphenols, iridoids, phenylethanoids) from Moroccan plants.
- Development of regio- and stereoselective methodologies for modified polyphenols synthesis.
- Development of thioacidolysis method for structural elucidation of bridged flavanols.
- Capable of both collaborative and independent research.
- Possession of good communication and management skills.

*Research Conducted or Supervised*

- *Natural Products:*
  - Essential oils, polyphenols, iridoids
  - Eucalyptus trees: Extraction, quantitative and qualitative analysis of essential oils (leaves) and condensed tannins (bark).
  - Vine leaves polyphenols (proanthocyanidins, flavonols, anthocyanidins): Extraction, quantitative analysis, isolation and identification by spectroscopic tools (mass and 1D and 2D NMR spectroscopy).
  - Phytochemical investigations of various Moroccan medicinal plants used in traditional pharmacopeae.

- *Analytical methods:*
  - Chromatography: HPLC/DAD, HPLC/ESI-MS. Application to the study of the condensation of flavanols and anthocyanins in model solution systems.
  - Spectroscopy: ESI/MS, MS/MS, ICD MS, 1D ($^{1}H$, $^{13}C$) and 2D (COSY, HSQC, HMBC, NOESY, ROESY) NMR techniques. Application to the structural elucidation of natural and synthesized compounds.

- *Composition of foods:*
  - Grape proanthocyanidins: Extraction from different parts (seeds, stems and skins), quantitative and qualitative analysis by HPLC and cleavage methods (thiolacidoysis).
  - Grape anthocyanins: Extraction, quantitative and qualitative analysis.
  - Food polyphenols and their role in human health
  - Polyphenols and their role in food technology

- *Flavor and aroma:*
  - Essential oils: extraction, analysis by GC/MS techniques, antibacterial and antifungal properties.

- *Chemical changes during processing:*
  - Chemical transformations which contribute to the organoleptic properties alterations (de-astringency, browning, darkening, etc …) of foods during processing, maturation, storage and aging.
  - Evolution of phenolic compounds during processing, maturation, storage and aging of foods in model solution systems.
  - Evolution of phenolic compounds in model solution systems. Detection, isolation and identification of the new formed compounds and confirmation of their presence in in foods.
  - Role of the new formed compounds in food organoleptic properties and huaman health.

- *Pharmacological activity:*
  - Antibacterial and antifungal activity of natural and synthesized compounds.
  - Mollusciscidal activity of proanthocyanidols and flavonols isolated from grapes and vine leaves.
  - Antioxydant and free radical scavenging properties of natural and synthesized compounds.
  - Strucure-activity relationships.

*Teaching Experience*

- Organic Chemistry: Stereochemistry, reactions, mechanisms and structures.
- Natural Products.
- Spectral Analysis: IR, MS, NMR.
- Chromatography: PC, GPC, HPLC.
- Polyphenols chemistry.

*Scientific stays in foreign laboratories:*

- Unité de Phytopharmacie et Médiateurs Chimiques. Team: Chemistry of Natural Products. National Institute for Agricultural Research, Versailles, France.
- UMR Sciences for Enology. Polyphenols team. National Institute for Agricultural Research, Montpellier, France.

- Laboratory of Polyphenols. National Institute for Agricultural Research, Narbonne, France.
- Materia Medica and Pharmacognosy Laboratory, School of Pharmacy, Montpellier, France..

**LANGUAGES**

- English, French and Arabic (Native Language): Writing, Speaking and Reading.

**MICROCOMPUTER USE**

- Operating systems : WINDOWS
- MS OFFICE
- Others: Chemdraw, Chemsketch, … etc.

**OTHERS**

- **Deputy Director** of Ecole Normale Supérieure, Rabat, Morocco. Since July 2014.
- **Head of the Chemistry department** at Ecole Normale Supérieure, Rabat, Morocco. 2011-2014.
- **Professor** at Ecole Normale Supérieure, Mohammed V University of Rabat. Since 2001.
- **Responsible of the research team** "Organic Chemistry and Physical and Chemical Studies".
- **Responsible of the Research Master** "Valorization of the natural resources plant".
- **Responsible of the professional bachelor's degree** "university course teaching in physics and chemistry".
- **Expert Review Panel** for the AOAC Stakeholder Panel on Strategic Food Analytical Methods (Flavanols, St. John's Wort, Chondroitin, Kratom, Ashwagandha, Folin C, …)
- **Member** of various scientific associations.
- **Post-doc** at the French National Agricultural Research Institute. Montpellier & Versailles INRA centers.
- **Supervisor** of PhD students.
- **Editor in Chief** of *Green and Sustainable Chemistry* journal
- **Regional Editor** of the *American Journal of Food Technology.*
- Guess Editor *of Current Bioactive Compounds* journal *special issue* on

*"Current Hyphenated Methods in Polyphenol Analysis".*

- **Editorial Board Member** of various scientific journals
  - *Journal of Food Composition and Analysis*
  - *Organic Chemistry Insight*
  - *Recent Patents on Food, Nutrition and Agriculture*
  - *The Open Agriculture Journal*
  - *The Open Natural Products Journal*
  - *The Open Organic Chemistry Journal*
  - *International Journal of Medicinal and Aromatic Plants*
- **Reviewer** for many scientific journals
  - *American Journal of Food Technology*
  - *Arabian Journal of Chemistry*
  - *Asian Journal of Agricultural Research*
  - *Biotechnology*
  - *British Journal of Pharmacology*
  - *Current Bioactive Compounds*
  - *Food Chemistry*
  - *International Journal of Agricultural Research*
  - *International Journal of Dairy Science*
  - *International Journal of Food Sciences and Technology*
  - *International Journal of Pharmacology*
  - *Journal Marocain de Chimie Hétérocyclique*
  - *Journal of Agricultural and Food Chemistry*
  - *Journal of Chromatography A*
  - *Journal of Food Biochemistry*
  - *Journal of Food Composition and Analysis*
  - *Journal of Molecular Structure*
  - *Journal of Mass Spectrometry*
  - *Journal of Natural Products*
  - *Journal of Pharmaceutical and Biomedical Analysis*
  - *Journal of Physical Chemistry*
  - *Journal of Separation Science*
  - *Journal of the Science of Food and Agriculture*
  - *Journal of Zhejiang University-SCIENCE B*

- *LWT-Food Science and Technology*
- *Molecules*
- *Natural Products Research*
- *Pakistan Journal of Biological Sciences*
- *Phytochemical analysis*
- *Phytochemistry*
- *Rapid Communications in Mass Spectrometry*
- *Recent Patents on Food, Nutrition & Agriculture*
- *Tetrahedron Letters*
- *The Open Agriculture Journal*
- *The Open Natural Products Journal*
- *The Open Organic Chemistry Journal*
- *The Open Spectroscopy Journal*

**LIST OF PUBLICATIONS**


**1** Elbir, M.; **Es-Safi, N.**; Amhoud, A.; Mbarki, M. (**2015**). Characterization of phenolic compounds in olive stones of three Moroccan varieties. *Maderas, Ciencia y tecnología, 17,* 479-492.

**2** Benayad, Z. ; Gomez-Cordoves, C. ; **Es-Safi, N.** (**2014**). Characterization of flavonoid glycosides from fenugreek (*Trigonella foenum-graecum*) crude seeds by HPLC-DAD-ESI/MS analysis. *International Journal of Molecular Sciences, 15,* 20668-20685*.*

**3** Benayad, Z. ; Gomez-Cordoves, C. ; Martinez-Villaluenga, C.; Frias, J. ; **Es-Safi, N.** (**2014**). Phenolic composition, antioxidant and anti-inflammatory activities of extracts from Moroccan Opuntia ficus–indica flowers obtained by different extraction methods. *Industrial Crops and Products*, *62*, *412-420*

**4** Benayad, Z. ; Gomez-Cordoves, C. ; **Es-Safi, N.** (**2014**). Identification and quantification of flavonoid glycosides from fenugreek (*Trigonella foenum-graecum*) germinated seeds by LC–DAD–ESI/MS analysis. *Journal of Food Composition and Analysis*, 35, 21-29.

5 **Es-Safi, N**. (**2012**). Plant Polyphenols: Extraction, Structural Characterization, Hemisynthesi and Antioxidant Properties. Phytochemicals as Nutraceuticals - Global Approaches to Their Role in Nutrition and Health, Dr Venketeshwer Rao (Ed.), Intech Open Access Publisher, ISBN 979-953-307-611-8, 181-206**.** Available from: http://www.intechopen.com/books/phytochemicals-as-nutraceuticals-global-approaches-to-their-role-in-nutrition-and-health/polyphenols-as-potent-antioxidants-with-a-major-role-in-food-organoleptic-properties-and-human-healt

6 **Es-Safi, N**. Mass Spectroscopic Methods for the Characterization of Flavonoid Compounds. *Current Bioactive Compounds* **2012,** 8, 240-265**.**

7 **Es-Safi, N.** (**2014**). Review of the Book ''Green Materials for Sustainable Water Remediation and Treatment'' Edited by Anuradha Mishra and James H Clark**.** *Green and Sustainable Chemistry*.

8 **Es-Safi, N**. (**2012**). Mass Spectroscopic Methods for the Characterization of Flavonoid Compounds. *Current Bioactive Compounds*, 8, 240-265**.**

9 **Es-Safi, N**. **(2012).** Editorial Hot Topic: Current Hyphenated Methods in Polyphenol Analysis. *Current Bioactive Compounds*, 8, 189**.**

10 **Es-Safi, N.**; Essassi, E. M.; Massoui, M.; Banoub, J. Mass Spectrometry as a Powerful Analytical Technique for the Structural Characterization of Synthesized and Natural Products. In: *Detection of Biological Agents for the Prevention of Bioterrorism*, NATO Science for Peace and Security Series A: Chemistry and Biology, ISBN 978-90-481-9814-6. Springer Science+Business Media B.V., **2011**, p. 319

**11** Tene Ghomsi, J.; Hamou Ahabchane, N.; **Es-Safi, N.**; Essassi, E.M. 4-Phenyl-1,5-benzodiazepin-2-one Compound as a Precursor of Various New heterocyclic Systems with Potent pharmacological Properties. *Frontiers in Science and Engineering An International Journal Edited by Hassan II Academy of Science and Technology*, 1-2**,** 17 pages, **2011**.

12 Boutayeb, M.; El Imadi, S.; Benchidmi, M.; Essassi, E.M.; **Es-Safi, N.**; El Ammari, L. Synthesis of New Pyrazolo[1.5.4-*de*]quinoxalines. *Synthetic Communications* **2010**, 40, 2130-2137.

13 Rida, M.; El Meslouhi, H.; **Es-Safi**, **N.**; Essassi, E.M.; Banoub, J. Structural fragmentation study of new synthetic benzodiazepine derivatives using electrospray ionization tandem mass spectroscopy. *Rapid Communications in Mass Spectrometry* **2008**, *22*, 2253-2268.

14 Rida, M.; El Meslouhi, H.; Hammou Ahabchane, N.; Garrigues, G.; **Es-Safi**, **N.**; Essassi, E.M. A Convenient Method for the Synthesis of 1,5-benzodiazepin-2-one. *The Open Organic Chemistry Journal* **2008**, 2, 83-87.

15 **Es-Safi, N.**; Meudec, E.; Bouchu, C.; Fulcrand, H.; Ducrot, P.H.; Gaëtan, H.; Cheynier, V. New compounds obtained by evolution and oxidation of malvidin 3-*O*-glucoside in ethanolic medium. *Journal of Agricultural and Food Chemistry* **2008**, *56*, 4584-4591.

16 **Es-Safi, N.;** Le Guernevé, C.; Ducrot, P. H. Application of NMR and MS Spectroscopy to the Structural Elucidation of Modified Flavan-3-ols and their Coupling Reaction Products**.** *Specroscopy Letters,* **2008**, *41*, 41-56.

**17** Guidouche, S.; **Es-Safi, N.;** Ducrot, P. H. Mechanistic study on the enzymatic oxidation of flavonols. *Tetrahedron Letters* **2008**, *49*, 619-623.

**18** **Es-Safi, N.;** Beauhaire, J.; Ducrot, P. H. (**2007**). Antioxidative activity of modified flavanols derivatives. *American Journal of Food Technology*, *2*, 618-629.

19 Guidouche, S.; **Es-Safi, N.;** Ducrot, P. H. (**2007**). *Trametes versicolor* laccase mediated oxidation of flavonoids. Influence of the hydroxylation pattern of ring B of flavonols. *American Journal of Food Technology*, *2*, 630-640.

**20** **Es-Safi, N.;** Guidouche, S.; Ducrot, P. H. (**2007**). Flavonoids: Hemisynthesis, reactivity and antioxidative properties. *Molecules*, *12*, 2228-2258

**21** **Es-Safi, N.;** Kerhoas, L.; Ducrot, P. H. (**2007**). Fragmentation study of iridoid glucosides through positive and negative ESI/MS, CID/MS and tandem MS/MS. *Rapid Communications in Mass Spectrometry*, *21*, 1165-1175.

**22** **Es-Safi, N.;** Kerhoas, L.; Ducrot, P. H. (**2007**). NMR Analysis and Fragmentation Study of Globularin through Positive and Negative ESI/MS, CID/MS and Tandem MS/MS**.** *Specroscopy Letters*, *40*, 695-714.

**23** Tene Ghomsi, J.; Hammou Ahabchane, N.; **Es-Safi**, **N.**; Essassi, E.M. (**2007**). Synthesis and Spectroscopic Stuctural Elucidation of New Quinoxaline Derivatives. *Spectroscopy Letters*, *40*, 741, 751.

**24** **Es-Safi, N.;** Kollmann, A.; Khlifi, S.; Ducrot, P. H. (**2007**). Antioxidative effect of compounds isolated from *Globularia alypum* L**.** Structure–activity relationship. *LWT-Food Science and Technology*, *40*, 1246-1252.

**25** **Es-Safi, N.;** Khlifi, S.; Kollmann, A.; Ducrot, P. H. (**2006**). Antioxidative activity of polyphenoolic compounds isolated from *Globularia alypum* L. Structure-activity relationship. *Polyphenol Communications*, 493-494

**26** Ghidouche, S.; **Es-Safi, N.;** Ducrot, P. H. (**2006**). Importance of the substitution pattern of ring B of flavonols on their transformation by *Trametes versicolor* laccase. *Polyphenol Communications*, 161-162.

**27** **Es-Safi, N.;** Guyot, S.; Ducrot, P.H. (**2006**). NMR, ESI/MS and MALDI-TOF/MS analysis of pear juice polymeric proanthocyanidins with potent free radical scavenging activity. *Journal of Agricultural and Food Chemistry*, *54*, 6969-6977.

**28** **Es-Safi, N.;** Beauhaire, J.; Boyer, F.D.; Ducrot, P. H. (**2006**). Substituent effects on flavanol couplings. *Polyphenol Communications*, 57-58**.**

**29** **Es-Safi, N.;** Khlifi, S.; Kollmann, A.; Kerhoas, L.; El Abbouyi, A.; Ducrot, P.H. (**2006**). Iridoid glucosides from the aerial parts of *Globularia alypum* L. (Globulariaceae). *Chemical and Pharmaceutical Bulletin*, *54*, 85-88.

**30** **Es-Safi, N.;** Ducrot, P.H. (**2006**). Oxidation of flavan-3-ols: Gram-Scale synthesis of taxifolin. *Letters in Organic Chemistry*, *3*, 231-234.

**31** Khlifi, S.; El Hachimi Y., Khalil A., **Es-Safi, N.;** El Abbouyi, A. (**2006**). Antioxidant properties of *Salvia verbenaca* L. hydro-methanolic extract. *Indian Journal of Pharmacology*, *38*, 276-280.

**32** **Es-Safi, N.;** Le Guernevé, C.; Kerhoas, L.; Ducrot, P.H. (**2006**). Influence of an 8-trifluoroacetyl group on flavanol couplings. *Tetrahedron*, *62*, 2705-2714.

33 **Es-Safi, N.;** Kerhoas, L.; Einhorn, J.; Ducrot, P.H. (**2005**). Application of ESI/MS, CID/MS and tandem MS/MS to the fragmentation study of eriodictyol 7-*O*-glucosyl-(1→2)-glucoside and luteolin 7-*O*-glucosyl-(1→2)-glucoside. *International Journal of Mass Spectrometry*, *247*, 93-100

34 **Es-Safi, N.;** Kerhoas, L.; Ducrot, P. H. (**2005**). Application of positive and negative ESI-MS, CID/MS and tandem MS/MS to a study of fragmentation of 6-hydroxyluteolin 7-*O*-glucoside and 7-*O*-glucosyl-(1→3)-glucoside. *Rapid Communications in Mass Spectrometry*, *19*, 2734-2742.

35 **Es-Safi, N.;** Khlifi, S.; Kerhoas, L.; Kollmann, A.; El Abbouyi, A.; Ducrot, P. H. (**2005**). Antioxidant constituents of the aerial parts of *Globularia alypum* growing in Morocco. *Journal of Natural Products*, *68*, 1293-1296.

36 Khlifi, S.; El Hachimi Y., Khalil A., **Es-Safi, N.;** El Abbouyi, A. (**2005**). Antioxidant properties of *Globularia alypum* L. hydro-methanolic extract. *Indian Journal of Pharmacology*, *37*, 227-231.

37 Boyer, F.D.; **Es-Safi, N.;** Beauhaire, J.; Le Guernevé, C.; Ducrot, P. H. (**2005**). Synthesis of modified proanthocyanidins: easy and general introduction of an hydroxy group at C-6 of catechin; efficient synthesis of elephantorrhizol. *Bioorganic & Medicinal Chemistry Letters*, *15*, 563-566.

38 Beauhaire, J.; **Es-Safi, N.;** Boyer, F.D.; Kerhoas, L.; Le Guernevé, C.; Ducrot, P. H. (**2005**). Synthesis of modified proanthocyanidins: introduction of acyl substituents at C-8 of catechin. Selective synthesis of a C-4 → O →C-3 ether-linked procyanidin-like dimer. *Bioorganic & Medicinal Chemistry Letters*, *15*, 559-562.

39 **Es-Safi, N.;** Cheynier, V**.** (**2004**). Flavanols and anthocyanins as potent compounds in the formation of new pigments during storage and aging of red wine. In *Red Wine Color - Exploring the Mysteries.* Waterhouse AL, Kennedy JA (Eds), *ACS Symposium*, Series 886, Washington, DC, USA, 143-159.

40 **Es-Safi, N.** (**2004**). Colour of a xanthylium pigment in aqueous solutions at different pH values. *Food Chemistry*, *88*, 367-372.

41 **Es-Safi, N.;** Kerhoas, L.; Boyer, F. D.; Le Guernevé, C.; Ducrot, P. H. (**2004**). Selective synthesis and structure of a C4-O-C3 ether-linked procyanidin-like dimer. *Polyphenols Communications*, 578-579.

42 Beauhaire, J.; Boyer, F. D.; **Es-Safi, N.;** Le Guernevé, C.; Ducrot, P. H. (**2004**). New methodologies for the synthesis of proanthocyanidins. *Polyphenols Communications*, 73-74.

43 Boyer, F. D.; **Es-Safi, N.;** Beauhaire, J.; Le Guernevé, C.; Ducrot, P. H. (**2004**). Hydroxylation on ring of the catechin, studies on the stability of resulting flavanol derivatives. *Polyphenols Communications*, 577-578.

44 **Es-Safi, N.;** Cheynier, V.; Moutounet, M. (**2003**). Implication of phenolic reactions in food organoleptic properties. *Journal of Food Composition and Analysis*, *16*, 535-553.

45 **Es-Safi, N.;** Cheynier, V.; Moutounet, M. (**2003**). Effect of copper on oxidation of (+)-catechin in a model solution system. *International Journal of Food Science & Technology*, *38*, 153-163.

46 **Es-Safi, N.;** Cheynier, V.; Moutounet, M. (**2002**). Interactions between cyanidin 3-O-glucoside and furfural derivatives and their impact on food color changes. *Journal of Agricultural and Food Chemistry*, *50*, 5586-5595.

47 **Es-Safi, N.;** Cheynier, V.; Moutounet, M. (**2002**). Role of aldehydic derivatives in the condensation of phenolic compounds with emphasis on the sensorial properties of fruit-derived foods. *Journal of Agricultural and Food Chemistry*, *50*, 5571-5585.

48 **Es-Safi, N.;** Le Guernevé, C.; Cheynier, V.; Moutounet, M. (**2002**). 2D NMR analysis for unambiguous structural elucidation of phenolic compounds formed through reaction between (+)-catechin and glyoxylic acid. *Magnetic Resonance in Chemistry*, *40*, 693-704.

**49** **Es-Safi, N.;** Cheynier, V.; Moutounet, M. (**2002**). Role of aldehydes in the condensation of phenolic compounds with emphasis on food organoleptic properties. *Polyphenols Communications*, 577-578.

50 **Es-Safi, N.;** Cheynier, V.; Moutounet, M. (**2000**). Study of the reactions between (+)-catechin and furfural derivatives in the presence or absence of anthocyanins and their implication in food color change. *Journal of Agricultural and Food Chemistry*, *48*, 5946-5954.

51 **Es-Safi, N.;** Le Guernevé, C.; Cheynier, V.; Moutounet, M. (**2000**). New phenolic compounds formed by evolution of (+)-catechin and glyoxylic acid in hydroalcoholic solution and their implication in color changes of grape-derived foods. *Journal of Agricultural and Food Chemistry*, *48*, 4233-4240.

52 **Es-Safi, N.;** Le Guernevé, C.; Cheynier, V.; Moutounet, M. (**2000**). New phenolic compounds obtained by evolution of (+)-catechin and glyoxylic acid in hydroalcoholic medium. *Tetrahedron Letters*, *41*, 1917-1921.

53 **Es-Safi NE**, Le Guernevé, C**.;** Fulcrand, H.; Cheynier, V.; Moutounet, M. (**2000**). Xanthylium salts formation involved in wine colour changes. *International Journal of Food Science and Technology*, *35*, 63-74.

54 **Es-Safi, N.;** Le Guernevé, C.; Labarbe Benoit, Fulcrand, H.; Cheynier, V.; Moutounet, M. (**1999**). Structure of a new xanthylium salt derivative. *Tetrahedron Letters*, *40*, 5869-5872.

55 Cheynier, V.; **Es-Safi, N.;** Fulcrand, H. (**1999**). Structure and colour properties of anthocyanins and related pigments. *In The Proceedings of the first International Congress Pigments in food Technology* (edited by M. I. Minguez Mosquera, M. Jaren Galan & D. Hornero Mendez), Sevilla Spain March 24-26, 23-35.

56 **Es-Safi, N.;** Fulcrand, H.; Cheynier, V.; Moutounet, M. (**1999**). Competition between (+)-catechin and (-)-epicatechin in acetaldehyde-induced polymerization of flavanols. *Journal of Agricultural and Food Chemistry*, *47*, 2088-2095.

57 **Es-Safi, N.;** Fulcrand, H.; Cheynier, V.; Moutounet, M. (**1999**). Studies on the acetaldehyde-induced condensation of (-)-epicatechin and malvidin 3-O-glucoside in a model solution system. *Journal of Agricultural and Food Chemistry*, *47*, 2096-2101.

58 **Es-Safi, N.;** Le Guernevé, C.; Fulcrand, H.; Cheynier, V.; Moutounet, M. (**1999**). New Polyphenolic Compounds with Xanthylium Skeletons Formed Through Reaction between (+)-Catechin and Glyoxylic Acid. *Journal of Agricultural and*

*Food Chemistry*, *47*, 5211-5217.

59 Hmamouchi, M.; Lahlou, M.; **Es-Safi, N.;** Agoumi, A. (**1998**). Molluscicidal properties of some proanthocyanidins, flavones and flavonols. *Fitoterapia*, *69*, 161-164.

60 **Es-Safi, N.;** Fulcrand, H.; Cheynier, V.; Moutounet, M. (**1998**). Detection of new pigments through the reaction of (+)-catechin with glyoxylic acid. *Polyphenols Communications*, 395-396.

61 Fulcrand, H.; **Es-Safi, N.;** Cheynier, V.; Moutounet, M. (**1998**). A new oxidative pathway contributing to wine browning. *Polyphenols Communications*, 259-260.

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63 Hmamouchi, M.; **Es-Safi, N.;** Essassi, E.M.; Moutounet, M. (**1996**). Les composés phénoliques de la vigne rouge provenant du Maroc. *Polyphenols Communications*, 91-92.

64 Fulcrand, H.; **Es-Safi, N.;** Doco, T.; Cheynier, V.; Moutounet, M. (**1996**). LC-MS study of acetaldehyde induced polymerisation of flavan-3-ols. *Polyphenols Communications*, 203-204.

65 **Es-Safi, N.;** Fulcrand, H.; Cheynier, V.; Moutounet, M., Hmamouchi, M.; Essassi E.M. (**1996**). Kinetic studies of acetaldehyde-induced condensation of flavan-3-ols and malvidin-3-glucoside in model solution systems. *Polyphenols Communications*, 279-280.

66 Hmamouchi, M.; **Es-Safi, N.;** Lahlou, M.; Agoumi, A.; Moulis, C., Fouraste, I. (**1996**). Molluscicidal properties of some proanthocyanidins, flavones, and flavonol derivatives. *Polyphenols Communications*, 441-442.

67 Hmamouchi, M.; **Es-Safi, N.;** Hamamouchi, J.; Agoumi, A.; Moulis, C., Fouraste, I. (**1996**). Antimicrobial activity of some proanthocyanidins. *Polyphenols Communications*, 434-444.

68 Hmamouchi, M.; **Es-Safi, N.;** Lahrichi A., Fruchier A., Essassi, E.M. (**1996**). Flavones and flavonols in leaves of some moroccan Vitis. *American Journal of Enology and Viticulture*, *47*, 186-192.

69 Fulcrand, H.; Doco Thierry, **Es-Safi, N.;** Cheynier, V.; Moutounet, M. (**1996**). Study of the acetaldehyde-induced polymerization of flavan 3-ols by liquid chromatography-ion spray mass spectrometry. *Journal of Chromatography A*, *752*, 85.

70 Hmamouchi, M.; **Es-Safi, N.;** Pellecuer, J.; Essassi, E. M. (**1995**). Composition anthocyanique des pellicules de raisin de quatre cépages provenant du Maroc. *Bulletin de l'Office International de la Vigne*, *68 (777-778)*, 905-919.

71 Hmamouchi, M.; **Es-Safi, N.;** Boubekri, C.; Bourzeix, M.; Essassi, E.M. (**1994**). Analyse qualitative et quantitative des proanthocyanidols de la grappe de raisin de quatre cépages provenant du Maroc. *Bulletin de l'Office International de la Vigne*, *67 (765-766),* 901-915.

72 **Es-Safi, N.;** Hmamouchi, M.; Tantaoui-Elaraki, A., Agoumi, A. (**1991**). Influence de

la durée d'incubation sur l'activité antimicrobienne des huiles essentielles d'eucalyptus. *Al Biruniya, Rev. Mar. Pharm.*, *7*, 113.

73 Hmamouchi, M.; **Es-Safi, N.** (**1990**). Contribution à l'étude des tanins d'Eucalyptus. II- Analyse quantitative. *Al Biruniya, Rev. Mar. Pharm*., *6*, 109.

74 Hmamouchi, M.; Tantaoui-Elaraki, A.; **Es-Safi, N.** (**1990**). Mise en évidence des proprétés antimicrobiennes des tanins extraits d'eucalyptus. *Al Biruniya, Rev. Mar. Pharm*., *6*, 9.

75 Hmamouchi, M.; Tantaoui-Elaraki, A.; **Es-Safi, N.;** Agoumi, A. (**1990**). Mise en évidence des proprétés antibactériennes et antifongiques des huiles essentielles d'eucalyptus. *Plantes Médicinales et Phytothérapie*, *24*, 278.

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Curriculum Vitae

**Holly E. Johnson, Ph.D.**
2502 5th St.#3 Santa Monica, CA 90405 holly@alkemist.com 808.631.8823

## Academic Degrees

2007 Ph.D. in Pharmacognosy
Specialization: Natural Products Chemistry & Medical Ethnobotany
Department of Medicinal Chemistry & Pharmacognosy
Program for Collaborative Research in the Pharmaceutical Sciences
College of Pharmacy, University of Illinois – Chicago, IL

1997 B.S. in Environmental Biology, B.S. in Botany
Department of Biological Sciences
Humboldt State University, Arcata, CA

## Professional Experience

| | |
|---|---|
| 2014 - present | **Laboratory Director**, Alkemist Labs, Costa Mesa, CA |
| 2013 – 2014 | **Senior Field Applications Chemist**, Waters Corp., Milford, MA |
| 2011 – 2013 | **Adjunct Professor**, University of Hawaii, Lihue, HI |
| 2009 – present | **Research Associate**, National Tropical Botanic Garden, Kalaheo, HI |
| 2009 – 2011 | **Researcher**, University of Hawaii – Manoa, College of Tropical Agriculture & Human Resources, Kapaa, HI |
| 2007 – 2011 | **Visiting Assistant Professor**, Weber State University, Department of Botany, Ogden, UT |
| 2007 – 2009 | **Postdoctoral Research Fellow**, Institute for Ethnomedicine, Jackson, WY |
| 2005 – 2007 | **Senior Analytical Technician**, California State University -Fullerton Department of Biological Sciences, Fullerton, CA |
| 2003 – 2005 | **Analytical Chemistry Consultant**, Institute for Ethnobotany, Acacia Lab, National Tropical Botanic Garden, Kalaheo, HI |
| 2000 – 2003 | **Pre-Doctoral Fellow**, National Institutes of Health Center for Botanical Dietary Supplements Research, Chicago, IL |
| 1998 – 2002 | **Pharmacology/Toxicology Production Associate**, NAPRALERT™ Database, University of Illinois – Chicago, IL |
| 1997 – 2000 | **Research & Teaching Assistant**, National Cooperative Drug Discovery Group, Program for Collaborative Research in the Pharmaceutical Sciences, Chicago, IL |

## Honors

| | |
|---|---|
| 2001 – 2003 | National Research Service Awards (NIH #1F31AT000064-01 & NIH #5F31AT000064-02) National Institutes for Health - Center for Botanical Dietary Supplements Research in Women's Health |
| 2000 | Charles Wesley Petranek Memorial Scholar<br>University of Illinois – Chicago |
| 1997 | Meredith Botany Scholar<br>Humboldt State University |

## Research Interests

Botanical dietary supplements; natural products chemistry;
analytical methods development & validation for natural products;
ethnopharmacology; biologically active compounds from plants and cyanobacteria.

## Field Experience

Dominican Republic, Puerto Rico, Mexico, Venezuela, El Salvador, Costa Rica, Peru, Guam, American Samoa, Western Samoa, Tonga, Fiji, Sweden, Canada, the Hawaiian Islands, continental U.S.A. including California, Wyoming, N. Carolina & Florida.

## Membership in Professional Societies & Advisory Boards

American Association for the Advancement of Science
American Botanical Council Advisory Board
American Chemical Society
American Herbal Products Association
American Herbal Pharmacoepia Advisory Board
American Society of Pharmacognosy
AOAC International
Botanical Society of America
International Society for Ethnopharmacology
Society for Economic Botany
Phytochemical Society of North America

**Selected Publications**

Johnson HE, Acebes AC, Watts NE. 2014
Development and Validation of multiplex PCR bioassays for probing host-parasitoid interactions in biological control of the banana aphid (*Pentalonia nigronervosa*) in Hawaiian taro (*Colocasia esculenta )* fields. **Ecological Applications**

Kirby J, Nishimoto M, Park JG, Withers ST, Nowroozi F, Behrendt D, Fortman JL, Johnson HE, Anderson JV, Keasling JD 2010.
Cloning of casbene & neocasbene synthases from Euphorbiaceae plants and expression in *Saccharomyces cerevisiae*.
**Phytochemistry** 71:1466-1473.

Johnson HE, Banack SA, Cox PA. 2008
Variability in content of the anti-AIDS drug
candidate prostratin in Samoan populations of *Homolanthus nutans*.
**Journal of Natural Products** 71(12): 2041-2044.

Johnson HE, King SR, Banack SA, Webster C, Callanaupa WJ, Cox PA. 2008
Cyanobacteria (*Nostoc commune*) used as a dietary item in the Peruvian highlands produce the neurotoxic amino acid BMAA.
**Journal of Ethnopharmacology**. 118(1):159-65.

Cox PA, Johnson HE, Tavana G. 2008
Giving Samoan healers credit for prostratin.
**Science**. 320(5883):1589.

Banack SA, Johnson HE, Cheng R, Cox PA. 2007
Production of the neurotoxin BMAA by a marine cyanobacterium.
**Marine Drugs**. 5(4):180-96.

Buenz EJ, Bauer BA, Johnson HE, Tavana G, Beekman EM, Frank KL, Howe CL. 2006
Searching historical herbal texts for potential new drugs.
**British Medical Journal**. 333(7582):1314-5.

Buenz EJ, Johnson HE, Beekman EM, Motley TJ, Bauer BA. 2005
Bioprospecting Rumphius's Ambonese Herbal: Volume I.
**Journal of Ethnopharmacology**. 96(1-2):57-70.

# Melissa Meaney Phillips

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Silver Spring, MD 20906
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## EDUCATION

**Postdoctoral Research Chemist** **January 2008 – January 2010**
Organic Chemical Metrology Group, Analytical Chemistry Division, National Institute of Standards and Technology, Gaithersburg, MD
Project: Determination of Marker Compounds in *Vaccinium* Berries
Advisor: Dr. Lane C. Sander

**PhD in Chemistry (Analytical)** **December 2007**
Department of Chemistry, Michigan State University, East Lansing, MI
Project: Analytical Applications of Fluorescence Quenching
Advisor: Dr. Victoria L. McGuffin

**MS in Forensic Chemistry** **October 2007**
School of Criminal Justice, Michigan State University, East Lansing, MI
Project: Quantitation of Nitrated Explosives by Fluorescence Quenching following Thin-Layer Chromatography
Advisors: Dr. Victoria L. McGuffin, Dr. Jay A. Siegel, Dr. Ruth J.H. Waddell

**BS in Lyman Briggs School – Chemistry, *cum laude*** **May 2002**
Michigan State University, East Lansing, MI

## RESEARCH EXPERIENCE

**Program Coordinator, Food & Nutrition** **2013 – present**
Organic Chemical Metrology Group, Chemical Sciences Division, National Institute of Standards and Technology, Gaithersburg, MD
- Responsible for development of food Standard Reference Materials (SRMs), including identification and acquisition of materials, coordination of analytical measurements, and documentation of results
- Responsible for oversight of food and nutrition-related research projects

**Research Chemist** **2008 – present**
Organic Chemical Measurement Science Group, Chemical Sciences Division, National Institute of Standards and Technology, Gaithersburg, MD
- Evaluated various approaches for integration of data from two-dimensional liquid chromatography (LCxLC) for purposes of comparing quantitative data.
- Certified concentrations for water-soluble vitamins in food and dietary supplement SRMs (e.g., infant formula, baby food, whole milk powder, whole egg powder, soy flour, fortified breakfast cereal, soy milk, pet food, protein drink mix) using various extraction techniques and analytical methods such as liquid chromatography with isotope-dilution mass spectrometric detection (LC-ID-MS and LC-ID-MS/MS).
- Developed a method for high-precision determination and certified concentrations of choline and carnitine in food-matrix SRMs using microwave digestion and LC-ID-MS.
- Developed methods for high accuracy and high precision determination of ammonium and phosphate in a fertilizer SRM by ion chromatography with conductivity detection (IC-CD).
- Developed methods and certified concentrations of relevant active and marker compounds in botanical dietary supplement and natural product SRMs (e.g. *Vaccinium* berries, soy, St. John's wort) using various

extraction techniques and analytical methods such as liquid chromatography with absorbance (LC-Abs), gas chromatography with ID-MS, IC-CD, and LC-ID-MS.
Developed methods for separation of biomarker isomers by LC-Abs.
Administered a quality assurance program for dietary supplement laboratories, including selection and shipment of samples, communication with participants, collection and analysis of data, and formulation and distribution of final reports.
Tested and catalogued the performance (e.g. selectivity, number of theoretical plates, pressure) of over 300 liquid chromatography (LC) columns.

**Research Assistant** **2002 – 2007**
Department of Chemistry, Michigan State University
Investigated fluorescence quenching-based methods for detection of nitrated explosives by screening fluorophores based on sensitivity and incorporating them into potential field-ready devices for explosives detection.
Utilized the pH-dependent fluorescence of fluorescein for determination of acids in solution and applied this method to analysis of foods and beverages (juices, wines, and vinegars) and drugs of abuse (γ-hydroxybutyric acid or GHB) by HPLC.
Developed a less toxic method for the separation of explosives by thin-layer chromatography and quantitation based on CCD camera imaging.

**TEACHING EXPERIENCE**

**Teaching Assistant** **2002 – 2007**
Department of Chemistry, Michigan State University
Introductory Physical Chemistry I (Recitation Instructor) Physical chemistry of macroscopic systems including gases, liquids, phase diagrams, classic thermodynamics, chemical equilibrium, kinetics, electrolytic solutions and electrochemistry. Fall 2007. Instructor: Dr. John L. McCracken, enrollment: 280.
Advanced Analytical Chemistry (Teaching Assistant) Basic electronics and data acquisition/analysis, electrochemistry, and statistics for chemists. Fall 2006. Instructors: Dr. Merlin L. Bruening and Dr. Gary J. Blanchard, enrollment: 20.
Advanced Analytical Chemistry (Teaching Assistant) Principles of equilibria and applications in analytical methodology including acid-base, complexation, redox reactions, potentiometry and conductometry, solute partitioning in extraction and chromatography, and kinetic methods of analysis. Fall 2005. Instructor: Dr. Victoria L. McGuffin, enrollment: 12.
Quantitative Analysis (Recitation and Laboratory Instructor) Preparation and quantitative analysis of chemical compounds, including solution descriptions, solution chemistry (acid/base, solubility, complexation, oxidation-reduction reactions), titrimetry, volumetric calculations, statistics, chemical equilibrium, activity, buffers, indicators, gravimetric analysis, equilibrium, introductory spectroscopy, and calibration curves. Summer 2003, 2004, 2005, 2006, 2007. Instructor: Dr. Kathryn G. Severin, enrollment: 30.
Analytical Laboratory (Laboratory Instructor) A project-based capstone course in which students solve analytical chemical problems including chromatographic separations (GCMS or HPLC), spectroscopic (AA or XRF) and electrochemical methods (potentiometry or stripping voltammetry), deformulation of a household product using available techniques, computer programming using Labview, and surface and interface analysis. Spring 2003, 2004, 2005, 2006, 2007. Instructors: Dr. Merlin L. Bruening and Dr. Kathryn G. Severin, enrollment: 15-30.
Introductory Physical Chemistry I (Recitation Instructor) Physical chemistry of macroscopic systems including gases, liquids, phase diagrams, classic thermodynamics, chemical equilibrium, kinetics, electrolytic solutions and electrochemistry, and statistical mechanics. Fall 2002, 2003, 2004. Instructor: Dr. Paul F. Mantica, enrollment: 280.

**Undergraduate Research Mentor** **2004 – 2007**
Department of Chemistry, Michigan State University
Heidi L. Bonta, Michigan State University: Incorporation of Selected Fluorophores into Field-Ready Devices for the Detection of Nitrated Explosives. Fall 2006-Fall 2007.

Jenny M. Borowitz, Michigan State University: Quantitation of Nitrated Explosives by Fluorescence Quenching following Thin-Layer Chromatography. Summer 2005-Spring 2006.
Victoria J. Hall, Huntington University: Selectivity of Fluorescein Quenching by Nitroaromatic Compounds. Summer 2004.

**Guest Lecturer** **2005**
Forensic Science Workshop, Portage Northern High School, Portage, MI
Developed and presented forensic science-based laboratory experiments to 25 high school science teachers interested in incorporation of such materials into the classroom. Experiments included determination of blood alcohol content using visible spectrophotometry following reaction with a chromophore as well as comparison of soil composition (e.g. limestone, chloride, iron) using observation and visible spectrophotometry following addition of appropriate indicator solutions.

**Guest Lecturer** **2004**
School of Criminal Justice, Michigan State University
Survey of Forensic Science. Scientific analysis of physical evidence. Four major aspects of physical evidence using real criminal and civil cases: generation of physical evidence by criminal activity; collection and preservation of physical evidence; analysis of physical evidence by forensic science laboratory; presentation of scientific expert testimony in court. Topics covered: Fire/arson and explosives analysis. Fall 2004. Instructor: Dr. David R. Foran, enrollment: 15.

**Tutor** **2003 – 2005**
Department of Chemistry, Michigan State University
General Chemistry II and Introductory Physical Chemistry.

**Undergraduate Teaching Assistant** **2001**
Department of Mathematics, Michigan State University
Multivariable Calculus (Recitation Instructor) Vectors in space, functions of several variables and partial differentiation, multiple integrals, line and surface integrals, and Green's and Stokes's theorems. Spring 2001. Instructor: Dr. Khodr M. Shamseddine, enrollment: 600.

**PROFESSIONAL AFFILIATIONS**

| | |
|---|---|
| American Chemical Society (ACS) | 2004-present |
| ACS Subdivision on Chromatography and Separations Chemistry | 2009-present |
| AOAC International | 2008-present |
| AOAC International Technical Division on Reference Materials | 2011-present |
| Washington Chromatography Discussion Group | 2008-present |
| American Academy of Forensic Sciences | 2004-2008 |
| Society of Electroanalytical Chemistry | 2004-2008 |
| Midwestern Association of Forensic Scientists | 2007-2008 |
| Society for Applied Spectroscopy | 2007-2008 |

**PROFESSIONAL DEVELOPMENT**

**Participant, The New ISO 13528:2015 Workshop on updated statistical methods for PT,** Training Course, QuoData GmbH (2016).

**Participant, Introduction to Chemometrics,** Short Course, Washington Chromatography Discussion Group (2013).

**Participant, Comprehensive Two-Dimensional Liquid Chromatography (LCxLC) Short Course,** HPLC 2013 (2013).

**Participant, Fundamentals of Uncertainty Analysis**, National Institute of Standards and Technology Short Course (2012).

**Participant, ISO 17043 Proficiency Testing Workshop,** National Voluntary Laboratory Accreditation Program (NVLAP) (2011).

**Participant, Introduction to Mass Spectrometry and Interpretation of Mass Spectra**, Baltimore-Washington Mass Spectrometry Discussion Group Short Course (2010).

**Participant, Single Laboratory Validation of Analytical Methods for Dietary Supplements**, AOAC Training Course (2008).

**Participant, Advanced HPLC Method Development**, Washington Chromatography Discussion Group Short Course (2008).

**Participant, Creating a Teaching Philosophy You Can Use**, Workshop, Teaching Assistant Programs, Michigan State University (2007).

**Participant, Talking about Teaching in the Interview**, Workshop, Teaching Assistant Programs, Michigan State University (2007).

**Participant, Understanding and Handling Classroom Incivility**, Workshop, Teaching Assistant Programs, Michigan State University (2007).

**Participant, Using Demonstrations to Promote Conceptual Understanding in Chemistry: Making Connections on the Macroscopic, Microscopic, and Symbolic Levels**, Lilly Seminar Series, Office of Faculty and Organizational Development, Michigan State University (2006).

**Participant, Making Classroom Lectures Interactive and Effective: Engaging Students in Course Content through Interactive Lecturing**, Lilly Seminar Series, Office of Faculty and Organizational Development, Michigan State University (2006).

**ACADEMIC AND PROFESSIONAL SERVICE**

**Co-Guest Editor,** Journal of AOAC International, AOAC International (2016)
Special Section on Reference Materials with 6 original research articles

**Co-Chair,** Proficiency Testing Task Force, Stakeholder Panel on Infant Formula and Adult Nutritionals, AOAC International, Gaithersburg, MD (2015-present)
Provided expert guidance in establishing a proficiency testing program for infant formulas and adult nutritionals. Designed studies, including analyte and matrix selection, and established protocols for new program.

**Member,** AOAC INTERNATIONAL Editorial Board (2014-present)

**Co-Chair,** International Vitamin Conference (IVC), Washington, DC (2014)

**Member,** General Chapters Chemical Analysis Expert Committee, United States Pharmacopeia, Rockville, MD (2010-2015)
Review and approve changes to USP guidelines related to chemical analysis.
Member of Subcommittee on Dietary Supplements.
Member of Expert Panel on Elemental Impurities.

**Stakeholder, Working Group Member, and Expert Review Panel Member,** Stakeholder Panel on Infant Formula and Adult Nutritionals, AOAC International, Gaithersburg, MD (2010-present)
Provided expert guidance on method performance requirements for determination of vitamins in infant formulas.

**Stakeholder, Working Group Member, and Expert Review Panel Member,** Stakeholder Panel on Strategic Food Analytical Methods, AOAC International, Gaithersburg, MD (2014-present)
Provided expert guidance on method performance requirements for determination of analytes of interest in foods.

**Stakeholder, Working Group Member, and Expert Review Panel Member,** Stakeholder Panel on Dietary Supplements, AOAC International, Gaithersburg, MD (2014-present)
Provided expert guidance on method performance requirements for determination of analytes of interest in dietary supplements.

**Co-Guest Editor,** Analytical and Bioanalytical Chemistry, Springer (2012)
Special Issue on Functional Food and Dietary Supplements with 25 original research articles and critical reviews

**Poster Committee,** HPLC Conference, Boston, MA (2010)
Judged poster presentations to help identify a contest winner.

**Presenter,** Kids Adventures, Carderock Springs Elementary School, Bethesda, MD (2014)
Presented science demonstrations to elementary children.

**Presenter,** Kids Adventures, Rock Creek Forest Elementary School, Chevy Chase, MD (2009, 2013)
Presented science demonstrations to elementary children.
Developed a lab to demonstrate pH using red cabbage indicator and household chemicals.

**Presenter,** Kids Adventures, Candlewood Elementary School, Derwood, MD (2013)
Presented science demonstrations to elementary children.

**Presenter,** USA Science and Engineering Festival, Washington, DC (2012)

Presented science demonstrations to elementary children.

**Presenter,** Take your Daughters and Sons to Work Day**,** NIST, Gaithersburg, MD (April 2008-2010)
Developed a hands-on activity for 11 – 12 year olds.
Demonstrated chromatography principals using paper chromatography and separating food dye in grape soda.

**Secretary**, Washington Chromatography Discussion Group (2009-2015)

**Board Member**, Washington Chromatography Discussion Group (2008-2009)

**Poster Committee**, HPLC Conference, Baltimore, MD (2008)
Judged poster presentations to help identify a contest winner.

**Co-chair and Member**, ACS Women in Chemistry, Michigan State Local Section American Chemical Society (Member 2002-2007; Co-Chair 2004-2005)
American Chemical Society's National Chemistry Week. Performed demonstrations. Coordinated 30 demonstration teams in 2004.
Girls Math/Science Conference. Coordinated a hands-on session entitled "Solving Murder with Makeup" for sixth-grade girls. Sponsored by the Capital Area Science and Math Center.
Awards
Sustained Effort toward Excellence in Diversity, Office of Affirmative Action, Michigan State University, 2006.
Outstanding Overall Local Section Women Chemist Committee, American Chemical Society, 2003, 2004, 2005.
Outstanding Outreach to Girls or Young Women Finalist, American Chemical Society, 2003.

**Co-chair and Member, Orientation Committee**, Department of Chemistry, Michigan State University
Coordinated the orientation schedule for incoming graduate students. Organized and raised funds for a department-wide picnic. (Member 2003, 2004; Co-Chair 2005, 2006)

**Graduate Student Representative, Educational Policies Committee**, Department of Chemistry, Michigan State University
Modified graduate program course requirements and the written component for Ph.D. candidacy. Integrated a biological chemistry area into the department beginning Fall 2006. (2004-2007)

**Co-editor, Teaching Assistant Manual**, Department of Chemistry, Michigan State University
Prepared a document to assist incoming graduate students in their first experiences with teaching, including sections on learning styles, the types of students at MSU, tips on being an effective instructor, and a resource guide. (2004, 2006)

**Co-author and Presenter, University Policies and Procedures on Teaching**, Department of Chemistry, Michigan State University
Authored and delivered presentations designed to supplement the Teaching Assistant Manual, including skits and sections on learning styles, sexual harassment, academic dishonesty, and potential classroom situations. (2004-2006)

**Coordinator and Volunteer, Scout Chemistry Merit Badge Day**, Michigan State University
Coordinated a series of hands-on experiments and demonstrations in which 50 boy and girl scouts fulfill the requirements for the Chemistry Merit Badge. Administered a web-based sign up, communicated with scout leaders and parents, and organized volunteers. (Coordinator 2005-2006; Volunteer 2004)

**State Event Supervisor and Volunteer, Chemistry Lab**, Michigan Science Olympiad

Wrote and administered a laboratory practical for high school competition. Topics included thermodynamics, molecular structures, colligative properties, and redox reactions. Coordinated volunteers to set-up, proctor, and grade exams. (State Event Supervisor 2005, 2007; Volunteer 2006)

**Graduate Student Representative, Advisory Committee to the Chair**, Department of Chemistry, Michigan State University

Advised on departmental issues important to graduate students. Developed goals for other departmental committees. (2005-2007)

**Graduate Student Representative, Anti-Discrimination Judicial Board**, Michigan State University

Advised the President on issues related to discrimination in policy and procedure. (2005-2007)

**Coordinator, "Things Every Scientist Should Know – Outside the Laboratory"**, Women in Chemistry, Michigan State University

Coordinated speakers on topics including intellectual properties, alternative careers in the sciences, conflict resolution, health and wellness, scientific writing, and financial planning. Received a Local Section Innovative Grant from the American Chemical Society to support the seminar series. (2005)

## HONORS AND AWARDS

2015 William P. Slichter Award, NIST
2015 Expert Review Panel of the Year Member, AOAC International
2015 Best Poster Award, Scripps 12th Annual Natural Supplements: An Evidence Based Update
2013 Best Poster Award, HPLC 2013
2007 Educational Merit Fellowship, Department of Chemistry, Michigan State University
2007 Travel Fellowship, School of Criminal Justice, Michigan State University
2007 Travel Fellowship, American Chemical Society Michigan State University Local Section
2006 Educational Merit Fellowship, Department of Chemistry, Michigan State University
2006 Outstanding Graduate Student Woman, Faculty-Professional Women's Association, Michigan State University
2006 Excellence-in-Teaching Citation, College of Natural Science, Michigan State University
2006 Travel Fellowship, The Graduate School, Michigan State University
2005 Tracy A. Hammer Outstanding Graduate Student Award, College of Natural Science, Michigan State University
2005 Educational Merit Fellowship, Department of Chemistry, Michigan State University
2005 Travel Fellowship, Council of Graduate Students, Michigan State University
2002 Recruitment Fellowship, Department of Chemistry, Michigan State University

## INVITED PUBLICATIONS

Melissa M. Phillips. "Choline: Properties and Determination." In: Caballero, B., Finglas, P., and Toldrá, F. (eds.) *The Encyclopedia of Food and Health* vol. 2, pp. 73-78. Oxford: Academic Press. (2016)

Catherine A. Rimmer, Melissa M. Phillips. "Solution to Certified Reference Material Recipe Challenge." *Anal. Bioanal. Chem.* 405 (2013) 6899-6900.

Catherine A. Rimmer, Melissa M. Phillips. "Certified Reference Material Recipe Challenge." *Anal. Bioanal. Chem.* 405 (2013) 4321-4322.

Melissa M. Phillips, Catherine A. Rimmer. "Functional Foods and Dietary Supplements." *Anal. Bioanal. Chem.* 405 (2013) 4323-4324.

Melissa M. Phillips. "Analytical Approaches to Determination of Total Choline in Foods and Dietary Supplements." *Anal. Bioanal. Chem.* 403 (2012) 2103-2112.

Hendrik Emons, Jane Weitzel, John Budin, Melissa Phillips, Catherine Rimmer, Donna Zink. "TDRM/TDLM Workshop on Reference Materials and Laboratory Accreditation at the AOAC Annual Meeting 2011." *Inside Laboratory Management*. (Nov/Dec 2011) 6-7.

Melissa M. Phillips. "André M. Striegel, Wallace W. Yau, Joseph J. Kirkland, and Donald D. Bly (Eds.): Modern size-exclusion liquid chromatography. Practice of gel permeation and gel filtration chromatography, 2nd ed." *Anal. Bioanal. Chem.* 399 (2011) 1571-2.

Catherine A. Rimmer, Melissa M. Phillips. "Analytical Tools for the Dietary Supplement and Food Laboratory." *Natural Products Insider* (Mar 7, 2011).

Paula Brown, Melissa Phillips, Catherine Rimmer, Laura Wood. "Quality Focus: GMPs: The Other Pieces of the Puzzle." *Nutraceuticals World*. (Jan/Feb 2011) 28-29.

Paula Brown, Catherine Rimmer, Melissa Phillips, Laura Wood. "Quality Focus: The GMP Puzzle: What's in Your Box?" *Nutraceuticals World*. (Nov 2010) 28-29.

**PEER-REVIEWED SCIENTIFIC PUBLICATIONS**

Melissa M. Phillips, Mary Bedner, Manuela Gradl, Carolyn Q. Burdette, Michael A. Nelson, James H. Yen, Lane C. Sander, Catherine A. Rimmer. "Liquid Chromatography with Absorbance Detection and with Isotope-Dilution Mass Spectrometry for Determination of Isoflavones in Soy Standard Reference Materials." (in preparation)

Janet Maxwell Roseland, Kristine Y. Patterson, Karen W. Andrews, Katherine M. Phillips, Melissa M. Phillips, Pamela R. Pehrsson, Guy L. Dufresne, Jette Jakobsen, Pavel A. Gusev, Sushma Savarala, Quynhanh V. Nguyen, Andrew J. Makowski, Chad R. Scheuerell, Guillaume P. Larouche, Stephen A. Wise, James M. Harnly, Juhi R. Williams, Joseph M. Betz, and Christine L. Taylor. "Interlaboratory Trial for Measurement of Vitamin D and 25-Hydroxyvitamin D [25(OH)D] in Foods and a Dietary Supplement Using Liquid Chromatography–Mass Spectrometry." *J. Agric. Food Chem.* 64 (2016) 3167-3175.

Lynn X. Zhang, Carolyn Q. Burdette, Melissa M. Phillips, Catherine A. Rimmer, R. Kenneth Marcus. "Determination of Isoflavone Content in SRM 3238 Using Liquid Chromatography-Particle Beam/Electron Ionization Mass Spectrometry." *J. AOAC Int.* 98 (2015) 1483-1490.

Melissa M. Phillips. "Liquid Chromatography with Isotope-Dilution Mass Spectrometry for Determination of Water-Soluble Vitamins in Foods." *Anal. Bioanal. Chem.* 407 (2015) 2965-2974.

Benjamin J. Place, Mallory J. Morris, Melissa M. Phillips, Lane C. Sander, Catherine A. Rimmer. "Evaluation of the Impact of Peak Description on the Quantitative Capabilities of Comprehensive Two-Dimensional Liquid Chromatography." *J. Chromatogr. A* 1368 (2014) 107-115.

Laura J. Wood, Katrice A. Lippa, Melissa M. Phillips, Catherine A. Rimmer, N. Alan Heckert, Stefan D. Leigh, Amanda J. Moors, Rebecca S. Pugh, and Lauren B. Rust. "Breakfast Cereal Sampling Study for Nutritional Elements." *Anal. Bioanal. Chem.* 405 (2013) 4569-4578.

Mark S. Lowenthal, Melissa M. Phillips, Catherine A. Rimmer, Paul A. Rudnick, Yamil Simón-Manso, Stephen E. Stein, Dmitrii Tchekhovskoi, Karen W. Phinney. "Developing Qualitative LC-MS Methods for Characterization of *Vaccinium* Berry Standard Reference Materials." *Anal. Bioanal. Chem.* 405 (2013) 4451-4465.

Lane C. Sander, Mary Bedner, David L. Duewer, Katrice A. Lippa, Melissa M. Phillips, Karen W. Phinney, Catherine A. Rimmer, Michelle M. Schantz, Katherine E. Sharpless, Susan Tai, Jeanice B. Thomas, Stephen A. Wise, Laura J. Wood. "The Development and Implementation of Quality Assurance Programs to Support Nutrient Measurements." *Anal. Bioanal. Chem.* 405 (2013) 4437-4441.

Melissa M. Phillips, Katherine E. Sharpless, Stephen A. Wise. "Standard Reference Materials for Foods: A Program Update." *Anal. Bioanal. Chem.* 405 (2013) 4325-4335.

Melissa M. Phillips, Lane C. Sander. "Microwave-Assisted Extraction and Quantitative LC/IDMS Measurement of Total Choline and Free Carnitine in Foods." *J. AOAC Int.* 95 (2012) 1479-1486.

Hendrik Emons, Jane Weitzel, John Budin, Melissa Phillips, Catherine Rimmer, Donna Zink. "TDRM/TDLM Workshop on Reference Materials and Laboratory Accreditation at the AOAC Annual Meeting 2011." *Accred. Qual. Assur.* 17 (2012) 101-105.

Melissa M. Phillips, Catherine A. Rimmer, Laura J. Wood, Katrice A. Lippa, Katherine E. Sharpless, David L. Duewer, Lane C. Sander, Joseph M. Betz. "NIST/NIH Dietary Supplement Laboratory Quality Assurance Program: The First Five Exercises." *J. AOAC Int.* 94 (2011) 803-814.

Ryan G. Brennan, Melissa M. Phillips, Liang Y.O. Yang, Thomas P. Moffat. "Characterization and Purification of Commercial SPS and MPS by Ion Chromatography and Mass Spectrometry." *J. Electrochem. Soc.* 158 (2011) D178-86.

Melissa M. Phillips, Ryan J. Case, Catherine A. Rimmer, Katherine E. Sharpless, Stephen A. Wise, Lane C. Sander. "Determination of Organic Acids in *Vaccinium* Berry Standard Reference Materials." *Anal. Bioanal. Chem.* 398 (2010) 425-434.

Melissa S. Meaney, Victoria L. McGuffin. "Investigation of Common Fluorophores for the Detection of Nitrated Explosives by Fluorescence Quenching." *Anal. Chim. Acta* 610 (2008) 57-67.

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**NIST SPECIAL PUBLICATIONS**

Melissa M. Phillips, Catherine A. Rimmer, Laura J. Wood. "Dietary Supplement Laboratory Quality Assurance Program: Exercise K Final Report." NIST Interagency Report 8032. Gaithersburg, MD, USA. DOI: 10.6028/NIST.IR.8032. http://dx.doi.org/10.6028/NIST.IR.8032 (November 2014).

Melissa M. Phillips, Catherine A. Rimmer, Laura J. Wood, Mary Bedner, Kaitlyn D. Chieh, Rick L. Paul. "Dietary Supplement Laboratory Quality Assurance Program: Exercise J Final Report." NIST Interagency Report 7997. Gaithersburg, MD, USA. DOI: 10.6028/NIST.IR.7997. http://dx.doi.org/10.6028/NIST.IR.7997 (April 2014).

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Melissa M. Phillips, Catherine A. Rimmer, Laura J. Wood, Anthony F. Marlow, Michele M. Schantz, John R. Sieber. "Dietary Supplement Laboratory Quality Assurance Program: Exercise H Final Report." NIST Interagency Report 7903. Gaithersburg, MD, USA. DOI: 10.6028/NIST.IR.7903. http://dx.doi.org/10.6028/NIST.IR.7903 (Dec 2012).

**PUBLISHED ABSTRACTS**

Melissa M. Phillips. "NIST Tools for Quality Assurance in Botanical Dietary Supplement Measurements." *Planta Med.*, 77 (2011).

**INVITED PRESENTATIONS**

Melissa M. Phillips, Laura J. Wood, Katherine E. Sharpless, Stephen A. Wise. "Food Reference Materials for Nutritional Assessment." 14th Biological and Environmental Reference Material (BERM) Symposium, Washington, DC, October 2015.

Melissa M. Phillips. "The Role of Standard Reference Materials in Method Performance Verification Studies." 128th AOAC INTERNATIONAL Annual Meeting and Exposition, Boca Raton, FL, September 2014.

Melissa M. Phillips. "Metrology 101: No Umbrella Required." Penn State Erie, The Behrend College, Erie, PA, December 2013.

Melissa M. Phillips. "Eggs, Milk, Cereal, and Meat: SRMs for Breakfast." The Pittsburgh Conference, Philadelphia, PA, March 2013.

Melissa M. Phillips. "Challenges in the Certification of Dietary Supplement Standard Reference Materials." The Pittsburgh Conference, Orlando, FL, March 2012.

Melissa M. Phillips. "NIST Tools for Quality Assurance in Botanical Dietary Supplement Measurements." 10th Annual International Conference on the Science of Botanicals, Oxford, MS, April 2011.

Melissa M. Phillips, Lane C. Sander, Katherine E. Sharpless, Stephen A. Wise. "The Journey of a Standard Reference Material." College of the Holy Cross, Worcester, MA, June 2010.

Melissa M. Phillips, Lane C. Sander, Katherine E. Sharpless, Stephen A. Wise. "Development of Cranberry Juice Cocktail and Other Related Reference Materials." 123rd AOAC Annual Meeting and Exposition, Philadelphia, PA, September 2009.

Melissa S. Meaney, Lane C. Sander, Katherine E. Sharpless, Stephen A. Wise. "Characterization of NIST Dietary Supplement SRMs." Chromatography Forum of the Delaware Valley Spring Symposium, Fort Washington, PA, April 2009.

**ORAL PRESENTATIONS**

Melissa M. Phillips, Catherine A. Rimmer. "NIST Tools for the Analysis of Dietary Supplements and Foods." SupplySide East, Secaucus, NJ, May 2011.

Melissa M. Phillips, Lane C. Sander, Katherine E. Sharpless, and Stephen A. Wise. "Determination of Water-Soluble Vitamins in NIST Food Matrix SRMs." The Pittsburgh Conference, Atlanta, GA, March 2011.

Melissa M. Phillips, Catherine A. Rimmer, Lane C. Sander, Katherine E. Sharpless, and Stephen A. Wise. "Determination of Vitamins in NIST Food Matrix SRMs." The Pittsburgh Conference, Orlando, FL, March 2010.

Melissa M. Phillips, Lane C. Sander, Katherine E. Sharpless, Stephen A. Wise. "Certification of Organic Acid and Flavonol Concentrations in *Vaccinium* Berry Standard Reference Materials (SRMs)." 238th American Chemical Society National Meeting and Exposition, Washington, DC, August 2009.

Melissa S. Meaney, Victoria L. McGuffin. "Fluorescence Quenching of Fluorescein for the Detection of Acids in Forensic Samples." The Pittsburgh Conference, Chicago, IL, March 2007.

Melissa S. Meaney, Victoria L. McGuffin. "Fluorescence Quenching of Fluorescein for the Detection of Carboxylic Acids." The Pittsburgh Conference, Orlando, FL, March 2006.

Melissa S. Meaney, Victoria L. McGuffin. "Investigation of Common Fluorophores for the Detection of Nitrated Explosives by Fluorescence Quenching." The Pittsburgh Conference, Orlando, FL, March 2005.

**POSTER PRESENTATIONS**

Melissa M Phillips, Catherine A Rimmer, Laura J Wood, Joseph M Betz. "NIST Tools for Dietary Supplements Testing: Ensuring Quality in Commercial Products." 13th Annual Natural Supplements: An Evidence-Based Update, San Diego, CA, January 2016.

Catherine A Rimmer, Melissa M Phillips, Michele M Schantz, Laura J Wood, Lee Yu, Joseph M Betz. "Marine Reference Materials for Dietary Supplement Analysis." 13th Annual Natural Supplements: An Evidence-Based Update, San Diego, CA, January 2016.

Melissa M Phillips, Catherine A Rimmer, Laura J Wood, Joseph M Betz. "Interlaboratory Studies for Dietary Supplements: Fundamentals for Understanding Supplement Composition." 14th Biological and Environmental Reference Material (BERM) Symposium, Washington, DC, October 2015.

Melissa M. Phillips, Benjamin J. Place, Catherine A. Rimmer, Lane C. Sander, Katherine E. Sharpless, Stephen A. Wise. "Characterization of Polyphenols in Vaccinium Berry Dietary Supplement Standard Reference Materials." 14th Biological and Environmental Reference Material (BERM) Symposium, Washington, DC, October 2015.

Laura J. Wood, Melissa M. Phillips, Joseph F. Browning, Johanna E. Camara, Kaitlyn D. Chieh, Siva K. R. Chinthalapati, Grace E. Hahm, John Molloy, Rick L. Paul, Savelas A. Rabb, Michele M. Schantz, Katherine E. Sharpless, John R. Sieber, Lee L. Yu. "Characterization of a New Total Nutrient Standard Reference Material: Dry Cat Food." 14th Biological and Environmental Reference Material (BERM) Symposium, Washington, DC, October 2015.

Melissa M. Phillips, Laura J. Wood, Joseph F. Browning, Johanna E. Camara, Kaitlyn D. Chieh, W. Clay Davis, Grace E. Hahm, Jeanita S. Pritchett, Michele M. Schantz, Katherine E. Sharpless, John R. Sieber, Lorna T. Sniegoski, Michael J. Welch. "Characterization of a New Total Nutrient Standard Reference Material: Protein Drink Mix." 14th Biological and Environmental Reference Material (BERM) Symposium, Washington, DC, October 2015.

Brittany L. Catron, Kaitlyn D. Chieh, Peter B. Howell, Stephen E. Long, Karen E. Murphy, Michael A. Nelson, Rick L. Paul, Melissa M. Phillips, Catherine A. Rimmer, Lane C. Sander, Katherine E. Sharpless, Stephen A. Wise, Laura J. Wood. "Characterization of St. John's Wort Standard Reference Materials (SRMs)." 14th Biological and Environmental Reference Material (BERM) Symposium, Washington, DC, October 2015.

Melissa M. Phillips, Laura J. Wood, Catherine A. Rimmer, Mary Bedner, Jeanice B. Thomas, Katherine E. Sharpless, Lane C. Sander, Stephen A. Wise. "Soy Standard Reference Materials (SRMs) for Quality Assurance in Nutrition Measurements." 14th Biological and Environmental Reference Material (BERM) Symposium, Washington, DC, October 2015.

Melissa M. Phillips, Johanna E. Camara, Grace E. Hahm, Karen W. Phinney, Lane C. Sander, and Stephen A. Wise. "Using Isotope Dilution with LC/MS and LC/MS/MS to Measure Water-Soluble Vitamins in NIST Unfortified and Fortified Food-Matrix SRMs." 14th Biological and Environmental Reference Material (BERM) Symposium, Washington, DC, October 2015.

Melissa M Phillips, Catherine A Rimmer, Laura J Wood, Joseph M Betz. "Interlaboratory Studies for Dietary Supplements: Fundamentals for Understanding Supplement Composition." 129th AOAC INTERNATIONAL Annual Meeting and Exposition, Los Angeles, CA, September 2015.

Hannah Simon, Melissa M. Phillips, Catherine A. Rimmer, Caleb J. Porter. "Value Assignment of Curcuminoids in Turmeric Standard Reference Materials." 129th AOAC INTERNATIONAL Annual Meeting and Exposition, Los Angeles, CA, September 2015.

Melissa M. Phillips, Laura J. Wood, Joseph F. Browning, Johanna E. Camara, Kaitlyn D. Chieh, W. Clay Davis, Grace E. Hahm, Jeanita S. Pritchett, Michele M. Schantz, Katherine E. Sharpless, John R. Sieber, Lorna T. Sniegoski, Michael J. Welch. "Characterization of a New Total Nutrient Standard Reference Material: Protein Drink Mix." 129th AOAC INTERNATIONAL Annual Meeting and Exposition, Los Angeles, CA, September 2015.

Brittany L. Catron, Kaitlyn D. Chieh, Peter B. Howell, Stephen E. Long, Karen E. Murphy, Michael A. Nelson, Rick L. Paul, Melissa M. Phillips, Catherine A. Rimmer, Lane C. Sander, Katherine E. Sharpless, Stephen A. Wise, Laura J. Wood. "Characterization of St. John's Wort Standard Reference Materials (SRMs)." 129th AOAC INTERNATIONAL Annual Meeting and Exposition, Los Angeles, CA, September 2015.

Melissa M. Phillips, Laura J. Wood, Catherine A. Rimmer, Mary Bedner, Jeanice B. Thomas, Katherine E. Sharpless, Lane C. Sander, Stephen A. Wise. "Soy Standard Reference Materials (SRMs) for Quality Assurance in Nutrition Measurements." 129th AOAC INTERNATIONAL Annual Meeting and Exposition, Los Angeles, CA, September 2015.

Melissa M Phillips, Catherine A Rimmer, Laura J Wood, Joseph M Betz. "Interlaboratory Studies for Dietary Supplements: Fundamentals for Understanding Supplement Composition." 12th Annual Natural Supplements: An Evidence-Based Update, San Diego, CA, January 2015.

Melissa M. Phillips, Catherine A. Rimmer, Lane C. Sander. "LC-MS and LC-MS/MS for Determination of Water-Soluble Vitamins in Foods." 127th AOAC INTERNATIONAL Annual Meeting and Exposition, Chicago, IL, August 2013.

Melissa M. Phillips, Mallory J. Morris, Benjamin J. Place, Catherine A. Rimmer, Lane C. Sander. "Comparison of Commercial Software Approaches for Quantitation in Two-Dimensional Liquid Chromatography." HPLC2013, Amsterdam, the Netherlands, June 2013.

Melissa M. Phillips, Catherine A. Rimmer, Lane C. Sander. "LC-MS and LC-MS/MS for Determination of Water-Soluble Vitamins in Foods." HPLC2013, Amsterdam, the Netherlands, June 2013.

Melissa M. Phillips, Lane C. Sander, and Stephen A. Wise. "Using LC/MS/MS to Measure Water-Soluble Vitamins in NIST Unfortified Food-Matrix SRMs." 126th AOAC INTERNATIONAL Annual Meeting and Exposition, Las Vegas, NV, October 2012.

Catherine A. Rimmer, Melissa M. Phillips, Laura J. Wood. "Improving Measurement Capabilities: NIST Interlaboratory Studies for Food and Dietary Supplements." 126th AOAC INTERNATIONAL Annual Meeting and Exposition, Las Vegas, NV, October 2012.

Melissa M. Phillips, Catherine A. Rimmer, Lane C. Sander. "Microwave-Assisted Extraction and LC-MS Analysis of Total Choline and Free Carnitine in Foods." The Second International Vitamin Conference, Copenhagen, Denmark, May 2012.

Melissa Phillips, Mary Bedner, Johanna Camara, Danielle Cleveland, Candice Jongsma, Mark Lowenthal, Bryant Nelson, Karen Phinney, Karsten Putzbach, Catherine Rimmer, Lane Sander, Katherine Sharpless, Susan Tai, Jeanice Thomas, Stephen Wise. "Standard Reference Materials for the Determination of Vitamins in Food,

Supplement, and Clinical Samples." The Second International Vitamin Conference, Copenhagen, Denmark, May 2012.

Catherine A. Rimmer, Melissa M. Phillips, Laura J. Wood, Katherine E. Sharpless, Stephen A. Wise, Lane C. Sander. "NIST Dietary Supplement Laboratory Quality Assurance Program: A Tool for Improving Vitamin Measurements in Foods and Dietary Supplements." The Second International Vitamin Conference, Copenhagen, Denmark, May 2012.

Melissa M. Phillips, Lane C. Sander, Stephen A. Wise. "Microwave-Assisted Extraction and LC-MS Analysis of Total Choline in Foods." 125th AOAC INTERNATIONAL Annual Meeting and Exposition, New Orleans, LA, September 2011.

Catherine A. Rimmer, Mary Bedner, Manuela K. Gradl, Mariana Arce-Osuna, Melissa M. Phillips, Lane C. Sander, Katherine E. Sharpless, Klaus Albert. "Determination of Soy Isoflavones in Foods and Dietary Supplements." 125th AOAC INTERNATIONAL Annual Meeting and Exposition, New Orleans, LA, September 2011.

Catherine A. Rimmer, Melissa M. Phillips, Laura J. Wood, Katrice A. Lippa, Stephen A. Wise, Lane C. Sander. "NIST Dietary Supplement Laboratory Quality Assurance Program: The First Five Years." 125th AOAC INTERNATIONAL Annual Meeting and Exposition, New Orleans, LA, September 2011.

Melissa M. Phillips, Lane C. Sander, Katherine E. Sharpless, Stephen A. Wise. "Determination of B-Vitamins, Choline, and Carnitine in NIST Food-Matrix SRMs." HPLC, Budapest, Hungary, June 2011.

Mary Bedner, Manuela K. Gradl, Mariana Arce-Osuna, Melissa M. Phillips, Catherine A. Rimmer, Lane C. Sander, Katherine E. Sharpless, Klaus Albert. "Determination of Soy Isoflavones in Foods and Dietary Supplements." HPLC, Budapest, Hungary, June 2011.

Melissa M. Phillips, Ryan G. Brennan, Thomas P. Moffat. "Analytical Characterization of Commercial SPS and MPS by Ion Chromatography and Mass Spectrometry." The Pittsburgh Conference, Atlanta, GA, March 2011.

Melissa M. Phillips, Lane C. Sander, Katherine E. Sharpless, and Stephen A. Wise. "Determination of Water-Soluble Vitamins in NIST Food-Matrix SRMs." 124$^{th}$ AOAC INTERNATIONAL Annual Meeting and Exposition, Orlando, FL, September 2010.

Lisa Steinhauser, Melissa M. Phillips, Catherine A. Rimmer, Klaus Albert, Lane C. Sander. "Method Development for the Determination of Yohimbine in Dietary Supplements." 124$^{th}$ AOAC INTERNATIONAL Annual Meeting and Exposition, Orlando, FL, September 2010.

Melissa M. Phillips, Catherine A. Rimmer, Kevin D. Krueger, Mark S. Lowenthal, Rachel A. Lieberman, Lane C. Sander. "Characterization of *Vaccinium* Berry Standard Reference Materials (SRMs)." HPLC, Boston, MA, June 2010.

Melissa M. Phillips, Catherine A. Rimmer, Karen W. Phinney, Jeanice B. Thomas, Bryant C. Nelson, Lane C. Sander. "Determination of Water-Soluble Vitamins in NIST Food-Matrix SRMs." The First International Vitamin Conference, Copenhagen, Denmark, May 2010.

Melissa M. Phillips, Catherine A. Rimmer, Lane C. Sander, Karen W. Phinney, Jeanice B. Thomas, Bryant C. Nelson, Karsten Putzbach, Katherine E. Sharpless, Stephen A. Wise. "Standard Reference Materials for the Determination of Vitamins in Foods and Dietary Supplements." The First International Vitamin Conference, Copenhagen, Denmark, May 2010.

Catherine A. Rimmer, Melissa M. Phillips, Laura J. Wood, Katrice A. Lippa, Lane C. Sander. "NIST Dietary Supplements Laboratory Quality Assurance Program: A Focus on Vitamin Exercises." The First International Vitamin Conference, Copenhagen, Denmark, May 2010.

Melissa M. Phillips, Catherine A. Rimmer, Lane C. Sander, Katherine E. Sharpless, Stephen A. Wise. "Determination of Vitamins in NIST Food Matrix SRMs." NIST Sigma Xi Postdoctoral Poster Session, Gaithersburg, MD, February 2010.

Catherine Rimmer, Katrice Lippa, Melissa Phillips, David Duewer, Lane Sander, Katherine Sharpless, Stephen Wise, Laura Wood. "Dietary Supplement Laboratory Quality Assurance Program." 123rd AOAC INTERNATIONAL Annual Meeting and Exposition, Philadelphia, PA, September 2009.

Melissa M. Phillips, Lane C. Sander, Katherine E. Sharpless, Stephen A. Wise. "Development of *Vaccinium* Berry Dietary Supplement Standard Reference Materials (SRMs)." 12th Biological and Environmental Reference Material (BERM) Symposium, Oxford, UK, July 2009.

Catherine A. Rimmer, Katrice A. Lippa, Laura J. Wood, Melissa M. Phillips, Katherine E. Sharpless, Stephen A. Wise, Lane C. Sander, David L. Duewer. "NIST Quality Assurance Program for Dietary Supplements." 12th Biological and Environmental Reference Material (BERM) Symposium, Oxford, UK, July 2009.

Melissa S. Meaney, Lane C. Sander, Katherine E. Sharpless, Stephen A. Wise. "Characterization of Organic Acid and Flavonoid Profiles in *Vaccinium* Berry Dietary Supplement Standard Reference Materials (SRMs)." The Pittsburgh Conference, Chicago, IL, March 2009.

Melissa S. Meaney, Lane C. Sander, Katherine E. Sharpless, Stephen A. Wise. "Characterization of Organic Acid and Flavonoid Profiles in *Vaccinium* Berry Dietary Supplement Standard Reference Materials (SRMs)." NIST Sigma Xi Postdoctoral Poster Session, Gaithersburg, MD, February 2009.

Melissa S. Meaney, Lane C. Sander, Katherine E. Sharpless, Stephen A. Wise. "Development of *Vaccinium* Berry Dietary Supplement Standard Reference Materials (SRMs)." HPLC, Baltimore, MD, May 2008.

Melissa S. Meaney, Victoria L. McGuffin. "Fluorescence Quenching Detection of Nitrated Explosives." The Pittsburgh Conference, Chicago, IL, March 2004.

**SRM ACTIVITIES**

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| RM 8441a | Wheat Hardness (TPL/TC)<br>Extended certification date based on USDA data. |
| RM 8445 | Spray-Dried Whole Egg for Allergen Detection (TPL/TC)<br>Extended certification date based on FDA data. |
| RM 8642a | FDA Saxitoxin Dihydrochloride Solution (TPL/TC)<br>Acquired material from FDA. |
| SRM 194a | Ammonium Dihydrogen Phosphate<br>Measured ammonium and phosphate by IC-CD. |
| SRM 916b | Bilirubin<br>Method developed for stabilization and measurement of bilirubin isomers XIIIα, IXα, and IIIα by LC-Abs. |
| SRM 1544 | Fatty Acids and Cholesterol in a Frozen Diet Composite (TPL/TC)<br>To be discontinued when out of stock. To be replaced by SRM 1548b Typical Diet. |
| SRM 1546a | Meat Homogenate (TPL/TC)<br>Measured water-soluble vitamins by ID-LC/MS/MS. Prepared data for submission to SED. Drafted and finalized Certificate of Analysis. Prepared additional data for submission to SED. Updated and finalized Certificate of Analysis. |
| SRM 1548a | Typical Diet (TPL/TC)<br>Planned and purchased material to prepare renewal SRM. |
| SRM 1549a | Whole Milk Powder (TPL/TC)<br>Measured water-soluble vitamins, choline, and carnitine by ID-LC-MS. |
| SRM 1577c | Bovine Liver<br>Prepared additional data for submission to SED. |
| SRM 1845a | Whole Egg Powder (TPL/TC)<br>Measured water-soluble vitamins by ID-LC/MS/MS. Measured choline and carnitine by ID-LC-MS. Prepared data for submission to SED. |
| SRM 1849a | Infant/Adult Nutritional Formula (TPL/TC)<br>Measured water-soluble vitamins, choline, and carnitine by ID-LC-MS. Prepared additional data for submission to SED. Drafted and finalized updated Certificate of Analysis. |
| SRM 1869a | Infant/Adult Nutritional Formula (TPL/TC)<br>Acquired material and stratified samples. Coordinated technical measurements made by NIST staff and collaborating laboratories. |
| SRM 1974c | Organics in Mussel Tissue (*Mytilus edulis*)<br>Prepared updated Certificate of Analysis. |
| SRM 2383a | Baby Food Composite (TPL/TC)<br>Measured water-soluble vitamins by ID-LC-MS. Obtained additional carotenoid data from contracting laboratory. Prepared data for submission to SED. Drafted and finalized updated Certificate of Analysis. |
| SRM 2384 | Baking Chocolate (TPL/TC)<br>Measured water-soluble vitamins by ID-LC-MS/MS. Coordinated stability for 5 additional analyte groups. Prepared data for submission to SED. Drafted and finalized updated Certificate of Analysis. |

SRM 2385 Slurried Spinach (TPL/TC)

SRM 2386 Avocado Powder (TPL/TC)
Acquired material and stratified samples. Coordinated measurement of total nutrients through Grocery Manufacturer's Association. Coordinated technical measurements made by NIST staff. Measured water-soluble vitamins by ID-LC-MS/MS.

SRM 2387 Peanut Butter (TPL/TC)
Measured water-soluble vitamins by ID-LC-MS/MS. Coordinated stability for 3 additional analyte groups. Prepared data for submission to SED. Drafted and finalized updated Certificate of Analysis.

SRM 3180 Iodide Anion Standard Solution
Measured iodide by IC-CD.

SRM 3233 Fortified Breakfast Cereal (TPL/TC)
Measured water-soluble vitamins by ID-LC-MS.

SRM 3234 Soy Flour (TPL/TC)
Measured water-soluble vitamins by ID-LC/MS/MS. Measured choline and carnitine by ID-LC-MS. Measured isoflavones by LC-UV. Prepared isoflavones data for submission to SED. Drafted and finalized updated Certificate of Analysis.

SRM 3235 Soy Milk (TPL/TC)
Measured isoflavones by LC-UV. Measured water-soluble vitamins by ID-LC/MS/MS. Coordinated measurement of total nutrients by Grocery Manufacturer's Association. Prepared data for submission to SED.

SRM 3236 Soy Protein Isolate (TPL/TC)
Measured isoflavones by LC-UV. Prepared data for submission to SED. Drafted and finalized Certificate of Analysis.

SRM 3237 Soy Protein Concentrate (TPL/TC)
Measured isoflavones by LC-UV. Prepared data for submission to SED. Drafted and finalized Certificate of Analysis.

SRM 3238 Soy-Containing Solid Oral Dosage Form (TPL/TC)
Measured isoflavones by LC-UV. Prepared data for submission to SED. Drafted and finalized Certificate of Analysis.

SRM 3239 Isoflavones Calibration Solution (TPL/TC)
Prepared solutions. Measured isoflavones by LC-UV. Prepared data for submission to SED. Drafted and finalized Certificate of Analysis.

SRM 3252 Protein Drink Mix (TPL/TC)
Measured water-soluble vitamins by ID-LC/MS/MS. Measured choline and carnitine by ID-LC-MS (via Grace Hahm, student intern). Coordinated measurement of total nutrients through Grocery Manufacturer's Association. Prepared data for submission to SED. Drafted and finalized Certificate of Analysis.

SRM 3253 Yerba Mate (TPL/TC)
Prepared data for submission to SED. Drafted and finalized Certificate of Analysis.

SRM 3262 St. John's Wort Aerial Parts
Measured chlorogenic acid, flavonoids, and naphthodianthrones by LC with absorbance and fluorescence detection.

SRM 3264 St. John's Wort Methanol Extract
Measured chlorogenic acid, flavonoids, and naphthodianthrones by LC with absorbance and fluorescence detection.

SRM 3276 Carrot Extract in Oil (TPL/TC)

SRM 3277 Krill Oil
Coordinated measurement of fatty acids and astaxanthin through Grocery Manufacturer's Association.

SRM 3278 Tocopherols in Edible Oils (TPL/TC)
Extended certification range based on stability data.

SRM 3281 Cranberry (Fruit)
Measured organic acids by ID-LC-MS and ID-GC-MS. Method developed for measurement of anthocyanidins and flavonols by LC-Abs. Method developed for measurement of anthocyanins by LC-Abs. Method developed for fingerprinting of proanthocyanidins by LC-FL-MS. Conducted stability testing of organic acids by LC-MS.

SRM 3282 Low-Calorie Cranberry Juice Cocktail
Measured organic acids by IC-CD and LC-UV, method developed for measurement of anthocyanidins and flavonols by LC-Abs. Conducted stability testing of organic acids by LC-MS.

SRM 3283 Cranberry Extract
Measured organic acids by IC-CD and ID-LC-MS, method developed for measurement of anthocyanidins and flavonols by LC-Abs. Method developed for measurement of anthocyanins by LC-Abs. Method developed for fingerprinting of proanthocyanidins by LC-FL-MS. Conducted stability testing of organic acids by LC-MS.

SRM 3284 Cranberry-Containing Solid Oral Dosage Form
Measured organic acids by IC-CD and ID-LC-MS, method developed for measurement of anthocyanidins and flavonols by LC-Abs. Method developed for measurement of anthocyanins by LC-Abs. Method developed for fingerprinting of proanthocyanidins by LC-FL-MS. Conducted stability testing of organic acids by LC-MS.

SRM 3285 Mixed Berry-Containing Solid Oral Dosage Form
Measured organic acids by IC-CD and ID-LC-MS, method developed for measurement of anthocyanidins and flavonols by LC-Abs. Method developed for measurement of anthocyanins by LC-Abs. Method developed for fingerprinting of proanthocyanidins by LC-FL-MS. Conducted stability testing of organic acids by LC-MS.

SRM 3286 Organic Acids Calibration Solution (TPL/TC)
Prepared and measured organic acids by LC-UV. Drafted and finalized Certificate of Analysis. Conducted stability testing of organic acids by LC-MS.

SRM 3287 Blueberry (Fruit)
Measured organic acids by IC-CD and ID-LC-MS, method developed for measurement of anthocyanidins and flavonols by LC-Abs. Method developed for measurement of anthocyanins by LC-Abs. Method developed for fingerprinting of proanthocyanidins by LC-FL-MS. Measured water-soluble vitamins by ID-LC-MS. Conducted stability testing of organic acids by LC-MS.

SRM 3290 Dry Cat Food (TPL/TC)
Measured water-soluble vitamins by ID-LC/MS/MS. Measured choline and carnitine by ID-LC-MS (via Grace Hahm, student intern). Coordinated measurement of total nutrients, gravimetric fat, and crude fiber through Grocery Manufacturer's Association. Collected final data and

prepared Report of Analysis summary for total nutrients. Prepared data for submission to SED. Drafted and finalized Certificate of Analysis.

SRM 3291 Bilberry Extract
Measured organic acids by ID-LC-MS, method developed for measurement of organic acids by IC-CD and of anthocyanidins and flavonols by LC-Abs. Method developed for measurement of anthocyanins by LC-Abs. Method developed for fingerprinting of proanthocyanidins by LC-FL-MS. Conducted stability testing of organic acids by LC-MS.

SRM 3951 Vitamin $B_{12}$ in Frozen Human Serum
Attempted to develop an ID-LC-MS/MS method for cyanocobalamin. Detection limits are not low enough for the SRM.

*Lars Reimann*
*Chief Scientific Officer*
*Eurofins Scientific, Inc.*

*Summary:*
*Mr. Reimann graduated from University of Copenhagen with a degree in biochemistry/analytical chemistry and has for the past 25 years managed laboratories specializing in the analysis of a wide variety of foods and feeds as well as their ingredients to determine compliance with industry standards, to verify nutritional value and to ensure the absence of food safety issues. His responsibilities have included acting as advisor to clients and technical societies in their dealings with analytical problems of a technical or regulatory nature.*

# CATHERINE A. RIMMER

National Institute of Standards and Technology
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Gaithersburg, MD 20899-8392

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Email: catherine.rimmer@nist.gov

## EDUCATION:

Ph.D. Analytical Chemistry, Florida State University, Tallahassee, FL, 2001
Dissertation title: "Toward more practical electrochromatography"
Advisor, John G. Dorsey

B.A., Chemistry/Anthropology, University of Vermont, Burlington, VT, 1993

## EXPERIENCE:

RESEARCH EXPERIENCE**:**
***Research Chemist*** *National Institute of Standards and Technology*, Analytical Chemistry Division, September 2003-

- Coordinator for the NIST/NIH Dietary Supplement Laboratory Quality Assurance Program
- Developed methods for the extraction of complex matrix samples and performed trace organic analysis on botanical samples
- Examined extraction methods for the determination of vitamins and marker compounds in foods and dietary supplements
- Developed isotope dilution mass spectrometry methods for quantitation vitamins in dietary supplements and food matrices
- Performed certification measurements on a variety of dietary supplements and food samples
- Designed, synthesized, and characterized a series of stationary phases for liquid chromatography with special emphasis on fluorinated phases.

***National Research Council Postdoctoral Fellowship****, National Institute of Standards and Technology*, Advisors Lane C. Sander and Stephen A. Wise, September 2001-2003

- Synthesized and characterized a series of stationary phases for a study of the effects of bonding chemistry and bonded phase length on shape selectivity and methylene selectivity in reversed phase liquid chromatography.
- Synthesized and examined novel immobilized polymer stationary phases for the separation of tocopherols (vitamin E) and carotenoid isomers.
- Measured trace organic compounds, specifically focusing on polycyclic aromatic hydrocarbons (PAH) in a variety of matrices by liquid chromatography with UV absorbance and fluorescence detection.

***Research Assistant**, Florida State University*, Advisor John G. Dorsey, 1996-2001

- Designed and tested instrumentation for the introduction of purely electroosmotically driven gradient separations in capillary electrochromatography.
- Developed an instrumental design for the use of "High Voltage" capillary electrochromatography/capillary electrophoresis. This system allows for faster electroosmotically driven separations, with decreased background noise.
- Studied the use of high viscosity solvents in chromatographic separations with electroosmotic flow. Electrochromatography is not limited by pressure, therefore, it is possible to use unconventional solvents to increase mobile phase strength and tune selectivity.

***Summer Intern**, Procter and Gamble, Miami Valley Laboratories*, Cincinnati, OH
Advisor, Thomas Chester and G. Ed Burton Summer 1999

- Studied the use and feasibility of enhanced fluidity mobile phases in electroosmotically driven separations.

TEACHING EXPERIENCE:

***Adjunct Instructor**, Introduction to Analytical Chemistry, Florida State University*
Summer 2001

- Class focused on quantitative analysis and wet chemical methods for 25 students.
- Prepared and delivered lectures on topics including acid/base chemistry, electrochemistry, spectroscopy, and separations.
- Organized laboratory experiments to reinforce concepts learned in lecture and teach laboratory skills and supervised a laboratory teaching assistant.
- Evaluated students based on examinations, quizzes, and laboratory reports, tailored for the class.

***Teaching Assistant**, Introduction to Analytical Chemistry, Florida State University,* Fall 1997

- Responsible for teaching analytical problem solving and good laboratory techniques.
- Provided short laboratory lectures
- Prepared unknown samples for analysis
- Graded lecture exams and quizzes.

***Teaching Assistant**, General Chemistry II Laboratory, Florida State University,* Fall 1996

- Prepared and delivered short introductory laboratory lectures.

- Supervised and aided students as they performed the assigned experiments.

***Personal Tutor*** for Introduction to Analytical Chemistry (Quantitative Analysis), and Advanced Analytical Chemistry (Instrumental Methods)

WORK EXPERIENCE:

***Staff Analytical Chemist****, Wyeth Ayerst Laboratories*, Rouses Point, NY March 1993-June 1996.

- Primary duties involved writing and validating cleaning validation methods.
- Performed content uniformity, final product identification, and dissolution testing.
- Calibrated and maintained instrumentation.
- Trained new employees in use of instrumentation and methods.

***Park Ranger****, National Park Service, Cape Cod National Seashore*, Eastham, MA Summers 1989-1992.

- Planned and presented walks, talks, and evening campfire programs on the natural, geologic, and cultural history of Cape Cod for park visitors.

**SRM ACTIVITIES**

Responsible for separation method development (including extraction) and contributing to certification measurements for the following SRMs.

- SRM 1950, Metabolites in Human Plasma, measured fat soluble vitamins and carotenoids by LC-UV and LC-FL
- SRM 968d, Fat Soluble Vitamins in Human Serum, measured fat soluble vitamins and carotenoids by LC-UV and LC-FL
- SRM 3274, Edible Oils, measured tocopherols in edible oils by 3 LC-UV and LC-FL methods
- SRM 1849, Infant/Adult Nutritional Formula, measured fat soluble vitamins by isotope dilution LC-MS, LC-UV, and LC-FL
- SRM 3246-3248, Ginkgo biloba Dietary Supplements, measured ginkgolides by two LC-MS methods
- SRM 3280 Multivitamin/Multielement tablet, measured fat soluble vitamins by LC-MS
- SRM 3258-3261 Bitter Orange Dietary Supplements, assisted with LC method development
- SRM 3251 Saw Palmetto Extract, measured tocopherols, all *trans* b-carotene, 9-*cis* β-carotene, and total β-carotene by LC-Fluorescence and LC-UV
- SRM 3276 Carrot Extract in Oil, measured tocopherols and β-carotene by LC-Fluorescence and LC-MS

- SRM 3287-3294 Berry Suites, developing a method for the fingerprint of proanthocyanidin polymers and anthocyanins. Assisted with organic acid method development.
- SRM 17F Sucrose, measured impurities in sucrose
- Aided in the design and certification of several dietary supplement calibration solution SRMs
- SRM 1845 a Whole Egg Powder
- SRM 3234-3239 Soy SRMs
- SRM 3267-3270 Kudzu SRMs
- SRM 3271-3273 Red Clover SRMs
- SRM 1549 a Whole Milk Powder
- SRM 3233 Fortified Breakfast Cereal

**INTERNATIONAL ACTIVITIES**

- SIM8.17.P Retinyl palmitate in Milk powder
- CCQM.P.78 Retinyl palmitate in Milk powder
- CCQM.K.62 Retinyl palmitate in Milk powder

**INSTRUMENT EXPERIENCE**

- Liquid chromatography with:
  - Ultraviolet/Visible detection (LC/UV)
  - Fluorescence detection (LC/FL)
  - Mass spectrometric detection (LC/MS)
  - Evaporative light scattering detection (LC/ELSD)
  - Charged aerosol detection (LC/CAD)
- Capillary electrophoresis (CE)
- Gas chromatography with:
  - Mass spectrometric detection (GC/MS)
  - Flame ionization detection (GC/FID)
- Supercritical fluid chromatography (SFC)
- Ultraviolet/visible absorbance spectrometry
- Fluorimetry

**SERVICE:**

- American Chemical Society Subdivision of Chromatography and Separations Chemistry, member of executive board (term 10/08-10/10), Secretary (2010-2015), Chair Elect (2015-)
- Product Quality Working Group for the National Advisory Council for Complementary and Alternative Medicine (NACCAM) July 2007-2009
- Summer undergraduate research fellowship (SURF) mentor 2007 and 2009
- AOAC Expert Review Panel Member for SAM-e, vitamin D, and cranberry
- President of the Washington Chromatography Discussion Group 2005-2006
- Co-Program Chair/Vice President of the Washington Chromatography Discussion Group 2003-2005
- Board member of the Washington Chromatography Discussion Group (2006-current)
- Presented Great Grape Soda Race for Adventures in Science, Rockville Science Day, Girl Scouts: Get Psyched About Science, and Take our Daughters and Sons to Work Day, as requested (approximately 4 times/year)
- Graduate student representative, Florida State University, Department of Chemistry Safety Committee, 1998-1999

**HONORS AND AWARDS:**

- William P. Slichter Award (2015)
- NIST MML Mentor Award (2015)
- AOAC 2014-2015 Expert Review Panel of the Year
- National Research Council Postdoctoral Fellowship awarded at the National Institute of Standards and Technology 2001-present
- Teaching Assistant Appreciation Award, sponsored by Alpha Chi Sigma at Florida State University, Fall 1996 and Fall 1997
- Katherine Blood Hoffman Fellowship Fall 1996
- Member American Chemical Society since 1993

**PUBLICATIONS:**

*Book chapter:*

1. Katrice A. Lippa, Catherine A. Rimmer, Lane C. Sander, "Shape Selectivity in Reversed Phase Liquid Chromatography" Chapter for publication in Advances in Chromatography 2007.

*Invited reviews:*

1. Catherine A. Rimmer, Katrice A. Lippa, Lane C. Sander "Shape Selectivity in Reversed Phase Liquid Chromatography" LC-GC 23(2008) 984.
2. Catherine A. Rimmer, Stephanie M. Piranio, John G. Dorsey "Gradient elution techniques for capillary electrochromatography" J. Chromatogr. A 877 (2000) 115-124.
3. Catherine A. Rimmer, Caroline Simmons, John G. Dorsey "The measurement and meaning of void volume in reversed-phase liquid chromatography" J. Chromatogr. A 965 (2002) 219-232.

*Original research:*

1. Phillips MM, Case RJ, Rimmer CA, Sharpless KE, Wise SA, Sander LC "Determination of Organic Acids in *Vaccinium* Berry Standard Reference Materials" Analytical and Bioanalytical Chemistry, 398, 7-8 (2010) 2987-2995.
2. Thomas JB, Sharpless KE, Yen J, Rimmer CA "Determination of Fat-Soluble Vitamins and Carotenoids in Standard Reference Material 3280 Multivitamin/Multielement Tablets by Liquid Chromatography with Absorbance Detection" J. AOAC International, 94, 3 (2011) 815-822.
3. Wise AS, Poster DL, Leigh SD, Rimmer CA, Mossner S, Schubert P, Sander LC, Schantz MM, "Polycyclic Aromatic Hydrocarbons in a Coal Tar Standard Reference Material- SRM 1597a Revisited", Analytical and Bioanalytical Chemistry, 398, 2 (2010) 717-728.
4. Phinney KW, Rimmer CA, Thomas JB, Sander LC, Sharpless KE, Wise SA, "Isotope Dilution Liquid Chromatography-Mass Spectrometry Methods for Fat- and Water-Soluble Vitamins in Nutritional Formulations" Analytical Chemistry, 83, 1 (2011) 92-98.
5. Sander LC et al "Certification of Vitamins and Carotenoids in SRM 3280 Multivitamin/Multielement Tablets", Analytical Chemistry, 83, 1 (2011) 99-108.
6. Sharpless KE, Lindstrom RM, Nelson BC, Phinney KW, Rimmer CA, Sander LC, Schantz MM, Spatz RO, Thomas JB, Turk GC, Wise SA, Wood LJ, Yen JH "Preparation and Characterization of Standard Reference Material 1849 Infant/Adult Nutritional Formula", J. AOAC International, 93, 4 (2010) 1262-1274.

7. Cleveland D, Long SE, Sander LC, Davis WC, Murphy KE, Case RJ, Rimmer CA, Francini L, Patri AK "Chromatographic Methods for the Quantification of Free and Chelated Gadolinium Species in MRI Contrast Agent Formulations", Analytical and Bioanalytical Chemistry, 398, 1 (2010) 2987-2995.
8. Kuhnle M, Friebolin V, Albert, K, Rimmer CA, Lippa KA, Sander LC, "Architecture and Dynamics of C18 Bonded Interphases with Small Molecule Spacers", Anal. Chem. 81 (2009) 10136-10142.
9. Catherine A. Rimmer, Lane C. Sander "Shape Selectivity in Embedded Polar Group Stationary Phases for Liquid Chromatography", Analytical and Bioanalytical Chemistry, 394, 1 (2009) 285-291.
10. Michele M. Schantz, Mary Bedner, Stephen E. Long, John L. Molloy, Karen E. Murphy, Barbara Porter, Karsten Putzbach, Catherine A. Rimmer, Lane, C. Sander, Katherine E. Sharpless, Jeanice B. Thomas, Stephen A. Wise, Laura J. Wood, James H. Yen, Takashi Yarita, Agnes NguyenPho, Wendy R. Sorenson, Joseph M. Betz "Development of Saw Palmetto (Serenoa repens) Fruit and Extract Standard Reference Materials" Analytical and Bioanalytical Chemistry, 392, 3 (2008) 427-438.
11. Sander, L. C., Putzbach, K., Nelson, B. C., Rimmer, C. A., Bedner, M., Brown Thomas, J., Porter, B. J., Wood, L. J., Schantz, M. M., Sharpless, K. E., Wise, S. A., Yen, J. H., Siitonen, P. H., NguyenPho, A., Roman, M. C., and Betz, J. M., "Certification of Standard Reference Materials Containing Bitter Orange," Analytical and Bioanalytical Chemistry, 391, 6 (2008) 2023-2034.
12. Catherine A. Rimmer, et al. "Characterization of a Suite of Ginkgo-Containing Standard Reference Materials" Analytical and Bioanalytical Chemistry, 389, 1 (2007) 179-196.
13. Karsten Putzbach, Catherine A. Rimmer, Katherine E. Sharpless, Stephen A. Wise and Lane C. Sander "Determination of Bitter Orange Alkaloids in Dietary Supplement Standard Reference Materials by Liquid Chromatography with Atmospheric Pressure Ionization Mass Spectrometry", Analytical and Bioanalytical Chemistry, 389, 1 (2007) 197-205.
14. Katherine E. Sharpless, Jeanice Brown Thomas, David L. Duewer, Karsten Putzbach, Catherine A. Rimmer, Lane C. Sander, Michele M. Schantz, Stephen A. Wise, Takashi Yarita and James H. Yen, "Preparation and characterization of standard reference material 3276, carrot extract in oil" Analytical and Bioanalytical Chemistry, 389, 1 (2007) 207-217. Karsten Putzbach, Catherine A. Rimmer, Katherine E. Sharpless and Lane C. Sander "Determination of Bitter Orange alkaloids in dietary supplements standard reference materials by liquid chromatography with ultraviolet absorbance and fluorescence detection" J. Chromatogr. A. 1156 (2007) 304-307.

15. Catherine A. Rimmer, Lane C. Sander, Stephen A. Wise, "Selectivity of long chain stationary phases in reversed phase liquid chromatography" Analytical and Bioanalytical Chemistry, 382 (2005) 698-707.
16. Catherine A. Rimmer, Lane C. Sander, Stephen A. Wise, John G. Dorsey, "Synthesis and characterization of $C_{13}$ to $C_{18}$ stationary phases by monomeric, polymeric, and self-assembled monolayer approaches" J. Chromatogr. A. 1007(2003)11-20.
17. Catherine A. Rimmer, Paul McCall, John G. Dorsey "High Voltage Electrochromatography/Electrophoresis with Two Power Supplies" in preparation for submission to J. Chromatogr. A.
18. Ashley Lister, Catherine A. Rimmer, John G. Dorsey, "Gradient elution electrochromatography using a flow-injection analysis interface" J. Chromatogr. A 828 (1998) 105-112.

**PRESENTATIONS:**

*Invited oral presentations:*

1. Catherine A. Rimmer, "Methods Validation, Quality and Compliance: Analytical Tools for a Quality Assurance Unit" Supply Side West, Educational Session, November 2009.
2. Catherine A. Rimmer, "NIST Tools for Dietary Supplement and Functional Food Analysis: Standard Reference Materials, Analytical Method Development, and Quality Assurance Programs" International Society for Nutraceuticals and Functional Foods, November 2009.
3. Catherine A. Rimmer, Katherine E. Sharpless, Lane C. Sander, Stephen A. Wise, Joseph M. Betz, Agnes A. NguyenPho "Status of NIST SRMs for Dietary Supplements" AOAC International, September 2009, Philadelphia, PA.
4. Catherine A. Rimmer, "Soy Isoflavone Standard Reference Materials" NIH-ODS Conference on Soy Isoflavones, July 28, 2009, Bethesda, MD.
5. Catherine A. Rimmer, Katrice A. Lippa, Laura J. Wood, Katherine E. Sharpless, Stephen A. Wise, Lane C. Sander "NIST Tools for Dietary Supplement Analysis" National Health Products Research Society of Canada Meeting, February 19, 2009.
6. Catherine A. Rimmer, Katrice A. Lippa, Lane C. Sander, "Shape selective stationary phases: design, function, and synthesis" MASSEP, October 21, 2008, Boston, MA.
7. Catherine A. Rimmer et al. "Analysis of Vitamins in Reference Materials by LC/MS" AOAC International 2008, September 24, Dallas, TX.
8. Catherine A. Rimmer et al. "Dietary Supplement Proficiency Testing: NIST Pilot Program" AOAC International 2008, September 23, Dallas, TX.
9. Catherine A. Rimmer "Analytical Challenges in the certification of botanical dietary supplement Standard Reference Materials" 7$^{th}$ Annual Oxford International Conference on the Science of Botanicals, April 12-16, 2008, Oxford, MS.

10. Catherine A. Rimmer, Meghan E. Kern, Katrice A. Lippa, Lee J. Richter, Lane C. Sander, Lucile C. Teague, Rebecca Zangmeister, "Understanding chromatographic surfaces: an interdisciplinary approach", Pittcon 2008, March 2-6, New Orleans, LA.
11. Catherine A. Rimmer, Katrice A. Lippa, Lane C. Sander, "Shape selective stationary phases: design, function, and synthesis" Chromatography Forum of the Delaware Valley, January 15, 2008.
12. Catherine A. Rimmer, Katrice A. Lippa, Lane C. Sander, "Structure and function of chromatographic surfaces" Florida State University Department of Chemistry and Biochemistry, October 12, 2006, Tallahassee, FL.
13. Catherine A. Rimmer, Katrice A. Lippa, Lane C. Sander, "Structure and function of chromatographic surfaces" 231rst American Chemical Society Meeting, March 26- March 30, 2006, Atlanta, GA.

*Contributed oral presentations:*

1. Catherine A. Rimmer, Karen W. Phinney, Jeanice Brown-Thomas, Bryant Nelson, Katherine E. Sharpless, Stephen A. Wise, L.C. Sander "Determination of vitamins in Standard Reference Materials by liquid chromatography with isotope dilution mass spectrometry" March 7-12, 2009, Chicago, IL.
2. Catherine A. Rimmer, David L. Duewer, Katherine Sharpless, Laura J. Wood, "Dietary supplement laboratory proficiency testing-NIST pilot program" Pittcon 2008, March 2-6, New Orleans, LA.
3. Catherine A. Rimmer, Katrice A. Lippa, Lane C. Sander "Structure, function, and design of surfaces for liquid chromatography" HPLC 2007, June 17-21, Ghent, Belgium.
4. Catherine A. Rimmer, Samuel B. Howerton, Lane C. Sander "Preparation and certification of *Ginkgo biloba* Standard Reference Materials", HPLC 2005, June 26- June 30, 2005, Stockholm, Sweden.
5. Catherine A. Rimmer, Lane C. Sander, Stephen A. Wise, "The optimization of poly (ethylene co-acrylic acid) stationary phases for the separation of carotenoids", Pittcon, 2003, March 9-14, 2003, Orlando.
6. Catherine A. Rimmer, John G. Dorsey "Advances in gradient elution electrochromatography" paper 947, Pittcon 1999, March 7-12, 1999, Orlando, Florida
7. Catherine A. Rimmer, Ashley S. Lister, John G. Dorsey "Gradient capillary electrochromatography using a flow-injection interface"Pittcon 1998, March 1-5, 1998, New Orleans, LA.

*Poster presentations:*

1. Catherine A. Rimmer, Katrice A. Lippa, Lane C. Sander, Stephen A. Wise, "Reversed-phase liquid chromatography stationary phases for molecular shape recognition" ACS National Meeting, August 16, 2009, Washington, DC.

2. Catherine A. Rimmer, Katrice A. Lippa, Laura J. Wood, Melissa M. Phillips, Katherine E. Sharpless, Stephen A. Wise, Lane C. Sander, David L. Duewer "NIST Quality Assurance Program for Dietary Supplements" BERM, July 2009, Oxford, England.
3. Catherine A. Rimmer, Maximilian Kühnle, Meghan E. Kern, Katrice A. Lippa, Lane C. Sander "Fluorinated phases for shape selective separations in reversed- liquid chromatography" HPLC 2009, June 28-July 2 2009, Dresden Germany.
4. Catherine A. Rimmer, Meghan E. Kern, Katrice A. Lippa, Lane C. Sander, "Design, synthesis, and characterization of a novel perfluorinated Stationary Phase for Reversed Phase Liquid Chromatography" HPLC 2008, May 18-23, Baltimore, MD.
5. Lane Sander, Mary Bedner, Jeanice Brown Thomas, Ryan Case, Bryant Nelson, Catherine Rimmer, Michele Schantz, Katherine Sharpless, Michael Tims, "Analytical challenges in the certification of botanical dietary supplement Standard Reference Materials" HPLC 2007, June 17-21, Ghent, Belgium.
6. Karen Phinney, Mary Bedner, Nathan Dodder, Bryant Nelson, Catherine Rimmer, Lane Sander, Katherine Sharpless, Stephen Wise, "Liquid chromatography-mass spectrometry methods for clinical analytes and their role in clinical diagnostics" HPLC 2007, June 17-21, Ghent, Belgium.
7. Catherine A. Rimmer, Jeanice B. Thomas, Bryant C. Nelson, Karen W. Phinney, Karsten Putzbach, Lane C. Sander, Katherine E. Sharpless, Stephen A. Wise "The role of liquid chromatography in the certification of vitamins in two dietary supplement Standard Reference Materials (SRMs)" HPLC 2007, June 17-21, Ghent, Belgium.
8. Catherine A. Rimmer, Jeanice B. Thomas, Karsten Putzbach, Katherine E. Sharpless, Lane C. Sander, "Determination of fat-soluble vitamins in recent dietary supplement standard reference materials" 120th AOAC Annual Meeting and Exposition, September 17-21, 2006, Minneapolis, MN.
9. Katrice A. Lippa, Catherine A. Rimmer, Lane C. Sander, "Rational material design of chromatographic surfaces" HPLC 2006, June 18- June 22, 2006, San Francisco, CA.
10. Catherine A. Rimmer, Jeanice B. Thomas, Karsten Putzbach, Katherine E. Sharpless, Lane C. Sander "Determination of fat-soluble vitamins in recent dietary supplement Standard Reference Materials" HPLC 2006, June 18- June 22, 2006, San Francisco, CA.
11. Catherine A. Rimmer, Samuel B. Howerton, Katherine E. Sharpless, Lane C. Sander, "Development of *Ginkgo biloba* Standard Reference Materials" 119th AOAC Annual Meeting and Exposition, September 11-15, 2005, Orlando, FL.
12. Jeanice B. Thomas, Catherine A. Rimmer, Katherine E. Sharpless, Lane C. Sander, "Determination of carotenoids in SRM 3276 carrot extract in sunflower oil" 230th American Chemical Society Meeting, August 28-September 1, 2005, Washington, DC.

13. Catherine A. Rimmer, Samuel B. Howerton, Lane C. Sander "Determination of ginkgolides and flavonol glycosides in Ginkgo biloba Standard Reference Materials" 230th American Chemical Society Meeting, August 28- September 1, 2005, Washington, DC.
14. Catherine A. Rimmer, Lane C. Sander, Stephen A. Wise, "Evaluation of Long Chain Stationary Phases for Reversed-Phase Liquid", HPLC 2004, June13-June 18 2004, Philadelphia, PA.
15. Samuel B. Howerton, Catherine A. Rimmer, Lane C. Sander, Stephen A. Wise, "Standard Reference Materials (SRMS) Development of Dietary Supplements Derived From Ginkgo Biloba", HPLC 2004, June13-June 18 2004, Philadelphia, PA.
16. Catherine A. Rimmer, Lane C. Sander, Stephen A. Wise, "The effects of phase length and bonding chemistry in reversed phase liquid chromatography", Washington Chromatography Discussion Group, September 19, 2002
17. Catherine A. Rimmer, Lane C. Sander, Stephen A. Wise, "The effects of phase length and bonding chemistry in reversed phase liquid chromatography",paper 462, HPLC 2002, June2-June 7 2002. Montreal, Canada.

# *Anikó M. Sólyom*

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# CURRICULUM VITAE

## HIGHLIGHTS OF QUALIFICATION

- 30+ years of experience in development, validation, troubleshooting and documentation of analytical methods
- 25+ years experience in laboratory management
- Broad based background in instrumental and wet analytical techniques

## PROFESSIONAL EXPERIENCE

**GAAS Corporation**
*Tucson, Arizona*

Founder, CEO and CSO **1995-present**

- Supervising and conducting the analysis of dietary supplements, botanicals, pharmaceuticals and food products, including raw materials and finished products
- Analytical method development and validation
- Consulting and training

**ProlX Pharmaceuticals/Oncothyreon**
*Tucson, Arizona*

Manager of Analytical Services **2007-2008**

- Developed and validated new assay methods according to cGLP regulations to quantify novel cancer drugs in plasma and urine using QQQ LC/MS technique
- Identified metabolites of new cancer drugs in plasma and urine using TOF LC/MS technique
- Calculated pharmacokinetic parameters

**Department of Pharmacology and Toxicology/Department of Pharmacology**
**College of Pharmacy/College of Medicine, University of Arizona**
*Tucson, Arizona*

Director of Analytical Core, Arizona Center for Phytomedicine Research **1999-2006**
Project coordinator for NIEHS N01-ES-45529 (Chemical Disposition in Mammals) **2004-2006**
Associate Research Scientist **2001-2006**
Assistant Research Scientist **1994-1999**
Research Associate **1992-1994**

- Studied natural products
  - developed analytical procedures for the isolation, identification and quantification of the active

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components in natural products (HPLC, HPLC-MS, HPLC-MS-MS)
  - developed bioactivity guided preparative separation methods for complex botanical mixtures
- Studied chemical disposition in mammals
  - developed analytical procedures for the separation, identification and quantification of the metabolites of different xenobiotics from blood, urine, hepatocyte media and microsomal suspension (HPLC, HPLC-MS, HPLC-MS-MS, GC-MS)
  - served as a technical liaison to the Analytical Core and the Synthetic Chemistry Core of the Southwest Environmental Health Sciences Center
  - contributed to the development and publication of reports and manuscripts
- Characterized promising anticancer compounds
  - developed methods for HPLC, HPLC-MS and HPLC-MS-MS to determine qualitative and quantitative composition of the synthesized organic compounds
  - developed methods for and measured Quantitative Structure Activity Relationship (QSAR) of new compounds
  - measured and evaluated MS, HPLC-MS and HPLC-MS-MS UV, VIS and IR spectra
  - measured and calculated pKa an logP
- Managed the analytical laboratory in compliance with GLP, GMP and FDA regulations
  - supervised laboratory personnel (students and employees)
  - planned budget
  - wrote SOP-s
  - maintained the database of analytical data

**ANALTRON Applied Research Company**
*Budapest, Hungary* **1989-1992**

Co-Founder and Director of Engineering

- Principal investigator of a photoacoustic (PAS) gas detector development project for trace gas analysis in ambient air
  - developed a new PAS sensor for trace gas detection
  - designed an analytical instrument based on the PAS sensor
- Lead the design and construction of the calibration system for photoacoustic spectroscopy through all its stages, from grant proposal to final report
- Successfully applied for Hungarian OTKA and OMFB grants (similar to NSF and SBIR grants, respectively) to fund the development of the instrument

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**Central Research Institute for Physics of Hungarian Academy of Sciences**
*Budapest, Hungary*

Research Scientist, Director of Analytical Laboratory **1986-1991**
Research Associate **1984-1986**
Research Assistant **1981-1984**

- Developed methods characterizing metallic glasses for:
  - atomic absorption spectroscopy (AAS)
  - graphite furnace atomic absorption spectroscopy (GF-AAS)
  - inductively coupled plasma emission (ICP)
  - nuclear magnetic resonance (NMR)
  - electron microscopy
  - X-ray fluorescence spectroscopy (XRF)
  - method optimization based on mathematical statistics
- Applied various chemical and physical techniques for qualitative and quantitative analysis of metallic glasses:
  - quantitative determination of main components
  - qualitative and quantitative determination of impurities
  - statistical analysis of the test results
- Managed the analytical and quality control laboratory supporting metallic glass development
  - supervised laboratory personnel
  - planned budget

## OTHER WORK EXPERIENCE

**Department of Chemistry, University of Arizona**
*Tucson, Arizona* **1991 – 1992**

Visiting scientist

- Calibrated and improved the trace gas detection system based on photoacoustic spectroscopy developed by ANALTRON Applied Research Company

**Laser Photoacoustic Laboratory, Agricultural University of Wageningen**
*Wageningen, The Netherlands* **1990, 1991**

Visiting scientist

- Applied the photoacoustic system that was developed by ANALTRON Applied Research Company in agricultural, environmental and medical fields

**Department of Chemistry, University of Oulu**
*Oulu, Finland* **1986**

Visiting scientist

- Developed method for graphite furnace atomic absorption spectrometry (GFAA) to determine arsenic in geological samples

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**Helsingin Kauppiaat Oy (HK)**
*Helsinki, Finland* **1981**
Visiting scientist

- Analyzed beef and pork meat products and ready meats in the Quality Control Laboratory of HK, the fifth largest food manufacturer in Europe

## EDUCATION

**Technical University of Budapest**, *Budapest, Hungary* **1981 - 1984**
**Doctor of Philosophy** of Analytical Chemistry
Dissertation: Application of Optical Spectroscopic Methods for the Analysis of Metallic Glasses

**Technical University of Budapest**, *Budapest, Hungary* **1979 - 1981**
**Master of Sciences** of Chemical Engineering
Thesis: Critical Investigation of Atomic Absorption Techniques for Mercury Determination

**Technical University of Budapest**, *Budapest, Hungary* **1976 - 1979**
**Bachelor of Sciences** of Chemical Engineering
Major: Organic Chemistry

## ADDITIONAL INFORMATION

*Publications*: 44 professional publications in refereed periodicals and books
1 patent
49 conference posters and 10 conference lectures

*Honors*:

| | |
|---|---|
| 1981 | Predoctoral Fellowship - Helsingin Kauppiaat Oy, Helsinki, Finland |
| 1980 | Recipient of the "PHARE" Travel Award |
| 1990-1992 | Recipient of the "Szechenyi Istvan" Research Scholarship for investigating photoacoustic effects in gases |
| 2004 | Member, Special Emphasis Review Panel – Botanical Research Centers (ZAT1-DB17), NIH-NCCAM/ODS |
| 2001-2005 | Voting member - Presidential Task Force on Dietary Supplements, AOAC |
| 2004-2008 | Horwitz Advisor, AOAC |
| 2008- | Reviewer for The Journal of AOAC |
| 2014- | Voting member of the Stakeholder Panel on Dietary Supplements, AOAC |
| 2014 | Member of AOAC's Anthocyanins, Chondroitin, Folin-C and Mitragyna Working Groups |
| 2014 | Member of the Dietary Supplement Subcommittee of ALACC (Analytical Laboratory Accreditation Criteria Committee) |

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*Professional training, continuing education:*

- Official Methods of Analysis Program: Collaborative Study of Chemicals and Methods (AOAC)
- Single Laboratory Validation of Analytical Methods for Dietary Supplement (AOAC)
- Agilent TOF LC/MS Techniques and Operation (Agilent Technologies)
- Agilent 6410 QQQ LC/MS Techniques and Operation (Agilent Technologies)
- Advanced LC/MSD-Trap Application (Agilent Technologies)
- Fundamentals of Mass Spectrometry and Interpretation of Mass Spectra (University of Arizona)
- Drug Metabolism and Disposition (University of Arizona)
- Optimizing Quality Control of Pharmaceuticals and Biopharmaceuticals (American Chemical Society)
- Combinatorial Chemistry I and II (Fahad Al-Obeidi, Selectide Co.)
- Engineering Statistics (University of Arizona)
- Introduction to Probability and Statistics (University of Arizona)
- Nucleic Acids (University of Arizona)

*Other training:*

- The University Leadership Institute – The Center for Professional Development
- Bloodborne Pathogens
- Protection Study Volunteers in Research
- IACUC Certifications: “Laws and Regulations”, “Handling, Restraint and Techniques of Laboratory Rodents”, “Introduction to the Animal Hazards Program” and “Zoonotic Diseases of Laboratory Rodents”
- Basic Radiation Protection Course

*Memberships*: American Chemical Society,
Division of Analytical Chemistry and Chromatography
Southern Arizona Section of ACS
Women’s Chemistry Group
AOAC International
Technical Division on Reference Materials
Technical Division for Laboratory Management

*Computer skills*: LC and LC-MS software (ChemStation, Chrom Manager, MS Manager, MassHunter), ChemSketch, SigmaPlot, SigmaStat, Reference Manager, Microsoft Office (Word, Excel, PowerPoint), Mathlab, InDesign

*Languages*: Hungarian (native), Russian and Latin

*Citizenship*: Naturalized citizen

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**LIST OF PUBLICATIONS**

## Peer reviewed publications

J. Q. Gu, **A. M. Sólyom**, V. P. Rodriguez, Y. Wang, S.G. Franzblau, G. Montenegro, B. N. Timmermann:
Dereplication of Pentacyclic Triterpenoids in Plants with Potential Antitubercular Activity by HPLC-PAD-APCI/MS/MS
Submitted to *Phytochemistry*

J.L. Funk, J.A. Frye, J.N. Oyarzo, P.R. Kiela, N. Kuscuoglu, J. Wilson, G. McCaffrey, G. Stafford, G.J. Chen, R.C. Lantz, S.D. Jolad, **A. M. Sólyom**, B.N. Timmermann:
Ancient Herbal Remedy Prevents Arthritis by Blocking Transcription Factor Activation
Submitted to *Journal of Clinical Investigations*

K.L. Prudic, K. Smriti, **A.M. Sólyom,** B.N. Timmermann:
Isolation, Identification and Quantification of Potential Defensive Compounds in the Viceroy Butterfly and its Larval Host Plant, *Carolina willow*.
*J. Chem. Ecology,* **33**, 1149-1159 (2007)

W.R. Sorensen, D. Sullivan: (Collaborators: S. Baugh, M. Collison, R. Das, A. Erickson, T. Harmon, S. Heathman, D. Ji, B. Khandelwal, A. Kohn, S. Morris, D. Norden, T. Peng, B. Post, E. Powers, K. Reif, G. Schulzki, C. Shevchuk, **A. M. Sólyom**):
Determination of Campesterol, Stigmasterol, and Beta-Sitosterol in Saw Palmetto Raw Materials and Dietary Supplements by Gas Chromatography: Collaborative Study.
*J. of AOAC International,* **90(3)**, 670-678 (2007)

D. Gray, K. LeVanseler, M. Pan, E. Waysek: (Collaborators: S. Baugh, A. Chandra, R. Meibos, T. Peng, R. Perez, K. Reif, M. Roman, J. Rousch, J. Skamarack, **A. M. Sólyom,** D. Sullivan, K. Young):
Evaluation of a Method to Determine Flavonol Aglycones in *Ginkgo biloba* Dietary Supplement Crude Materials and Finished Products by High –Performance Liquid Chromatography: Collaborative Study.
*J. of AOAC International,* **90(1)**, 43-53 (2007)

R.K. Kuester, **A. M. Sólyom**, V.P. Rodriguez, I.G. Sipes:
The Effect of Dose, Route, and Repeated Dosing on the Disposition and Kinetics of Tetrabromobisphenol A in Male F-344 Rats
*Toxicological Sciences,* **96(2)**, 237-45 (2007)

E. Pfeiffer, S.I. Hohle, S.G. Walch, A. Riess, **A. M. Sólyom**, M. Metzler:
Curcuminoids Form Reactive Glucuronides *in vitro*
*Journal of Agricultural and Food Chemistry,* **55(2)**, 538-544 (2007)

R. C. Lantz, G. J. Chen, M. Sarihan, **A. M. Sólyom**, S. D. Jolad, B. N. Timmermann:
The Effect of Extracts from Ginger Rhizome on Inflammatory Mediator Production
*Phytomedicine,* **14(2-3)**, 123-128 (2007)

S.I. Hohle, E. Pfeiffer, **A. M. Sólyom**, M. Metzler:
Metabolism of Curcuminoids in Tissue Slices and Subcellular Fractions from Rat Liver
*Journal of Agricultural and Food Chemistry,* **54(3)**, 756-764 (2006)

J.L. Funk, J.N. Oyarzo, J.A. Beischel, G.J. Chen, R.C. Lantz, S.D. Jolad, **A. M. Sólyom**, B.N. Timmermann:
Turmeric Extracts Containing Curcuminoids Prevent Experimental Rheumatoid Arthritis
*Journal of Natural Products,* **69(3)**, 351-355 (2006)

J.L. Funk, J.B. Frye, J.N. Oyarzo, N. Kuscuoglu, J. Wilson, G. McCaffrey, G. Stafford, G.J. Chen, R.C. Lantz, S.D. Jolad, **A. M. Sólyom**, P.R. Kiela, B.N. Timmermann:

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Efficacy and Mechanism of Action of Turmeric Supplements in the Treatment of Experimental Arthritis
*Arthritis and Rheumatism,* **54(11)**, 3452-3464 (2006)

H. Jiang, **A.M. Sólyom, B.N.** Timmermann, D.R. Gang:
Characterization of gingerol-related compounds in ginger rhizome (*Zingiber officinale* Rosc.) by high performance liquid chromatography/electrospray ionization mass spectrometry.
*Rapid Communications in Mass Spectrometry*, **19**, 2957-2964 (2005)

D. Z. Zhou, T. Waszkuc, F. Mohammed: (Collaborators: M. Blumhorst, R. Buren, R. Das, L. Huang, J. Jabusch, X. Kou, M. Nagarajan, H. Nguyen, K. Orellana, T. Peng, B. Podhola, C. Ray, K. Reif, C. Shevchuk, **A. M. Sólyom,** D. Sullivan, J. Wang, W. Wang, Q. Yang, Q. Zheng):
Determination of Glucosamine in Raw Materials and Dietary Supplements Containing Glucosamine Sulfate and/or Glucosamine Hydrochloride by High-Performance Liquid Chromatography with FMOC-Su Derivatization: Collaborative Study.
*J. of AOAC International,* **88(4)**, 048-1058 (2005)

S.D. Jolad, R.C. Lantz, **A.M. Solyom**, C.J. Chen, R.B. Bates and B.N. Timmermann:
Commercially processed dry ginger (Zingiber officinale): Composition and effects on LPS-induced PGE2 production.
*Phytochemistry,* **66(13),** 1614-1635. (2005) PMID: 15996695.

S. I. Hoehle, E. Pfeiffer, **A.M. Sólyom**, B.N. Timmermann, M. Metzler:
In vitro Glucuronidierung von Curcuminoiden mit mikrosomalen UDP-Glucuronyltransferasen.
*Lebensmittelchemie*, **59**, 16. (2005)

P. R. Kiela, A.J. Midura, N. Kuscuoglu, S.D. Jolad, **A. M. Sólyom,** D.G. Besselsen, B.N. Timmermann, F.G. Ghishan:
The Effects of Boswellia serrata in Mouse Models of Chemically Induced Colitis
*AJP-GI and Liver Physiology*, **288**, G798-G808, (2005)

R.C. Lantz, G.J. Chen, **A.M. Sólyom**, S. D. Jolad and B.N. Timmermann:
The Effect of Turmeric Extracts on Inflammatory Mediator Production.
*Phytomedicine,* **12(6-7)**, 445-452 (2005)

B. Jagadish, B.S. Iyengar, **A. M. Sólyom**, W.A. Remers, R.T. Dorr, J.S. Yu, S. Gupta, E.A. Mash:
Synthesis of [$^{14}$C]-imexon
*J. Label. Compd. Radiopharm.* **48**, 165-170 (2005)

S. D. Jolad, R.C. Lantz, **A.M. Sólyom**, G.J. Chen, R.B. Bates and B.N. Timmermann:
Fresh Organically Grown Ginger (*Zingiber officinale*): Composition and Effects on LPS-induced $PGE_2$ Production
*Phytochemistry,* 65(13) 1937-1954 (2004)

C. J. Sweet, **A. M. Sólyom,** I.G, Sipes:
Absorption and Elimination of D&C Red28 in Male F-344 Rats
*Food and Chemical Toxicology*, 42(4) 641-8 (2004)

E. Pfeiffer, H. Esch, S. Höhle, **A.M. Sólyom**, B. N. Timmermann and M. Metzler:
In vitro Studies on the Estrogenic Activity and the Metabolism of Curcumin.
In: G. Eisenbrand et al. Eds.), Functional Food: Safety Aspects, Deutsche Forschungsgemeinschaft, Senate Commission on Food Safety. ISBN 3-527-27765-X. Wiley-VCH Verlag Weinheim, 324-329 (2004)

P.R. Kiela, A.J. Midura, N. Kuscuoglu, S.D. Jolad, A.M. Solyom, D.G. Besselsen, B.N. Timmermann, and F.K. Ghishan:
Boswellia serrata does not offer protection and is potentially hepatotoxic in mouse models of chemically induced colitis.

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*Am J Physiol Gastrointest* 288:G798-G808.(2004)

E. Pfeiffer, S. Höhle, **A.M. Sólyom**, M. Metzler:
Studies on the Stability of Turmeric Constituents.
*Journal of Food Engineering*, **56** (2-3) 257-259 (2003)

S. M. Sami, R. T. Dorr, D. S. Alberts, **A. M. Sólyom**, W. A. Remers:
Analogues of Amonafide and Azonafide with Novel Ring System
*J. Med. Chem.*, **43**(16), 3067-3073 (2000)

W. A. Remers , R. T. Dorr, S. M. Sami, D. S. Alberts, S. Bear, C. A. Mayr **A. M. Sólyom:**
A New Class of Antitumor Agent: 2-Substituted -1,2-dihydro-3*H*-dibenz[*de,h*]isoquinoline-1,3-diones.
*Current Topics in Medicinal Chemistry.*, 2, 45-61 (1997)

B. S. Iyengar, R . T. Dorr, D. S. Alberts, **A. M. Sólyom**, M. Krutzsch, W. A. Remers:
1,4-Disubstituted Anthracene Antitumor Agents
*J. Med. Chem.*, 40, 3734-3738 (1997)

S. M. Sami, R. T. Dorr, D. S. Alberts, **A. M. Sólyom**, W. A. Remers:
2-[2'-(Dimethylamino)ethyl]-1,2-dihydro-3*H*-dibenz[*de,h*]isoquinoline-1,3-diones with Substituents at Positions 4, 8, 9, 10 and 11. Synthesis, Antitumor Activity, and Quantitative Structure-Activity Relationship
*J. Med. Chem.*, 39, 4978-4987 (1996)

S. M. Sami, R. T. Dorr, **A. M. Sólyom**, D. S. Alberts, B. S. Iyengar, W. A. Remers:
6- and 7-Substituted 2-[2'-(Dimethylamino)ethyl]-1,2-dihydro-3*H*-dibenz[*de,h*]isoquinoline-1,3-diones. Synthesis, Nucleophilic Displacements, Antitumor Activity, and Quantitative Structure-Activity Relationship
*J. Med. Chem.*, 39, 1609-1618 (1996)

S. M. Sami, R. T. Dorr, **A. M. Sólyom**, D. S. Alberts, W. A. Remers:
Amino-Substituted 2-[2'-(Dimethylamino)ethyl]-1,2-dihydro-3*H*-dibenz[*de,h*]isoquinoline-1,3-diones. Synthesis, Antitumor Activity, and Quantitative Structure-Activity Relationship
*J. Med. Chem.*, 38, 983-993 (1995)

D. D. Bicanic, **A. M. Sólyom**, Gy. Z. Angeli, Hillion Wegh, Maarten Posthumus and Henk Jalink:
The Extent of Unwanted Infrared Photoacoustic Signals from Polymer Sampling Tubings Exposed to Ultraviolet Radiation
*Infrared Phys. Technol.*, 35, 637-644 (1994)

**A. M. Sólyom**, Gy. Z. Angeli, D. D. Bicanic, M. Lubbers:
Determination of Ammonia Using Carbon Dioxide Laser - Photoacoustic Spectroscopy Compared with Conventional Spectrophotometry
*The Analyst*, 117, 379-382 (1992)

Gy. Z. Angeli, **A. M. Sólyom**, A. Miklós, D. D. Bicanic:
Calibration of A Windowless Photoacoustic Cell for Detection of Trace Gases
*Analytical Chemistry*, 64, 155-158 (1992)

Gy. Z. Angeli, **A. M. Sólyom**, A. Miklós, D. D. Bicanic:
Dependence of the Photoacoustic Cell Constant on The Material Choice
*Photoacoustic and Photothermal Phenomena III. (Ed. D. Bicanic)* Springer Series in Optical Sciences, Vol. 69., p. 596., Springer Verlag, Berlin (1992)

**A. M. Sólyom**, D. D. Bicanic, Gy. Z. Angeli, A. Miklós, M. Lubbers:
Use of an Open Photoacoustic Cell for Some Applications in Agriculture
*Photoacoustic and Photothermal Phenomena III. (Ed. D. Bicanic)* Springer Series in Optical Sciences, Vol 69., p. 88., Springer Verlag, Berlin (1992)

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D. D. Bicanic, H. Jalink, M. Chirtoc, H. Sauren, M. Lubbers, J. Quist, E. Gerkema, C. van Asselt, A. Miklós, **A. M. Sólyom**, Gy. Z. Angeli, P. Helander, H. Vargas
Interfacing Photoacoustic and Photothermal Techniques for New Hyphenated Methodologies and Instrumentation Suitable for Agricultural, Environmental and Medical Applications
*Photoacoustic and Photothermal Phenomena III. (Ed. D. Bicanic)* Springer Series in Optical Sciences, Vol 69., p. 20., Springer Verlag, Berlin (1992)

**A. M. Sólyom**, A. Miklós, Gy. Z. Angeli, A. Lörincz:
Photoacoustic Spectroscopy I.: New Analytical Method for Environmental Trace Gas Analysis
*Acta Chimica Hungarica*, 128, 877-889 (1991)

Gy. Z. Angeli, A. Miklós, **A. M. Sólyom**, A. Lörincz:
Photoacoustic Spectroscopy II.: New Instrument for Continuous Monitoring of Environmental Trace Gases
*Acta Chimica Hungarica*, 128, 891-900 (1991)

**A. Sólyom**, P. Fodor, S. Kemény:
Application of Optimization Methods in Analytical Atomic Spectroscopy (In Hungarian)
*Magyar Kémikusok Lapja*, 46. 107-114 (1991)

L. Illgen, H. Mühlbach, S. Roth, G. Konczos, J. Takács, **A. Sólyom**:
Zum Einfluss von Verunreinigungen auf die Duktilitat und die Magnetischen Eigenschaften amorpher Bander aus Eisen-Bor-Silizium
*Hung. Acad. Sci. Centr. Res. Inst. Phys. KFKI Report* KFKI-1990-22/E (1990)

E. Tóth-Kádár, I. Bakonyi, J. Lóránth, **A. Sólyom**, L. Pogány, T. Dankházi, J. Tóth, G. Konczos, P. Fodor and H.H. Liebermann:
Determination of the Phosphorus Content in Ni-P Alloys
*Plating and Surface Finishing* 77(9) 70-75 (1990.)

E. Tóth-Kádár, I. Bakonyi, **A. Sólyom**, J. Hering, G. Konczos, and F. Pavlyák:
Preparation and Characterization of Electrodeposited Amorphous Ni-P Alloys
*Surface and Coating Technology*, 31, 31-43 (1987)

I. Bakonyi, L. K. Varga, A. Lovas, E. Tóth-Kádár, **A. Sólyom**:
Magnetization and NMR Study of Amorphous Ni-P Alloys in the Paramagnetic Concentration Range
*Journal of Magnetism and Magnetic Materials*, 50, 111-118 (1985)

A. Lovas, L. F. Kiss, G. Konczos, **A. Sólyom**:
Influence of Amorphous Ribbon Processing on the Magnetic Properties of Heat Treated Wound Cores
*Hung. Acad. Sci. Centr. Res. Inst. Phys. KFKI Report.* KFKI-1985-94 (1985)

S. Antus, E Baitz-Gács, F. Boros, M. Nógrádi, **A. Sólyom**:
Oxidation of 1,3-Diphenyl-1,3-Propanediones with Thallium(III)-Nitrate in Methanol
*Liebigs Ann. Chem.,* 1980 (8) 1271-1282

## Book chapter

E.Pfeiffer, H. Esch, S. Hohle, **A.M. Sólyom**, B.N. Timmermann, M. Metzler.
In vitro studies on the estrogenic activity and the metabolism of curcumin.
In: *Functional Foods: Safety Aspects* (G. Eisenbrand, Ed). Deutsche Forschungsgemeinschaft, Senate Commission on Food Safety, Wiley-VCH Verlag, Weinheim, pp. 325-329 (2003).

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## Patent

G. J. Chen, R.C. Clark, **A.M. Sólyom**, B.N. Timmermann, S.D. Jolad:
Anti-inflammatory activity of a specific turmeric extract
*Patent No.: US 2005123632*

## Oral presentations at national and international conferences

A. M. Sólyom (invited speaker):
Anthocyanin Working Group of AOAC: Did that bilberry powder come from bilberries, or something else?
*Annual Meeting of Pacific Southwest Section of AOAC International*
Monterey, CA, February 18-19th, 2015

A. M. Sólyom (invited speaker), E. Pfeiffer, M. Metzler, I.G. Sipes:
Bioavailabilty Studies of Curcuminoids: Lessons Learned and the Need for Labeled Reference Materials
*11th Annual Oxford International Conference on the Science of Botanicals*, Planta Med 2012; 78 - OP23
Oxford, MS, April 15-19th, 2012

Gy. Z. Angeli, A. M. Sólyom, A. Miklós, D. D. Bicanic:
Dependence of the photoacoustic cell constant on the material choice
*Conference Digest of 7th International Topical Meeting on Photoacoustic and Photothermal Phenomena*, O III/2. pp. 96-97.
Doorwerth, The Netherlands, August 26-30, **1991.**

A. M. Sólyom, Gy. Z. Angeli, A. Miklós, D. D. Bicanic, M. Lubbers:
Detection of ammonia - $CO_2$ laser photoacoustic spectroscopy compared to conventional spectrophotometry
*Book of Abstracts of XXVII. Colloquium Spectroscopicum Internationale,* D-1.5
Bergen, Norway, June 9-14, **1991.**

Gy. Z. Angeli, A. M. Sólyom, A. Miklós, D. D. Bicanic:
Calibration of a specially designed windowless photoacoustic cell for low concentration gas analysis
*Book of Abstracts of XXVII. Colloquium Spectroscopicum Internationale,* B-1.7.
Bergen, Norway, 9-14. June, **1991.**

Sólyom Anikó, Angeli György, Miklós András, Lörincz András
Investigation of air pollutant gases by infrared photoacoustic spectroscopy (in Hungarian)
*In the Molecule Spectroscopic Subcommittee of Spectroscopic Committee of GTE*
Budapest, Hungary, 11. Febr. **1991.**

Gy. Z. Angeli, A. Miklós, A. Sólyom, A. Lörincz:
Photoacoustic gas analyzer instrument for environmental measurements (in Hungarian)
*Proceedings of XXXIII. Hungarian Spectroscopic Itinerary Congress*, pp. 13-16.
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The application of a new analytical method - the photoacoustic spectroscopy - for environmental air analysis (in Hungarian)
*Proceedings of XXXIII. Hungarian Spectroscopic Itinerary Congress*, pp. 7-11.
Szekszárd, Hungary, June 19-22. **1990.**

A. Sólyom, P. Fodor, S. Kemény:

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Application of optimization methods in analytical atomic spectroscopy (in Hungarian)
*KEMOMETRIA'84.*
Csopak, Hungary, October 22-24. **1984.**

A. Sólyom, K. Balla-Zámbó:
Development of optical spectroscopic methods for the analysis of phosphorus content of metallic glasses (in Hungarian)
*XXVI. Hungarian Spectroscopic Itinerary Congress*, pp. 139-145
Kecskemét, Hungary, October 18-23, **1983.**

## Meeting abstracts

S.I. Hoehle, E. Pfeiffer, **A.M. Sólyom**, B.N. Timmermann, M. Metzler:
Glucuronidation of curcuminoids catalyzed by multiple human UDP-glucuronosyltransferases.
*European ISSX Meeting at the Pharmaceutical Sciences Fair, Drug Metabolism Reviews, in press.*

J.Z. Zhou, T. Waszkuc, F. Mohammed, C. Ray, R. Buren, D. Sullivan, J. Jabusch, X. Kou, Q. Yang, , **A.M. Sólyom**, J. Wang, T.S. Peng, M. Collision, M. Blumhorst, M. Nagarajan, B. Podhola, H. Li, C. Shevchuk, W. Wang, H. Nguyen, R. Das, K. Orellana, K. Reif:
Determination of Glucosamine in Raw Materials and Dietary Supplements Containing Glucosamine Sulphate and/or Glucosamine Hydrochloride by HPLC with FMOC-Su Derivatization: Collaborative Study
*Abstracts of Papers, 229th ACS National Meeting,* AGFD-058 (2006)

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In vitro Glucuronidierung von Curcuminoiden mit mikrosomalen UDP-Glucuronyltransferasen.
*Lebensmittelchemie* **59**, 16 (2005).

Pfeiffer, E., S. Höhle, **A. M. Sólyom**, B. N. Timmermann, and M. Metzler:
Stable and unstable glucuronides in curcumin metabolism.
*Toxicological Sciences* **72** (1), p. 313, Abstract #. 1520 (2003).

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In vitro studies on the biotransformation of curcuminoids.
*Drug Metab Reviews*, **35**, Suppl 1, 106. Abstract # 211 (2003)

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Characterization BPA Glucuronidation by Rat and Human Hepatocytes
*Toxicological Sciences* 72 (1), 106 p. 313 (2003)

**A.M. Sólyom**, R.C. Lantz, G.J. Chen, and B.N. Timmermann:
Bioactivity Guided Separation of Raw Turmeric (*Curcuma longa*).
*Toxicological Sciences* 66 (1), LB113 (2002)

C.J. Sweet, **A.M. Sólyom**, I.G.Sipes:
Pharmacokinetics and disposition of D&C Red No. 28 in Male Fischer-344 Rats
*Toxicological Sciences* 66 (1), LB113 (2002)

E. Pfeiffer, H. Esch, S. Höhle, M. Metzler, **A.M. Sólyom**, and B.N. Timmermann:
Chemical Stability of Curcuminoids and their Estrogenic Activity in Ishikawa Cells.
*Toxicological Sciences* 66 (1), LB112 p. 30 (2002)

S. Höhle, E. Pfeiffer, **A. M. Sólyom**, B. N. Timmermann, and M. Metzler:
In vitro Studies on the Biotransformation of Curcuminoids.

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*Drug Metabolism Reviews* 35:211, Suppl.1, p. 106 (2003)

R. C Lantz, G. J. Chen, **A. M. Sólyom**, B. N. Timmermann:
The Effect of Botanical Compounds on Inflammatory Mediator Production.
*FASEB Journal*, 16(4), A645 (2002)

R.K. Kuester, J.J Pritchett, S.M. Fontaine, **A.M. Sólyom,** I.G. Sipes:
Glucuronidation of Bisphenol A in Hepatic Microsomes: Age-Dependent Differences.
*The Toxicologist*, 60, Abstract # 456, p. 95 (2001)

**A. M. Sólyom**, I.G.Sipes:
The *in vivo* absorption, distribution and excretion of 14C-methyleugenol in male F-344 rats after topical administration
*The Toxicologist*, 60, Abstract # 1619, p. 340 (2001)

Gy. Z. Angeli, A. M. Sólyom, A. Miklós, D. D. Bicanic:
Dependence of the photoacoustic cell constant on the material choice
*Conference Digest of 7th International Topical Meeting on Photoacoustic and Photothermal Phenomena*, O III/2. pp. 96-97. (1991)

A. M. Sólyom, Gy. Z. Angeli, A. Miklós, D. D. Bicanic, M. Lubbers:
Detection of ammonia - $CO_2$ laser photoacoustic spectroscopy compared to conventional spectrophotometry
*Book of Abstracts of XXVII. Colloquium Spectroscopicum Internationale,* D-1.5 (1991)

Gy. Z. Angeli, A. M. Sólyom, A. Miklós, D. D. Bicanic:
Calibration of a specially designed windowless photoacoustic cell for low concentration gas analysis
*Book of Abstracts of XXVII. Colloquium Spectroscopicum Internationale,* B-1.7. (1991)

Gy. Z. Angeli, A. Miklós, A. Sólyom, A. Lörincz:
Photoacoustic gas analyzer instrument for environmental measurements (in Hungarian)
*Proceedings of XXXIII. Hungarian Spectroscopic Itinerary Congress*, pp. 13-16. (1990)

A. Sólyom, A. Miklós, Gy. Z. Angeli, A. Lörincz:
The application of a new analytical method - the photoacoustic spectroscopy - for environmental air analysis (in Hungarian)
*Proceedings of XXXIII. Hungarian Spectroscopic Itinerary Congress*, pp. 7-11. (1990)

A. Sólyom, K. Balla-Zámbó:
Development of optical spectroscopic methods for the analysis of phosphorus content of metallic glasses (in Hungarian)
*XXVI. Hungarian Spectroscopic Itinerary Congress*, pp. 139-145 (1983)

## Posters presented at national and international conferences

**A.M. Sólyom**:
A Single Laboratory Validation Study for the Determination of Curcuminoids in Dietary Supplements and Foods by Rapid Resolution HPLC using PDA Detection.
Presented at the 123rd AOAC International Annual Meeting and Exposition, Philadelphia, Pennsylvania, September 13-16, 2009

**A.M. Sólyom**, R.K. Kuester, V.P. Rodriguez, L. Jacobs, C.J. Sweet, I.G. Sipes:
Disposition of Tetrabromobisphenol A (TBBPA) in Male Fischer-344 rats.
Presented at the 45th Annual Meeting of the American Society of Toxicology, San Diego, California USA, March 5-9, 2006

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G.A. Knudsen, R.K. Kuester, V.P. Rodriguez, **A.M. Sólyom**, I.G. Sipes:
Disposition and Excretion of Tetrabromobisphenol A bis[2,3-Dibromopropylether] (TBBPA-DBPE) in Male Fischer-344 rats.
Presented at the 45th Annual Meeting of the American Society of Toxicology, San Diego, California USA, March 5-9, 2006

E. Pfeiffer, S.G. Walch, A. Riess, S.I. Hoehle, **A.M. Sólyom**, M. Metzler:
Curcumin Glucuronide Inhibits Cell-free Microtubule Assembly.
Presented at the 45th Annual Meeting of the American Society of Toxicology, San Diego, California, USA, March 5-9, 2006

E. Pfeiffer, A. Riess, S.I. Hoehle, S.G. Walch, **A.M. Sólyom**, M. Metzler:
Curcuminoids from Reactive Glucuronides that Inhibit Cell-free Microtubule Assembly.
Presented at Biological Reactive Intermediates VII, Tucson, Arizona, January 4-7, 2006

Zhou, J.Z., Waszkuc, T., Mohammed, F., Ray, C., Buren, R., Sullivan, D., Jabusch, J., Kou, X., Yang, Q., **Sólyom, A.M**., Wang, J., Peng, T.S., Collison, M., Blumhorst, M., Nagarajan, M., Podhola, B., Li, H., Shevchuk, C., Wang, W., Nguyen, H., Das, R., Orellana, K., Reif., K.:
Determination of glucosamine in raw materials and dietary supplements containing glucosamine sulfate and/or glucosamine hydrochloride by high-performance liquid chromatography with FMOC-Su derivatization: Collaborative study.
Presented at the 229th ACS National Meeting, San Diego, California, March 13-17, 2005

K. L. Prudic, B. N. Timmermann, **A.M. Sólyom**:
Analysis of the Viceroy Butterfly Defensive Compounds using Liquid Chromatography with Ion Trap Mass Spectrometric Detection and its Implications in a Classical Mimicry System
Presented at*119th AOAC International Annual Meeting and Exposition*, Orlando FL, USA, September 11-15, 2005

**A.M. Sólyom,** G.J. Chen, V.P. Rodriguez, R.C. Lantz, S.D. Jolad, B.N. Timmermann:
Changes in Chemical Composition and *in vitro* Anti-inflammatory Activity of Turmeric Oil during Long Term Storage
Presented at*119th AOAC International Annual Meeting and Exposition*, Orlando FL, USA, September 11-15, 2005

**A.M. Sólyom,** E. Pfeiffer, S. I. Hoehle, M. Metzler:
LC/MS Analysis of Glucuronides of Curcuminoids and their Reductive Metabolites
Presented at*119th AOAC International Annual Meeting and Exposition*, Orlando FL, USA September 11-15, 2005

S.I. Hoehle, E. Pfeiffer, **A.M. Sólyom,** B.N. Timmermann:
Glucuronidation of Curcuminoids Catalyzed by Multiple Human UDP-glucuronosyltransferases.
Presented at *Europian ISSX Meeting at the Pharmaceutical Science Fair*, Nice, France, June 12-16, 2005

J.L Funk, G Chen, G. McCaffrey, G. Stafford, J. Beischel, J. Wilson, R.C. Lantz, **A.M Sólyom**, S.D. Jolad, BN.Timmermann:
Curcumin-enriched Turmeric Extract Prevents Arthritis in Lewis Rats
Presented at *26th annual Meeting of the American Society of Bone and Mineral Research*, Seattle, WA, October 1-5, 2004,

**A.M. Sólyom**, V.P. Rodríguez, J.D. Jolad and B.N. Timmermann:
Analysis of Turmeric Extracts Using Liquid Chromatography with Ion Trap Mass Spectrometric Detection.
Presented at*118th AOAC International Annual Meeting and Exposition*, St. Louis, Missouri, September 19-23, 2004

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G.G. Angeli, V.P. Rodríguez, B.N. Timmermann, **A.M. Sólyom**:
Extraction and Analysis of Fresh Ginger Root and Ginger Dietary Supplement.
Presented at *118th AOAC International Annual Meeting and Exposition*, St. Louis, Missouri, September 19-23, 2004

V.P. Rodríguez, C.Sweet, B.N. Timmermann, **A.M. Sólyom**:
Development of an LC/MS/MS Method to Separate and Analyze Curcuminoids, their Metabolites and Degradation Products.
Presented at*118th AOAC International Annual Meeting and Exposition*, St. Louis, Missouri, September 19-23, 2004

K.L. Prudic, **A.M. Sólyom**, J.Q. Gu, B.N. Timmermann:
Defensive Chemicals in the Viceroy Butterfly (Limenitis Archippus) and its Larval Host-Plant, Carolina Willow (Salix Caroliniana)
Presented at *International Congress on Natural Products Research, American Society of Pharmacognosy*, Phoenix AZ, USA. July 31-August 4, 2004,

Amber S. Roberts, V.P. Rodríguez, B.N. Timmermann and **A.M. Sólyom**:
Quantification of the Curcuminoids Content in Bulk Wholesale and Retail Dietary Supplements.
Presented at *Undergraduate Research Posters on the Hill* (organized by The Council on Undergraduate Research), Washington D.C., April 20, 2004,

R.C. Lantz, G.J. Chen, M. Sarihan, **A.M. Sólyom**, S.D. Jolad, and B.N. Timmermann:
Sites of Action of Compounds Isolated from Ginger.
Presented at *Experimental Biology 2004*, Washington DC, April 18, 2004.

**A.M. Sólyom**, V.P. Rodriguez, and B.N. Timmermann:
Development of a Solid Phase Extraction (SPE) Method for the Analysis of Curcuminoids.
Presented at *117th AOAC International Annual Meeting and Exposition*, Abstract P1025, Atlanta, GA, USA, September 14-18, 2003

**A.M. Sólyom**, A.S. Roberts, V.P. Rodriguez, B.N. Timmermann:
Quantification of the Curcuminoids Content in Bulk Wholesale and Retail Turmeric Dietary Supplements.
Presented at *117th AOAC International Annual Meeting and Exposition,* Abstract P1026, Atlanta GA, USA, September 14-18, 2003

**A.M. Sólyom**, V.P. Rodriguez, Shivanand D. Jolad, B.N. Timmermann:
Ginger: What's in the bottle?
Presented at *117th AOAC International Annual Meeting and Exposition*, Abstract P1032, Atlanta GA, USA, September 14-18, 2003

S. Höhle, E. Pfeiffer, **A. M. Sólyom**, B. N. Timmermann, M. Metzler:
*In vitro* Studies on the Biotransformation of Curcuminoids.
Presented at *8th European ISSX Meeting*, Dijon, France, April 27-May 1, 2003

R.K. Kuester, D. Castro, **A.M. Sólyom**, I. G. Sipes:
Characterization BPA Glucuronidation by Rat and Human Hepatocytes
Presented at *42nd Annual Meeting of the American Society of Toxicology*, Salt Lake City UT,USA, March 09-13, 2003

E. Pfeiffer, S. Höhle, **A. M. Sólyom**, B. N. Timmermann, and M. Metzler:
Stable and unstable glucuronides in curcumin metabolism.
Presented at *42nd Annual Meeting of the American Society of Toxicology*, Salt Lake City UT, USA, March 09-13, 2003

E. Pfeiffer, H.L. Esch, S. Höhle, **A.M. Sólyom**, B.N. Timmermann, M. Metzler:
*In vitro* studies on the estrogenic activity and the metabolism of curcumin.

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Presented at *Symposium of the Deutsche Forschungsgemeinschaft, Senate Commission on Food Safety.* Functional Food: Safety Aspects. Abstract # 11, Karlsruhe, Germany, May 05-07, 2002..

R. C Lantz, G. J. Chen, **A. M. Sólyom**, B. N. Timmermann:
The Effect of Botanical Compounds on Inflammatory Mediator Production.
Presented at *Experimental Biology 02*, New Orleans LA, USA, April 20-24, 2002

**A.M. Sólyom**, R.C. Lantz, G.J. Chen, and B.N. Timmermann:
Bioactivity Guided Separation of Raw Turmeric *(Curcuma longa).*
Presented at *41st Annual Meeting of the American Society of Toxicology*, Nashville TN, USA, March 17-21, 2002

C.J. Sweet, **A.M. Sólyom**, I.G.Sipes:
Pharmacokinetics and disposition of D&C Red No. 28 in Male Fischer-344 Rats
Presented at *41st Annual Meeting of the American Society of Toxicology*, Nashville TN, USA, March 17-21, 2002

E. Pfeiffer, H. Esch, S. Höhle, M. Metzler, **A.M. Sólyom**, and B.N. Timmermann:
Chemical Stability of Curcuminoids and their Estrogenic Activity in Ishikawa Cells.
Presented at *41st Annual Meeting of the American Society of Toxicology*, Nashville TN, USA, March 17-21, 2002

E. Pfeiffer, S. Höhle, **A.M. Sólyom,** M. Metzler:
Studies on the stability of turmeric constituents.
Presented at *6th Karlsruhe Nutrition Symposium*, abstract P24 abstract book p.65, Karlsruhe, Germany, October 21-23, 2001.

R.K. Kuester, J.J Pritchett, S.M. Fontaine**, A.M. Sólyom**, I.G. Sipes:
Glucuronidation of Bisphenol A in Hepatic Microsomes: Age-Dependent Differences.
Presented at *4ost Annual Meeting of the American Society of Toxicology*, San Francisco CA, USA, March 25-29, 2001

**A. M. Sólyom**, I.G.Sipes:
The *in vivo* absorption, distribution and excretion of 14C-methyleugenol in male F-344 rats after topical administration
Presented at *4ost Annual Meeting of the American Society of Toxicology*, San Francisco CA, USA, March 25-29, 2001

**RESUME**

**Dr. Ajai Prakash Gupta**

**Senior Technical Officer, Quality Control & Quality Assurance & QCQA-Incharge (cGMP), Indian Institute of Integrative Medicine (CSIR), Canal Road, Jammu-180001**
**Date of Birth: 05th June 1968.**

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## PROFILE

- More than 25 years of experience in the area of Analytical Chemistry of Natural Products.
- Expertise in method development, validation & analysis of tissue culture samples and bioactive constitutions of microbes and medicinal plants. My area of expertise also includes pharmo-kinetics & pharmo-dynamics (PKPD) samples, drug metabolites, mechanistic study using sophisticated equipments like GCMS, UPLC, HPTLC, LC/MS/MS, LC-MS-TOF and HPLC.
- Jammu & Kashmir FDA approved Quality Control person till 2019.
- Published 85 research papers in journals of National and International repute with a total citation of 1310.
- Delivered 24 invited lectures nationally and internationally.
- Attended 23 conferences nationally and internationally.
- Published papers were acknowledged through ten awards.
- Six national/International patents.

**Experience in the Area of NABL and ISO certifications**

- Diploma in "Total Quality Management & ISO 9000", (1997), (Correspondence), All India Institute of Management, Madras.

**Attended conferences, workshops & ISO**

- Awareness Programme on ISO 9001:2000 QMS", On 5th April 2004 at IHBT, Palampur (HP).
- Internal Auditors Course on ISO 17025:1999 QMS", On 13th July 2005 at IHBT, Palampur
- National conference on Good Laboratory Practice (GLP)", at Industrial Toxicological Research Center, Lucknow, Jan 13-15, 2005.
- Workshop on "Validation of Analytical methods FDA and EU",13th October 2011, Anacon, Mumbai.
- Technical Manager of NABL in IHBT, Palampur for 3 years.
- Member of team for NABL accreditation in CIMAP, Lucknow, IHBT, Palampur & IIIM, Jammu.

## EDUCATION

1998 **Ph. D.: Specialized in Analytical Chemistry:** Central Institute of Medicinal & Aromatic Plants, (CSIR), Lucknow (R. M. L. Uni., Faizabad)

1989 1988

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| **M. Sc.: Organic Chemistry;** Kanpur | University. |
| | **Additional Qualifications:** |
| | Post Graduate Diploma in Computer Application, Kamla Nehru Institute of Technology, Sultanpur. |
| 1995 | Bachelor of Education, Math & Science, Kanpur University. |

## EXPERIENCE

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|---|---|
| 2012-present (IIIM-CSIR) | **Senior Technical Officer-III, Quality Control & Quality Assurance** Presently I am engaged in the analysis of PKPD samples, drug metabolites, mechanistic study, tissue culture based analysis and bioactive constitution's of microbes, PKPD and medicinal plants through HPLC, HPTLC, UPLC and LC-MS/MS. |
| 2007-2011 (IIIM-CSIR) | **Senior Technical Officer-II, Patent Cell Division** Experience of preparing comprehensive **s**cientific literature/Patent documents for project using software likes SciFinder, STN, Pub Med, TOXNET, ISI Web, EPO, USPTO, JPO, WIPO etc. |
| 2002-2007 (IHBT-CSIR) | **Technical Officer,** Natural Plant Products, Instrumentation In-charge Operation and maintenance of sophisticated instruments like NMR(Bruker; 300MHz), LC-MS-MS(Q-TOF) Water's Micromass, HPLC and Prep-HPLC (Water's), HPTLC (Camag), GC-MS (Shimadzu). Method Development and validation by sophisticated instruments. |
| 2000-2002 Govt. Opium & Alkaloid Works, Neemuch | **Research Officer,**<br>• Analysis of Morphine, Codeine, Cryptopine, Thebaine, Papaverine and Narcotine. Worked on projects to improve the efficiency of production plant and recovery of valuable alkaloids in process house.<br>• Development of process of manufacturing value-added synthetic derivatives of morphine, codeine and thebaine viz. Oxycodone, Hydrocodone, Hydromorphone, Pholcodeine, Dihydro-codeine, Dihydro-morphine etc. |
| 1998-2000 Govt. Opium & Alkaloid Works, Neemuch | **Senior Scientific Assistant,** Analysis of opium samples and its derivatives by using GC,HPLC, GC-MS and conventional methods. Analysis of store samples : Activated carbon, Filter aid, Furnace oil, Filter cloth etc. |
| | **Chemist** |
| 1989-1992 Hydroair Controls, Mumbai | **Waste Water Treatment analysis"**of different factories in India. Analysis of Chemical and Biological Oxygen demand, Oil & Greese, Dissolved oxygen, Hardness, Acidity, Alkanity and pH. |

## WORKSHOPS & TRAININGS ATTENDED

- VII National Users Workshop on **"Application of High Resolution NMR, Mass Spectrometry &**
- **Electron Microscopy",** Jan. 4-6, 1995 at Central Drug Research Institute, Lucknow, India.
- Training on **"HPLC-Practice of Liquid Chromatography",** Jan. 6-8, 1997 at Lab India Instruments

Pvt. Ltd, Pune, India (An associates of Perkin Elmer).

- Workshop on **"Sophisticated Instruments in Biomedical R & D Activities",** March 20, 1997, Central Drug Research Institute, Lucknow, India.
- Training on **"High Performance Thin Layer Chromatography",** in ANCHROME Enterprises (Recognised by CAMAG, Switzerland) at Bombay, August 17-18 , 1999.
- Participated in the National School on **"A New Dimension to NMR: From Molecules to Human Behavior"** from June 15-June 25, 2004 at IHBT, CSIR. Palampur, Himachal Pradesh (India).
- Training on **"QTOF micro small molecules operator training course",** at Manchester (UK), 23-26 Jan. 2006.
- Training on **"GC-MS Techniques, Troubles-shooting and GCMS solution Training for GCMS-QP2010"**, 04-06 Sep 2006 at Shimadzu (Asia Pacific) Pte Ltd, Singapore
- **"Workshop on Advance Workshop on Patent Strategies"**, from 1st to 4th Feb 2010, at Human Resource Development Center (CSIR), Kamla Nehru Nagar, Ghaziabad.
- Attended three days symposium on **"5th International Symposium on Drug Metabolism & Pharmacokinetics (DMPK)",** from 7th to 10th March 2013 at NIPER, Mohali.

## MEMBERSHIP OF SCIENTIFIC SOCIETIES

1. Life member of "National Magnetic Resonance Society".
2. Life member of "Essential Oil Organization of India".
3. Life member of "Indian Society of Analytical Scientists".
4. Life membership "Chromatographic Society of India". (CSI).
5. One year member of "Society for Medicinal Plants and Natural Product Research".
6. One year member of "International Society for Ethnopharmacology".
7. Life member of "The Indian Science Congress Association".
8. Three years member of The Phytochemical Society of Europe.
9. Member of Science Advisory Board (SAB).
10. Editorial Board member "International Journal of Ethnopharmacology".
11. Editorial Board member "Journal of Management Studies".
12. Editorial Board member, "Journal of Homeopathy & Ayurvedic Medicine".
13. Editorial Board member, "International Journal of Herbs, Spices and Medicinal Plants".
14. Editorial Board member, "International Journal of Pharma and bio sciences".
15. Editorial Board member, "International Journal of Pharma And Chemical Research (IJPACR)".
16. Editorial Board member, "Journal of New Science Biotechnology".
17. Editorial Board member, "Austin Journal of Biotechnology & Bioengineering".
18. Editorial Board member, "Global Journal of Biotechnology and Biomaterial Science".
19. Editorial Board member, "Innovational: Journal of Quality Assurance and Pharma Analysis (IJQAPA)".
20. Editorial Board member, "Global Journal of Organic and Inorganic Chemistry and Global Journal of Chemistry and Materials", Journal of Innovations in Pharmaceuticals and Biological Sciences (JIPBS), SM Journal of Nutrition and Metabolism.
21. Guest reviewer "Food and Nutrition Sciences".
22. Editorial Board members, "Pharmaceutical Crop", Platinum Global Journal of Medicine and Medical Sciences (PGJMMS).
23. Reviewer "Chromatography Research International, J of Sep Science, Food Chemistry, Food and agriculture chemistry, J of AOAC, Chromatographia, International Journal of Research & Development Technology (IJRDT), Natural Product Communication, Natural Product Research, Analytical method, J of liquid chromatography and related technologies, Phytomedicine, J of chromatographic science etc.
24. Peer reviewer "Research and Reports in Biology".

**PUBLICATION LIST & OTHERS:**


1. Mishra, N., **Gupta, A. P.**, Singh, B., Kaul, V. K. and Ahuja, P. S. "Rapid Determination of Podophyllotoxin in *Podophyllum hexandrum* by Reverse Phase High Performance Thin Layer Chromatography", **J. of liquid chromatography and related technologies**, 28, 665-679, **2005**.
2. Singh, N., **Gupta, A. P.**, Singh, B. and Kaul, V. K. "Quantification of Picroside-I and Picroside-II in *Picrorhiza kurroa* by High performance thin layer chromatography", **J. of liquid Chromatography and related technologies,** 28, 1679-1691, **2005**.
3. Mishra, N., Acharya, R., **Gupta, A. P.**, Singh, B., Kaul, V. K. and Ahuja, P. S. "A simple Micro analytical Technique for the Determination of *Podopyllotoxin hexandrum* Roots by Quantitative RP- HPLC and RP-HPTLC", **Current Science,** 88, 1372-1373, **2005**.
4. Singh, N. P., **Gupta, A. P.**, Sinha, A. K. and Ahuja, P. S. "High Performance Thin Layer Chromatography method for quantitative Determination of four major Anthraquinone derivatives in *Rheum emodi*", **J. of Chromatography A,** 1077,202-206, **2005**.
5. Bhandari, P., **Gupta, A. P.**, Singh, B. and Kaul, V. K. "Simultaneous Determination of Artemisinin, Artemisinic acid and Arteanniun-B in *Artemisia annua* using Reverse Phase High Performance Thin Layer Chromatography", **J. of Separation Science,** 28, 2288-2292, **2005**.
6. Kumar, N., Singh, B., Bhandari, P., **Gupta, A. P.**, Uniyal, S. K., and Kaul, V. K. "Biflavonoids from *Lonicera japonica*", **Phytochemistry, *66***, 2740-2744, **2005**.
7. Swaroop, A., **Gupta, A. P.** and Sinha, A. K. "Simultaneous determination of Quercetin, Rutin and Coumeric Acid in Flowers of *Rhododendron arboreum* by HPTLC", **Chromatographia, *62***, 649-652, **2005**.
8. Singh, N., Mahmood, U., Kaul, V. K., **Gupta, A. P.** and Jirovetz, L. "A new alkylated benzoquinone from rhizomes of *Iris kumaonensis*", **Natural Product Research**, ***20***, 75-78, **2006**.
9. Singh N., **Gupta, A. P.**, Singh, B. and Kaul, V. K. "Quantification of Valerinic Acid in *Valeriana jatamansi* and Valeriana officinalis by HPTLC", **Chromatographia**, ***63***, 209-213, **2006.**
10. Kumar, N., Singh, B., **Gupta, A. P.**, and Kaul, V. K. "Lonijaposides, novel cerebrosides from *Lonicera japonica*", **Tetrahedron, *62***, 4317-4322, **2006**.
11. Pathania, V., **Gupta, A. P.** and Singh, B. "Improved HPTLC Method for Determination of Curcuminoids from Curcuma longa", **J. of liquid chromatography and related technologies**, ***29***, 877-885,**2006**.
12. Bhandari, P., **Gupta, A. P.**, Singh, B. and Kaul, V. K. "HPTLC Determination of Swertiamarin and Amarogentin in Swertia species from the Western Himalayas", **J. of Planar Chromatography**, **19**, 212-215, **2006**.
13. Bhandari, P., Kumar, N., **Gupta, A. P.**, Singh, B. and Kaul, V. K., "Micro-LC Determination of Swertiamarin in Swertia species and Bacoside-A in Bacopa monnieri by HPLC", **Chromatographia**, 64, 599-602, **2006**.
14. N. Kumar, P. Bhadari, B. Singh, **A. P. Gupta** and V. K. Kaul, "Steroidal alkaloids from *Holarrhena antidysenterica*", **Chem. Pharm. Bull.**, 55(6), 912-914, **2007**.
15. Chawla, R., Arora, R., Singh, S., Sagar, R. K., Sharma, R. K., Kumar, R., Sharma, A., Gupta, M. L., Singh, S., Prasad, J., Khan, H. A., Swaroop, A., Sinha, A. K., **Gupta, A. P.**, Tripathi, R. P., Ahuja, P. S., "Radio-protective and antioxidant activity of fractionated extracts of berries of *Hippophae rhammnoides*", **J. of Medicinal Food**, 10(1), 101-109, **2007**.
16. Sharma, U. K., Sharma, N., **Gupta, A. P.**, Kumar, V. and Sinha, A. K., "RP-HPTLC determination and validation of vanillin and related phenolic compounds in accelerated solvent extract of *Vanilla planifolia*: A comparison with microwave, ultrasound and soxlet extraction", **J. of Separation Science**, 30, 3174-3180, **2007**.
17. P. Bhandari, N. Kumar, **A. P. Gupta**, B. Singh, V. K. Kaul, "A rapid RP-HPTLC densitometry method for simultaneous determination of major flavonoids in important medicinal plants", **J. of Separation Science,** 30(13), 2092-2096**, 2007**.
18. N. Kumar, P. Bhadari, B. Singh, **A. P. Gupta** and V. K. Kaul, "Reversed phase-HPLC for rapid

determination of polyphenols in flowers of rose species", **J. of Separation Science**, 31, issue-2, 262-267, **2008**.

19. V. Sharma, **A. P. Gupta**, P. Bhandari, R. C. Gupta and B. Singh, "A validated HPTLC method for the quantification of withaferin-A and withanolide-A in different plant parts of two morphotypes of *withania somnifera*", **Chromatograhia**, 66, 801-804, **2007**.
20. V. Jaitak, **A. P. Gupta,** V. K. Kaul and P. S. Ahuja, "Validated high performance thin layer chromatography method for steviol glycosides in *S. rebaoudiona*", **J. of Pharmaceutical & Biomedical Research**, 47, issue-4-5, 790-794, **2008**.
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**PATENTS**

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2. **Gupta, A. P.**, Singh, D. V., Gupta, M. M. and Sushil Kumar**," A process for extraction of stable green dye from *Eclipta alba*"**, Application 234/DEL/1999 published 2005-06-03, filed 1999-02-12.
3. Sandal, I., Bhattacharya, A., Ravindranath, S. D., Singh, B., Kaul, V. K., Saini, U., Kumar, J. K., Ahuja, P. S., and **Gupta, A. P.**, "Use of 2-Amino glutarimide (3-amino piperidine 2,6 dione) in promoting *Agrobacterium tumefacines* mediated genetic transformation of recalcitrant plants and explants and a simple method of producing it", File no.-0405NF2005/IN.
4. Patent filled, **"Standardized Extract of *Bergenia ciliata* for the Treatment of Inflammatory Disorders"**, Bharate Sandip Bibishan, Singh Surjeet, Singh Gurdarshan, Jain Shreyans Kumar, Kumar Ajay, Singh Bikarma,Gupta Ajai Prakash, Anand Rajneesh, Singh, Amarinder, Kushwaha Manoj, Gupta Mehak, Sharma Gourav, Sharma Ashwani & Vishwakarma Ram.
5. Patent filled, **"Standardized Extract of *Dysoxylum binectariferum* for the Treatment of Inflammatory Disorders"**, Bharate Sandip Bibishan, Singh Surjeet, Singh Gurdarshan, Jain Shreyans Kumar, Kumar Ajay, Singh Bikarma,Gupta Ajai Prakash, Anand Rajneesh, Singh Amarinder, Kushwaha Manoj, Gupta Mehak, Devi Sunita, Vij Bhavna & Vishwakarma Ram.
6. Patent filled, **"Process for the preparation of Actioside in-rich fraction from *Colebrookea oppositifolia* for the treatment of alcoholic hepatitis",** Naresh Satti, Prabhu Dutt, Balkrishan chandan, Neelam Sharma, Surjeet Singh, Gurudarshan singh, Manoj Tikku, Subhash Sharma, Jyotsna suri, Ajai Prakash Gupta, Inshad Ali Khan, Ram Vishwakarma.

**PAPERS PRESENTED IN CONFERENCES:**

1. Singh N., **Gupta A. P.**, Acharya R., Singh B., Kaul V. K and Ahuja P. S. "*Determination of Picroside-I and Picroside-II in Picrorhiza kurroa from high altitude locations of HP*" P-307, presented in **"IUPAC International Conference on Biodiversity and Natural Products.** 26-31$^{st}$ January 2004. New

Delhi."

2. Kumar, N., Singh, B., **Gupta, A. P.**, Kaul, V. K., Tapwal, A., Kaur, M. J. and Singh. L. "*Characterization of Paclitaxel, Baccatin-III and 10-Deacetyl Baccatin-III synthesized by fungal endophytes in Taxus Wallichana* ZUCC" P-180, presented in "IUPAC International Conference on Biodiversity and Natural Products. 26-31st January 2004. New Delhi.
3. Swaroop, A., Sinha, A. K., **Gupta, A. P.**, Chawla, R., Arora, R. and Sharma, R. K. "*RP-HPTLC Determination of Flavanoids in Berries of Hippophe rhamnoides and its Bioactivity evaluation*" P-25-4, presented in **"Chemistry Biology Interface: Synergistic New Frontiers,** Nov. 21-26, 2004, New Delhi, India".
4. Mishra, N., Acharya, R., **Gupta, A. P.**, Singh, B., Kaul, V. K. and Ahuja P. S. "*A simple Micro- analytical Technique for the Determination of Podopyllotoxin hexandrum Roots by Quantitative RP-HPLC and RP-HPTLC*" P-23-14, presented in **"Chemistry Biology Interface: Synergistic New Frontiers,** Nov. 21-26, 2004, New Delhi, India"
5. uhjt dqekj] fcØe flag] vt; izdk'k xqIrk] fot; dqekj dkSy] v'ouh Vioky] efuUnj thr dkSj ,o yky flag ^^VSDll okfyfp;kuk d vUr% & thoh dodu }kjk dSalj jks/kh nok ¼iSDyVsDly½ dk la'ys'k.k^^ cnyrvkS|kfxd f'k ifjos'k esa lxa/k ,oa vkS'k/kh; Qly jk'V%; laxks'Bh ,oa ,kCnkoyh ladyu 17&19 ekpZ] 2006
6. fot;yrk iBkfu;k] vt; izdk'k xqIrk ,o fcØe flag] ^^,pih,ylh vkSj ,pihVh,ylh d }kjk dqjdqek yksxk ls dqjD;qeksuksMl dk fo"ys'k.k^^ cnyr vkS|kfxdh ifjos'k esa lxa/k ,oa vkSÔ/kh; Qly jk'V%; laxks'Bh ,o,kCnkoyh ladyu 17&19 ekp] 2006
7. fodkl tSrd] fot; dqekj dkSy] fcØe flag ,oa vt; izdk'k xqIrk ^^LVhfo;k jsckmfM;kuk e LVhfo;ksklkbM vkSj fjckfM;ksklkbM dfeJ.k dk vkdyu^^ cnyrvkS|kfxd f'k ifjos'k esa lxa/k ,ovkS'k/kh; Qly jk'V%; laxks'Bh ,oa ,kCnkoyh ladyu 17&19 ekp] 2006
8. Kumar, N., Singh, B., **Gupta, A. P.**, Kaul, V. K. "An NMR and ESI-QTOF-MS/MS based approach for characterization of novel biologically active molecules" presented in "AvH-Kolleg meeting on Bio-Nano-Geo Sciences", 24-26 March 2006, IHBT, Palampur.
9. V. Pathania, **A. P. Gupta,** B. Singh, V. K. Kaul, "Isolation, Characterization and evaluation of Anthraquinones from *Cassia tora*", AvH-Kolleg meeting on Bio-Nano-Geo Sciences", 24-26 March 2006, IHBT, Palampur.
10. U. Sharma, N. Sharma, **A. P. Gupta**, V. Pathania and A. K. Sinha, "Comparison of different analytical techniques for the qualitative determination of vanillin and related phenolic compounds in *Vanilla plenifolia* pods", National Symposium on: Recent Advances in Analytical Sciences and Application, April 09-11, 2007, Himachal Pradesh University, Summer Hills, Shimla: Organised by Indian Society of Analytical Scientists-Delhi Chapter.
11. P. Bhandari, N. Kumar, **A. P. Gupta**, B. Singh, V. K. Kaul, "National Symposium on: Recent Advances in Analytical Sciences and Application, April 09-11, 2007, Himachal Pradesh University, Summer Hills, Shimla: organised by Indian Society of Analytical Scientists-Delhi Chapter.
12. S. Gupta, **A. P. Gupta**, P. Pandotra, Gandhi Ram, R. Anand and S. C. Taneja, "Capillary Gas Chromatography-Mass Spectrometry Analysis of *Zingiber officinale*", 2nd National Symposium on Analytical Sciences (NSAS) on "Analytical Innovations for Process and Technology Development" At IHBT, Palampur from November 23-25, 2008,Organised by Indian Society of Analytical Scientists-Delhi Chapter.
13. **A. P. Gupta**, P. Pandotra, R. Anand, Gandhiram, S. Gupta, R. Sapru, G. N. Qazi, "Quality Evaluation Of *Zingiber Officinale* By GC-MS", 3rd International Congress on Bioprocesses in Food Industries, 2008 & 5th Convention of the Biotech Research Society of India, at Osmania University, Hyderabad from November 6-8, 2008.
14. S. Gupta, Gandhiram, **A. P. Gupta**, P. Pandotra, S. Johri, G. N. Qazi, "Biometric Analysis, Molecular Fingerprinting & Essential oil analysis of Ginger Germplasm Collected from Northwestern Himalayas ", 3rd International Congress on Bioprocesses in Food Industries, 2008 & 5th Convention of the Biotech Research Society of India, At Osmania University, Hyderabad from November 6-8, 2008.
15. P. Pandotra, **A. P. Gupta**, S. Gupta, Gandhiram, R. Anand, S. C. Taneja, "Capillary Gas Chromatography Mass Spectrometry Analysis of *Zingiber officinale*" on 2nd National Symposium on Analytical Sciences (NSAS) on "Analytical Innovations for Process and Technology Development" At IHBT, Palampur from November 23-25, 2008, Organized by Indian Society of

Analytical Scientists-Delhi Chapter.

16. **A. P. Gupta**, S. Gupta, P. Pandotra, B. D. Gupta, J. K. Dhar, S. C. Taneja, "Simultaneous determination of Oleoresins in *Zingiber officinale* by RP-HPLC with Photodiode Array Detection", on ISAS-DC seminar held at IHBT, Palampur on 23-25 Nov 2008.

17. I. Khan, P. Pandotra, R. Sharma, **A.P. Gupta**, Y. S. Bedi, J. K. Dhar, B. D Gupta, S. Gupta, "RP-TLC method for the quantification of 6, 8 and 10-gingerol and finger printing of ultrasonic-assisted fresh rhizome extracts of *Zingiber officinale* Collected from different locations of North Western Himalayas", National seminar on New biology and plant engineering, School of life science, Jaipur national university, Dec 1st to 2nd 2009.
18. **A. P. Gupta,** P. Pandotra, J. K. Dhar, Y. S. Bedi, **S. Gupta, "T**oxic heavy metals analysis in rhizome of *Zingiber officinale* from North Western Himalayas by Atomic Absorption Spectroscopy**.** National seminar on New biology and plant engineering, School of life science, Jaipur national university, Dec 1st to 2nd 2009.
19. S. Gupta, P. Pandotra, R. Sharma, Prabhu Dutt, Gandhiram, B. D. Gupta, **A. P. Gupta,** Y. S. Bedi, "Fast and Eco-friendly chromolithic method development, validation and system suitability analysis for 6, 8, 10-gingerols and shogaol in rhizome of Zingiber officinale by LC-DAD and Empower software", at Separation Science Singapore 2010, Biopolis Science Park, Singapore from 5-6 August 2010.
20. Mohd. K. Husain, P. Pandotra, Gandhiram, S. Gupta, **A. P. Gupta,** Y. S. Bedi, "Analysis of genetic diversity in North-western Himalayan ginger (*Zingiber officinale*) using IRAP &REMAP marker technique", National Seminar on Recent advances in Plant Biotechnology: Prospects and Potentials-2011 (AMU, Aligarh).
21. Ajai Prakash Gupta and Suphla Gupta, "HPTLC based quality assessment of some high altitude plant species: Variation with Altitude" at International Symposium for HPTLC, 06-08 July 2011, Basal, Switzerland.
22. R. Sharma, P. Pandotra, Prabhudatt, **A. P. Gupta**, S. Gupta, "Ultra Sound Assisted Extraction (Green Extraction) and Monolithic Separation (Green Analysis) of some Medicinal Plants", International Symposium on Recent Advances in "Chromatography Sciences" and "Green Chemistry", 12-14th Jan. 2012, Manav Rachna International University, Faridabad.

## INVITED LECTURES/PRESENTATIONS:

1. Instrumental methods for analysis of the products derived from Medicinal and Aromatic plants in a training programme at IHBT, Palampur, 10 to 14 Nov. 2003.
2. Instrumental methods for analysis of the products derived from Medicinal and Aromatic plants in a training programme at IHBT, Palampur, 25 to 30 April 2004.
3. Cultivation, Processing and Quality Evaluation of Medicinal & Aromatic Crops at IHBT, Palampur, 25 to 30 April 2005.
4. "Role of Natural Product Chemistry", Navodaya Vidhyalaya Samiti, Regional Science Congress 06, at JNV Paprola (Kangra) on 16th November 2006.
5. "Overview of Patent Cell Division", IIIM-IHBT interactive meets, 23rd March 2010 At IHBT, Palampur.
6. Literature Survey through Modern Tool-Sci-Finder, "Training Programme for Officer of Councils under Department of Ayush, 5th April 2010, at IIIM, Jammu.
7. Smart Search through Smart Tool Scifinder, "Training Programme for Officer of Councils under Department of Ayush, 27th May 2010, at IIIM, Jammu.
8. Literature Survey through Modern Tool-SciFinder, "Training Programme for Officer of Council Under Department of Ayush, 17th June 2010, at IIIM, Jammu.
9. First Ayurveda Congress, "Quality assessment of medicinal plants/herbal drugs using modern analytical techniques", Klagenfurt, Austria; 1st to 2nd Oct2010.
10. National Seminar on Management of Quality Education & Research in Life Science

(MQERLS), "Importance of Quality Control in Herbs/Herbal Drug(s)", Swami Ramanand Teerth Marthwada University, Nanded, India; 7th & 8th March 2011.

11. Training Course on "Chromatographic Techniques for Pharmaceutical Research", Chromatography: Its relevance in modern day analysis, (23 MAY – 4 JUNE 2011), University Institute of Pharmaceutical Sciences (Networking Resource Centre) UGC Centre for Advanced Studies (CAS) Punjab University, Chandigarh 160014.
12. Quality Control in Herbs/Herbal Drug(S), "International Conference on Chemistry of Phyto-potentials: Health, Energy and Environmental perspectives (CPHEE 2011)", 4th-6th November, 2011.
13. Quality Control of Medicinal & Aromatic Plants, "Two days training programme on "Cultivation of Aromatic and Medicinal Plants, their processing, value addition and marketing" on 18th and 19th February, 2015.
14. Value Addition of MAPs, "Two days training programme on "Cultivation of Aromatic and Medicinal Plants, their processing, value addition and marketing" on 18th and 19th February, 2015.
15. Quality Control, Adulteration and value addition of MAPs in "National seminar sum exhibition on Kissan Mela, Entrepreneurship programme & Flower Show" Organized at IIIM Farm, Chatha on 15th and 16th March, 2015.
16. Invited lecture on, "HPLC and GLC", at Govt. College for Women, Gandhi Nagar, Jammu on 28 and 29th April 2015.
17. Invited lecture on, "Quality assessment of essential oils using modern tools", in "Training cum Workshop on Essential Oils, Perfumery & Aromatherapy" held at FRI , Dehradun from June 22-26, 2015.
18. Invited Lecture, "Patent, Copyright, Trademark & Infringement", Workshop on "Intellectual Property Right (IPR)", Govt. College for Women, Gandhi Nagar, Jammu, 18th November 2016.
19. Chief Guest and Inaugural Lecture, "Biodiversity and Medicinal Plants", National Seminar on Environment: Issues & strategies, R. S. S. College, Kanpur, 28th Jan 2016.
20. Invited Guest Speaker, "Chromolith RP-18e Muti-utility column", Chromatography ENGAGE" Merck, India at New Delhi, 24th Feb 2016.
21. Invited lecture and jury member, "Innovative Ideas from Every Day Lives", National Science Day (Innovation & make in India Fair), Org. by National Council for Science & Technology Communication (DST), New Delhi & J & K State Science Technology & Innovation Council, 25-26th Feb. 2016 at GCW, Gandhi Nagar, Jammu
22. Invited Lecture, "Analytical Techniques HPLC AND HPTLC", "Faculty Development Programme On Current Scenario & Future Perspective's In Pharmaceutical Research", Khalsa College Of Pharmacy, Gurusar Sadhar, Ludhiana, 8th to 12th March 2016.
23. Guest of Honour "World Health Day", Organised by Indo-Vietnam Medicine, 7th April 2016, K. L. Saigal Memorial Auditorium, Jammu.
24. Invited Lecture on, "Determination of adulteration in essential oil using modern tools", in "Training cum Workshop on Essential Oils, Perfumery & Aromatherapy" held at FRI, Dehradun from June 13-17, 2016.

# Hong You Ph.D.

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1365 Redwood Way, Petaluma, California 94954, USA

## EXPERIENCE

**Principal Scientist** June 2016 - Present
**Eurofins Supplement Analysis Center Inc.**

- Led method development projects in dietary supplement and food analysis, e.g. carotenoids, polyphenols, cocoa flavanols, creatine monohydrate, sulforaphane, steviol glycosides, and so on; investigated method performance, drafted and finalized SOPs and reports.
- Provided technical support for internal departments and clients; helped developing, verifying and validating customized methods from clients.
- Oversaw and performed analysis using instrumentation such as high performance liquid chromatorgraph (HPLC), gas chromatograph (GC), and wet chemistry techniques; troubleshot equipment/instruments utilized and performs minor repairs.
- Interacted with prospective clients in order to define their problems and issued appropriate quotes and proposals; interacted with existing clients to assure that their needs are met.
- Represented Eurofins Scientific in the Dietary Supplement Industry.
- Created and reviewed literature for marketing new methods and instruments capabilities to clients; peer-reviewed 10 manuscripts for the Journal of Food Biochemistry.

**Graduate Research Assistant** August 2011 - Present
**Iowa State University** (GPA: 3.7/4)
**Major Professor: Wendy S. White, Ph.D.**

- Screened more than 100 varieties of transgenic and conventional biofortified crops (sorghum, maize, banana) for their complete carotenoid profiles, using HPLC-PDA, HPLC-ECD, and LC-MS/MS; developed and validated extraction protocols and HPLC-PDA-MS/MS methods which allow the simultaneous separation, identification, and quantification of more than 15 analytes (retinol, retinyl esters, colored and colorless carotenoids); evaluated extraction protocols for quantifying hepatic vitamin A stores in animal models. Prepared SOP documents for analytical methods;
- Conducted a research project for the Africa Biofortified Sorghum Initiative, an international collaborative program to improve the health of millions of people who rely on sorghum as their primary dietary staple. Project title: “Evaluating the Bioefficacy of the Beta-Carotene in Biofortified Sorghum Using a Gerbil Model” (collaboration with DuPont Pioneer).
- Participated in a human clinical trial to test the provitamin A value of biofortified banana; assisted with experimental design, human subject interview, and sample analysis.
- Studied the molecular regulation of the beta-carotene oxygenase 1 (BCO1) enzyme.
- Gave 6 oral project-update slide-presentation to a Research Director and Senior Scientists from DuPont Pioneer; presented 3 posters at national/international conferences; be selected to give an oral platform presentation at a cutting-edge triennial international research conference.
- Trained 3 graduate students in fat-soluble vitamin and phytochemical analysis.

**Graduate Research Assistant** September 2008 - June 2011
**China Agricultural University**
**Major Professor: Yun Bo Luo, Ph.D., Fellow of the Academy of the International Union of Food Science and Technology (IUFoST).**

- Thesis project: Intervention Effects and Mechanisms of White Radish Extract in Nonalcoholic Fatty Liver Disease.
- Designed and prepared a white radish extract-mixed high-fat liquid diet for rats, based on AIN-93G; developed an industrial-scale extraction process for extracting isothiocyanates from white radishes in a pilot plant; identified and quantified isothiocyanates in 8 species of radishes using a novel GC-MS method.
- Evaluated the functions and the bioavailability of white radish sourced 4-methylthiobutyl isothiocyanate using a rat model (findings were reported by Beijing Television).
- Evaluated the anti-oxidant activity (using FRAP and DPPH assays) of 3 species of plums.

**Research & Development Intern/Technical Project Leader** March 2009 - September 2009
**Mars Foods (China) Co., Ltd.**

- Technical project leader for 3 Skittles® packaging innovation projects:
  - Developed transport units for bulk Skittles®.
  - Modified packaging graphics for Skittles®' stock keeping units (SKUs) to adapt to a new labeling requirement.
  - Developed a case unit for 100 triangle pouches each containing 5 g Skittles®.
- Participated in the system merging of Mars Food China and Wrigley China by working closely with more than 20 senior staff members from both companies.
- Compiled and modified product specifications (SPECs) and standard operating procedures (SOPs).

**Undergraduate Research Assistant** January 2006 - June 2008
**South China University of Technology**

- Senior Thesis project: Process Development of Utilizing Immobilized Pectase to Extract Lycopene from Tomato.

## TEACHING EXPERIENCE

**Graduate Teaching Assistant** January 2013 - May 2013
**Iowa State University**

- Teaching assistant for FSHN 362 - Nutrition in Growth and Development.
- Participated in preparing the lecture notes; graded students' homework, quizzes, and exams; set up the classroom for the instructor; answered students' questions.

**Graduate Teaching Assistant** March 2010 - July 2010
**China Agricultural University**

- Teaching assistant for Animal Experiment Lab.
- Presented lectures as instructor; drafted lecture handouts; prepared laboratory supplies; graded students' lab reports and homework.

## EDUCATION

**Doctor of Philosophy (Ph.D.) in Nutritional Sciences**, Iowa State University — May 2016
**Master of Engineering in Food Science**, China Agricultural University — July 2011
**Bachelor of Engineering in Pharmaceutical Engineering,** South China University of Tech — July 2008
**Registered Dietitian** (China) — January 2011

## PUBLICATIONS

- **You H**, Zhang Y, Zhao Z-Y, Che P, Albertsen MC, Glassman K, White WS. Quantifying the Bioefficacy of β-Carotene-biofortified Sorghum Using a Mongolian Gerbil Model (in preparation).
- **You H**, White WS. Evaluating Extraction Protocols for Quantifying Hepatic Retinol and Retinyl Esters (in preparation).
- **You H**, Hao R, Li R, Zhang L, Zhu Y, Luo Y. The Effect of Radish Sourced 4-(Methylthio)-3-butenyl isothiocyanate on Ameliorating the Severity of High Fat Diet Inducted Nonalcoholic Fatty Liver Disease in Rats. International Journal of Clinical and Experimental Medicine 2015;8:15910-15919.
- **You H**, Hao R, Zhao G, Zhu B, Zhu Y, Luo Y. Effect of White Radish Extract on Nonalcoholic Fatty Liver Diseases in SD Rats. Food Science, 2011;32:300-4.
- Zhao G, **You H**, Hao R, Zhu Y, Luo Y. Dynamic Changes of Isothiocyanates and Antioxidant Properties during Radish Seedling Development. Food Science, 2011;32:102-5.
- Zhao G, Hao R. **You H**, Zhu Y, Luo Y. Fatty Acid Composition and Antioxidant Activity of Eight Types of Radish Seed Oils. China Oils and Fats, 2011;36:73-6.

## CONFERENCE PRESENTATIONS

- Che P, Zhao Z-Y, Glassman K, Wu E, **You H**, White WS, Jones TJ, Albertsen MC. Technology Development of the Africa Biofortified Sorghum Project. 2nd International Conference on Global Food Security, Cornell University, Ithaca, NY, October 11-14, 2015 (poster presentation).
- **You H**, Zhang Y, Zhao Z-Y, Che P, Albertsen MC, Glassman K, White WS. Quantifying the Bioefficacy of β-Carotene-biofortified Sorghum Using a Mongolian Gerbil Model. Institute of Food Technologists Annual Meeting, Chicago, IL, July 11-14, 2015 (poster presentation).
- **You H**, White WS. Evaluating Extraction Protocols for Quantifying Hepatic Retinol and Retinyl Esters. Experimental Biology Annual Meeting, Boston, MA, March 28 - April 1, 2015 (poster presentation).
- **You H**, Zhang Y, Zhao Z-Y, Che P, Albertsen MC, Glassman K, White WS. Quantifying the Provitamin A Value of Beta-carotene-biofortified Sorghum. 17th International Carotenoid Symposium, Park City, UT, June 29 - July 4, 2014 (invited oral platform presentation).
- **You H**, Hao R, Zhu Y. Quality Evaluation and Antioxidant Activity of Several Species of Northern Plums during Different Growth Periods. 7th Annual Meeting of the Chinese Institute of Food Science and Technology, Beijing, China, November 4-5, 2010 (poster presentation).

## PROFESSIONAL ACTIVITIES & SERVICES

- AOAC Stakeholder Panel on Dietary Supplements (SPDS) - Member 2016 - present
- Journal of Food Biochemistry - Invited peer-reviewer for 10 manuscripts 2016 - present
- Phi Tau Sigma (the Honor Society for Food Science) - Lifetime Member 2015 - present
- The 17th International Carotenoid Symposium - Invited Platform Speaker 2014
- Institute of Food Technologists - Member 2014 - present
- International Carotenoid Society - Member 2013 - present
- American Society for Nutrition - Member 2012 - present
- Carotenoid and Retinoid Interactive Group (CARIG) - Member 2012 – present

## HONORS & AWARDS

- Iowa State University Graduate College Research Excellence Award 2016
- IFT(Institute of Food Technologists) Iowa Section Food Industry Scholarship 2016
- 14th Annual Norman Borlaug Lecture Poster Competition - 1st Place Award 2015
- David R. Griffith Research Excellence Award 2015
- Stanley Herren Graduate Fellowship 2013 - 2015
- Krishna I. and Savitri K. Kamath Scholarship 2014
- Midwest Aronia Association Recipe Contest - 3rd Place Award (Captain) 2013
- Louise M. Rosenfeld Scholarship 2012
- Verba S. and Verner H. Nielsen Endowed Scholarship 2012
- Print & Grace Powers Hudson Scholarship 2012
- Mars China Graduate Scholarship 2008
- School of Biological Sciences Dean Scholarship 2007
- Outstanding Social Contribution Scholarship 2005

## SKILLS

- Extensive experience in HPLC with PDA, FLD, MS/MS, or ECD detector; GC-MS; Brix refractometer; food penetrometer; Hunter colorimeter; western blotting.
- Hands-on experience in conducting cell culture, animal experiment and human clinical trial; separation and analysis of bioactive components in dietary supplements, foods and biological samples; statistics; grant writing.
- Proficient in computer software including Agilent ChemStation, Waters Empower, Genesis R&D, Food Processor, SAS, Statistix, Lotus Notes, Endnote, Microsoft Office Suite, Adobe Photoshop and Premiere; understand the basics of HACCP, SAP system, SPSS, and Solidworks.

**Yang Zhou, Ph.D.**

3801 SW 4th ST, Des Moines, IA 50315
Phone: (515)450-7007 (cell)
Email: yangzhou@eurofinsus.com

## QUALIFICATION

- Developed quantitative method for collagen and lutein analysis in various matrices.
- Ph.D. in Biochemistry and Biophysics; Hand-on experience in method development and nutrition analysis. Familiar with various instrumentations including UHPLC, MSMS etc.
- Versatile skills and solid background on analytical chemistry, clinical study, protein biochemistry etc., familiar with regular guideline such as cGMP, GLP, ISO etc.
- Served as Stakeholder of Strategic Food Analytical Methods of AOAC International and SPSFAM Heavy Metals Working Group

## EDUCATION

**Ph.D., Biophysics** (2007) Iowa State University, Ames IA, USA
**B.S., Biochemistry** (1998) Wuhan University, Wuhan, China

## PROFESSIONAL EXPERIENCE

**Scientist, Eurofins Scientific Inc., Des Moines, IA** 2011-Present

**Responsibilities:**

- Work with associate scientists to develop and validate analytical assays.
- Role as principal scientist to lead method development for vitamins, enzymes, authenticity department.
- Leading method development using the latest instrumentations including LC-MSMS.
- Work closely with clients, develop and verify proprietary methods to fit their scopes.
- Responsible for draft SOPs, reports, method investigations.
- Oversee and investigate method performance, responsible for ~100 analytical methods.
- Provide technical support for internal departments
- Work with chief scientific officer, department managers and quality manager and client to provide technique assurance
- Create and review literature for marketing new methods and instruments capabilities to clients

**Accomplishments:**

- Developed and validated methods for various vitamins including vitamin A, D, E, K, Folic acid, B1,B3, B5, B6, B12, Biotin, Inositol, Choline etc..
- Developed and validated method for various analytes including Elastin, Collagen, organic acid, Acteic acid etc.
- Developed and validated methods for various enzymes including Amylase, Xylanase, Phytase, Glucanse, Cellulase, Bromelain, Nattokinase, Lipase, Lactase etc.

**Postdoctoral Research Associate, Iowa State University in collaboration with Unilever R&D, Vlaardingen, The Netherlands.** 2008-2011

**Responsibilities:**

- Develop carotenoids assays including lutein, prepare SOPs for analytical methods, analyze experimental samples and direct laboratory procedures.

- Role as investigator and analytical expert for six human clinical projects, provides quality control and technical support for analytical data.
- Prepare written reports, summarized experimental data and conclusions and submitted to Unilever
- Manages and mentors lab members including graduate students, technician, and intern
- Discuss with project members about subject compliance, data validation, methodology and statistical analysis

**Accomplishments:**

- Completed six human clinical projects and discovered the quantitative effects of various factors on nutrition absorption.
- Developed and implemented methods for analysis of carotenoids and micronutrients in food samples, including fruits, vegetables, beverages, cereal grains and vegetable oils
- Performed HPLC with UV/VIS, fluorescence, and high-sensitivity electrochemical (CoulArray®) detection of micronutrients and bioactive components
- Produced monoclonal antibody for β-carotene-15,15'-monooxygenase (BCMO1), quantified BCMO1 expression in caco-2 cell western blot

**Research Intern, Pioneer Hi-Bred/DuPont, Inc. Johnston, IA** 2007-2008

- Screened for novel genes with roles in yield enhancement and drought resistance in maize and soybean, comprehensively characterized the effect of genes on traits in corn and soybean
- Cultured transgenic *Arabidopsis* and evaluated the effect of target genes on phenotype and traits, developed transgenic maize and soybean with tissue bombardment
- Developed and implemented various bioassays for determining cytokinin in plant tissues
- Performed RT-PCR to quantify the expression of target genes, extracted DNA and RNA from various plant tissues

**Graduate study, Iowa State University, Ames, IA** 2001-2007

- DNA manipulation, protein expression and purification:
  - Constructed various protein mutants.
  - Expressed mutated proteins in *E. Coli* and mammalian cells and purified protein using gel chromatography
- Enzyme kinetics of FBPase subunit exchange with fluorescence quantification:
  - Proven subunit exchange of FBPase caused by oriented and ordered dissocation of tetramer and dimer.
  - Established innovative methods for examining association/dissociation constants by quantifying the self-quenching of fluorescence signal.
  - Developed kinetic model of fructose-1,6-bisphosphatase (FBPase) subunit exchange and defined rate constants of enzyme association/dissociation
- X-ray crystallographic determination of substrate binding in ADSS:
  - Crystallized adenylosuccinate synthetase (ADSS) and its mutants under various states to identify the structural factor on recognizing L-aspartate
  - Delineated the molecular basis whereby valine$^{273}$ organizes the L-aspartate binding site
- Computational validation of ligand specificity in proteins:
  - Proved cavitation as a mechanism of substrate recognition in proteins
  - Predicted affinity change resulting from cavity presence by deriving the molecular potential energy under Lennard-Jones 12-6 definition
  - Validated protein functions and protein-substrate affinity through enzyme kinetics.

- Statistical data analysis:
  - Completed Master's level core courses Stat 500 (Statistical Methods), Stat 511 (Statistical Methods), Stat 542 and Stat 543 (Theoryof Probability and Statistics I & II)
  - Improved BLAST method to promote accuracy of alignment for the complicated eukaryotic genome.

**Research Associate, Wuhan University, China** 1998–2001

**Responsibilities:**
- Investigator and project coordinator responsible for collaboration with Tongji Medical School and Wuhan Medical Inc.: Facilitated project studying the physiological effects of pyrroloquinoline quinine (PQQ) at non-clinic and pre-clinic stage.
- Supervise experimental procedures, arranged tasks for team members
- Provide project progress reviews and updates to research team members, prepare reports to principal investigator

**Accomplishments:**
- Designed and optimized procedures for the production of PQQ and nerve growth factor (NGF).
- Produced polyclonal antibody for NGF, launched pre-clinical studies in mouse and rabbit to identify the physiological effects of PQQ.
- Clarified physiological roles of PQQ on NGF in stimulating nerve cell development using nerve cell culture.
- Initiated immunoassay for PQQ and methanol dehydrogenase.
- Identified PQQ as a cofactor of methanol dehydrogenase.
- Managed research team to conduct cell and animal experiments. Trained students and visiting scholars.

## COMMITTEE SERVICE

- Nutritional Sciences Council at Iowa State University 2010- 2011
- AOAC International Stakeholder Panel on Strategic Food Analytical Methods 2013-2015
- AOAC International SPSFAM Heavy Metals Working Group 2013-2015

## PROFESSIONAL ASSOCIATIONS

- AOAC International
- American Society for Nutrition (ASN)
- Society of Experimental Biology and Medicine (SEBM)
- International Carotenoid Society

## SELECTED PRESENTATION

- **Y. Zhou**, E. Jobgen. A Highly Sensitive UPLC Method for Thiamine (Vitamin $B_1$) and Thiamine Phosphate Esters in Food. 130$^{th}$ AOAC Annual meeting. Sept. 2016.

- R. Jahromi, H. Pratt, **Y. Zhou**, L. Reimann. Anthocyanins and Assessment of Authenticity of Red/Black Juices. 130th AOAC Annual meeting. Sept. 2016.

- **Y. Zhou**, G. Poole, K. Karsjens, J. Jordan, E. Jobgen. Challenges associated with determining protein content in potato products. 129th AOAC Annual meeting Sept. 2015.

- R. Jahromi, H. Pratt, **Y. Zhou**, L. Reimann, D. Hammond. Recent developments to detect lemon juice adulteration. 129th AOAC Annual meeting. Sept. 2015.

- White, W.S. **Zhou, Y**. Agustiana, A. Quadt, F. Dixon, P. Flendrig, L. Soybean Oil in Salad Dressing and Bioavailability of Fat-soluble Micronutrients in Salads: a Dose-Response Study. The 17th International Symposium on Carotenoids. Salt Lake City, UT, July, 2014.

- **Y. Zhou**, T. Newman, M Johnson, E Jobgen. Detection of choline in food and feed matrices by HPLC-Fluorescence through chemical derivatization. 3rd International Vitamin Conference. Washington DC, May 2014

- Y. Zhang, **Y. Zhou**, L. Flendrig, M. Gribnau, W. White. Effects of lecithin in salad dressing on the plasma appearance of fat-soluble micronutrients consumed in salads: contributions of chylomicrons and large VLDL. Experimental Biology'14, San Diego, CA, April 2014.

- L. Flendrig, **Y. Zhou**, Theo Mulder, Wendy White etc. Effect of phosphatidylcholine liposomes on the relative bioavailability of fat soluable (non-)nutrients in salad vegetables. 2nd International conference on food digestion, Spain, March 2013

- Zhang Y., **Zhou Y.**, M Gribnau, LM Flendrig, WS White. The effect of Lecithin/oil ratio in salad dressing on the bioavailability of fat soluble micronutrients in salad vegetables. Experimental Biology'12, New Orleans, LA. April, 2012

- **Zhou, Y.,** Agustiana, A., Flendrig, L.M., Quadt, F., White, W.S. The dose-response effects of the amount of oil in salad dressing on the bioavailability of carotenoids and fat-soluble vitamins in salad vegetables (poster). Gordon Research Conference on Carotenoids, Ventura, CA, January 17-22, 2010.

- Liu, W., **Zhou, Y.,** Sanchez, T., Ceballos, H., White, W.S. The vitamin A equivalence of the β-carotene in β-carotene-biofortified cassava porridges ingested by women (oral presentation). Presented at Experimental Biology ’10, Anaheim, CA, April 25, 2010.

## PUBLICATIONS

1. Y. Zhang, **Y. Zhou**, L. Flendrig, M. Gribnau, W. White. Effects of lecithin in salad dressing on the plasma appearance of fat-soluble micronutrients consumed in salads: contributions of chylomicrons and large VLDL. *FASEB J. April 2014; vol. 28 no. 1 Supplement 645.16.*

2. Zhang, Y., **Zhou, Y.**, Flendrig, L., Gribnau, M., White, W.S. Effects of lecithin/oil ratio in salad dressing on the bioavailability of fat soluble micronutrients in salad vegetables. *FASEB J. 2012;26:640.9.*

3. Flendrig, L., **Zhou, Y.**, Quadt, F., Mulder, T., Schuurbiers, E., White, W.S. Effects of phosphatidyl choline liposomes on the relative bioavailability of fat soluble micronutrients in salad vegetables. *FASEB J. 2012;26:31.4.*

4. **Zhou, Y.,** Agustiana, A., Flendrig, L.M., Quadt, F., White, W.S. The dose-response effects of the amount of oil in salad dressing on the bioavailability of carotenoids and fat-soluble vitamins in salad vegetables. *FASEB J. 2010 24:539.15.*

5. Liu, W., **Zhou, Y**., Sanchez, T., Ceballos, H., White, W.S. The vitamin A equivalence of the β-carotene in β-carotene-biofortified cassava porridges ingested by women. *FASEB J. 2010 24:92.7.*

6. **Zhou Y**, Honzatko RB; Time-dependent Fluorescence Change as a Probe of Subunit Exchange Kinetics in Porcine Fructose-1,6-Bisphosphatase*Determinants of Substrate Recognition and Mechanisms of Subunit Exchange*, Book Chapter, ProQuest, 2007.

7. **Zhou Y**, Fromm HJ, Honzatko RB; The role of Valine$^{273}$ in the recognition of L-Aspartate in Adenylosuccinate Synthetase. *Determinants of Substrate Recognition and Mechanisms of Subunit Exchange*, Book Chapter, ProQuest, 2007.

8. Iancu CV, **Zhou Y**, Borza T, Fromm HJ, Honzatko RB; Cavitation as a Mechanism of Substrate Recognition by Adenylosuccinate Synthetases, *Biochemistry*, 2006 Sep 26;45(38):11703-11

9. **Zhou Y,** Han Y, Zhao Y**.** Purification and identification of Lecithin and its application. *Amino Acid and Biological Resource*. Vol.2, 28-31, 2001

**10.** Cheng H, Zhao YF, **Zhou Y**, etc. Progress Curve of PQQ-depending Methanol Dehydrogenase Affected by Glycine. *Journal of Wuhan University* 1998; 44:4

**Brian T. Schaneberg, Ph.D.**
vbbri@yahoo.com
Seattle, WA 98104
720.480.7806

## EDUCATION

**Ph.D. in Organic Chemistry - August, 2000**
Virginia Commonwealth University, Richmond, Virginia
Dissertation - Dihydroagarofuran Sesquiterpene Alkaloids from *Maytenus putterlickoides*, and the Modification of the Maytansinoid Diene Moiety.

**Bachelor of Arts - May, 1995**
Central College, Pella, Iowa
Major - Chemistry, Minor - Biology

## WORK EXPERIENCE

**Starbucks Company** 2013 to present
Director of Regulatory & Scientific Affairs 2013 to present

- Manage regulatory team.
- Advise the business on regulations and science in relation to products, claims, labels, etc.
- Represent Starbucks Company and increase company visibility as subject matter experts through trade groups, committees, conferences, etc.
- Develop a global regulatory framework for the company.
- Connect cross functional teams.

**Mars Botanical, Germantown, Maryland** 2009 to 2013
Quality & Food Safety/Scientific & Regulatory Affairs Director 2010 to 2013
Analytical & Regulatory Manager 2010
Analytical Manager 2009

- Keep up to date on industry and regulatory changes and keep the Mars Botanical Leadership Team informed.
- Coordinate FDA regulatory review of labels and marketing pieces.
- Ensure Dietary Supplement GMPs are implemented and up-to-date.
- Maintain substantiation documentation for product claims.
- Represent the Mars Symbioscience Segment on the Global Quality & Food Safety and the Scientific & Regulatory Affairs Leadership Teams.
- Collaborations with FDA, NCNPR, AOAC, USP, AHPA, ABC, and industry leaders is common.
- Elected to the Council for Responsible Nutrition Board of Directors and sits on the National Advertising Division CRN committee.
- AOAC Working Group Chair for flavonoid analytical testing methods.
- Currently manages 2 associates.

**ChromaDex. Inc., Boulder, Colorado** 2004 to 2009
Director of Technical Services 2005 to 2009
Interim Manager of Isolation Services 2006 to 2009

Interim Manager of Analytical Services 2005
Senior Analytical Chemist 2004 to 2005

- Developed the quality system for the chemical and botanical reference standards.
- Negotiated vendor contracts for catalog supply and develop consignment contracts for natural product libraries.
- Reviewed and approved all technical data pertaining to marketing, such as brochures, technical literature and website information.
- Planned and coordinated seminars, shows, educational programs, and publications.
- Consulted with customers and clients while coordinating projects for the analytical and isolation departments.
- Collaborated with FDA, NIH, ODS, NCCAM, NCNPR, AOAC, USP, AHPA, ABC, AHP, and industry leaders is common.
- Extensive knowledge in natural products, including Stevia, Hoodia, Tea, and many more.
- Managed up to 15 scientists across three groups.
- Served as scientific expert witness in a class-action lawsuit.

**Adjunct Faculty Member, University of Colorado Denver** 2005 to 2008
Masters Research Advisor 2005 to 2008

**National Center for Natural Products Research** 2001 to 2003
University of Mississippi, Associate Research Scientist Nov. 2002 to 2003
University of Mississippi, Post-Doctoral Research Associate Jan. 2001 to Nov. 2002

- Analytical group leader responsible for method development of a wide range of botanical products.
- Developed methods to assess the quality and safety of botanical dietary supplements and herbals in support of FDA, NIH, USDA, AOAC and industry sponsored research projects.
- Routine technical reviewer of journal articles prior to submission for publication.

**Loudon County School District** Fall 2000
Substitute Teacher, Loudon County, Virginia

## RESEARCH EXPERIENCE

**Mars Botanical**, Germantown, Maryland 2009 to 2013

Coordinate the analytical group and the procedures for product safety and quality as well as in support of product development. Ensure the methods are fit for purpose and meet the dietary supplement GMP valid testing guidelines. Established ways for working around regulatory approval of labeling and advertising content. Advised on Food and Dietary Supplement regulations while regularly watching the regulatory landscape around the globe in support of the Mars Botanical products.

- Council for Responsible Nutrition Board of Directors
- AOAC Industry Stakeholder Panel member and Working Group Chair for flavonoid analytical methodologies.
- Prepared substantiation documents and coordinated safety documentation. Served as a reviewer for scientific journals (JAOAC, and J of Chrom A).

**ChromaDex Analytics**, Boulder, Colorado 2004 to 2009

Developed analytical methods to assess the safety and quality of botanical dietary supplements while leading analytical support for the isolation division. Samples ranged from raw plant material, to extracts, to finished products. Coordinated R&D projects in isolation services.

- Serve as a reviewer for scientific journals (Planta Medica, JAOAC, Journal of Separation Science, Journal of Chromatography, Chromatographia).

**National Center for Natural Products Research**, University, Mississippi 2001 to 2003

Developed analytical methods to assess the safety and quality of botanical dietary supplements. Areas of focus were *Ephedra* (species fingerprinting and ephedrine alkaloid analysis), *Aristolochia* and *Asarum* (species and population studies of aristolochic acid content), St. John's Wort (SLV for AOAC official methods), *Senecio* and *Symphytum* (pyrrolizidine alkaloid analysis with ELSD), Viagra (independent analysis of herbal products illegally adulterated), *Coleus forskohlii* (quality analysis of market products), Ginkgo (batch to batch consistency studies), *Centella asiatica* (quality analysis of market products), lemon grass (method developed for analysis of volatiles), *Echinacea* (plant propagation analysis), Goldenseal (plant propagation analysis), purity studies of isolated compounds for standardization purposes and analysis of catfish pond water for the USDA.

- Prepared summary reports for funding agencies, proofed manuscripts and grants, aided in grant writing. Served as a reviewer for scientific journals (Planta Medica, JAOAC, and J of Chrom B).

**Virginia Commonwealth University**, Richmond, Virginia 1995-2000
Graduate Research Assistant

Developed synthetic methods including the modification of the diene moiety of maytansine and its homologues to improve their water solubility and decrease their toxicity for better drug delivery as well as the structural activity requirement of the diene moiety. Research also involved the isolation and elucidation of bioactive dihydroagarofuran sesquiterpene alkaloids from *Maytenus putterlickoides* by chromatographic and spectroscopic techniques. This research relied heavily on NMR.

- Published two journal articles and thirteen presentations of research results at international, national, regional, and local meetings.
- Advised undergraduates doing independent studies in the laboratory.

1995-1998 **Nuclear Magnetic Resonance Spectrometer Technician** – Main troubleshooter and technician for departmental 300 MHz GE Nuclear Magnetic Resonance Spectrometer.

1995-1998 **Teaching Assistant** - Instructor of Qualitative Organic Chemistry and Organic Chemistry Labs, and instructor of General Chemistry Recitation. Responsible for lectures, quizzes, and final grades for the students. Served as a substitute lecturer for General Chemistry.

Summer 1994 **Research Assistant Intern** - Isolation and structural elucidation of natural products (acetogenins) by chromatographic and spectroscopic techniques.

- Resulted in the publication of one journal article.

## Achievements & Awards

Distinguished Scholar, 1991 - 1995
Teaching Assistantship, 1995 - 1997
Department of Chemistry Teaching Assistantship Award, 1998
Mary Kapp Research Assistantship, 1998 - 1999
University Graduate Fellowship, 1999 - 2000
Mary Kapp Service Award, 2000
Phi Kappa Phi National Honor Society Induction, 2000
Cambridge Who's Who, 2007

## Leadership

**Virginia Commonwealth University**, Richmond, Virginia

1999-2000 **President of the Graduate Student Association at VCU**
- Developed a proposal to implement the Graduate Student Association as a governing body at VCU by working on the Student Affairs portion of the Strategic Plan for the Graduate School at VCU.
- Created a Constitution and By-Laws in which a legislative body will be formed to oversee the concerns of the graduate students.
- Served on the Priority Committee for the Institutional Review Board.
- Served on the University Council, the Graduate Council, the Graduate Dean's Advisory Committee, and the Board of Visitors.
- Appointed representatives to campus wide committees.

1998-1999 **Vice-President and Treasurer of the Graduate Student Association at VCU**
- Served on the Graduate Academic Committee, and the Office of Information and Technology Strategic Planning Committee.
- Maintained and developed the yearly budget (20K).

## Laboratory Skills

**Analytical Techniques** – Working knowledge of various chromatographic and spectroscopic techniques (HPLC with PDA or ELS detectors, LC/MS, GC/FID, GC/MS, NMR, Karl Fisher, liquid-liquid extraction, SPE and SFE).
**Synthetic Techniques** - Structural modification techniques (hydrogenation, oxidation, acetylation, hydrogenolysis, hydroxylation, and reduction reactions).
**Biological Techniques** - Bioactivity analysis utilizing the Brine Shrimp Lethality Bioassay.
**ComputerSkills** -Waters Millennium, HP ChemStation, Microsoft Office, Chemdraw, Internet

**Central College**, Pella, Iowa

1994, 1995 **Captain of the Men's Tennis Team**
1994 **Student Assistant Coach of the Women's Volleyball Team**
1993, 1994 **Fellowship of Christian Athletes Leader**

## Professional Organizations, Training, Panels

American Chemical Society (1996 - 2007)
American Society of Pharmacognosy (1997 - Present)
Phi Kappa Phi National Honors Society (2000 - Present)
Association of Analytical Chemists, International (AOAC, 2003 - Present)
SLV of Analytical Methods for Dietary Supplements (September, 2003)
Horwitz Advisor for AOAC (2004)
International Society for Horticultural Sciences (2005 - 2006)
Society for Medicinal Plant Research (GA) (2006 - 2007)
NIH NCCAM Grant Review Panel (2006)
Expert Review Panel AOAC – St. John's Wort (2004, 2013)
Lutein/Zeaxanthin (2006)
Milk Thistle and Cranberry (2009)
Turmeric and Yohimbine (2010)
AHPA cGMP Working Group – (2007)
National Toxicology Program Review Panel (2008)
Natural Health Product Research Society of Canada (2009 – 2013)
CRN Government Relations Committee (2010 – 2013)
CRN Board of Director (2012 – 2013)
AOAC Stakeholder Panel on Strategic Food Analytical Methods (2011 – Present)
Chair of Flavonoid Working Group Committee (2011 – Present)
Scientific Advisory Group Member of NCA (2013 – Present)
AOAC Assist. Chair Stakeholder Panel on Dietary Supplements (2014 – Present)
ILSI Caffeine Committee (2015 – Present)

**Publications**


1. Machonis, P.R.; Jones, M.A.; **Schaneberg, B.T.**; Kwik-Uribe, C. "Method for the Determination of Catechin and Epicatechin Enantiomers in Cocoa-Based Ingredients and Products by Liquid Chromatography: Single-Laboratory Validation"*Journal of AOAC International* **2012**, 95(2), 500.
2. Ma, G.; Bavadekar, S.A.; **Schaneberg, B.T.**; Khan, I.A.; Feller, D.R."Effects of Synephrine and beta-Phenethylamine on Human alpha-Adrenoceptor Subtypes," *Planta Medica* **2010**, *76*(10), 981.
3. Sorenson, W.R. and Sullivan, D. (Collaborators: Cain, T.; Chang, E.; Del Grosso, A.; Goodridge, R.; Kou, X.; La Luzerne, P.; Landreth, B.; LeVansler, K.; Neal-Kababick, J.; Paradis, B.; **Schaneberg, B.**; Shevchuk, C. "Determination of Aristolochic Acid I in Botanicals and Dietary Supplements Potentially Contaminated with Aristolochic Acid I Using LC-UV with Confirmation by LC/MS: Collaborative Study," *Journal of AOAC International* **2007**, *90*(4), 925.
4. Rimmer, C.A.; Howerton, S.B.; Sharpless, K.E.; Sander, L.C.; Long, S.E.; Murphy, K.E.; Porter, B.J.; Putzback, K.; Rearick, M.S.; Wise, S.A.; Wood, L.J.; Zeisler, R.; Hancock, D.K.; Yen, J.H.; Betz, J.M.; Nguyenpho, A.; Yang, L.; Scriver, C.; Willie, S.; Sturgeon, R.; **Schaneberg, B.**; Nelson, C.; Skamarack, J.; Pan, M.; Levanseler, K.; Gray, D.; Waysek, E.H.; Blatter, A.; Reich, E. "Characterization of a Suite of Gingko-Containing Standard Reference Materials," *Analysis of Bioanalytical Chemistry* **2007**, *389*(1), 179.
5. Ma, G.; Bavadekar, S.A.; David, Y.; Lalchandani, S.G.; Rangaswamy, N.; **Schaneberg, B.T.**; Khan, I.A.; Feller, D.R. "Pharmacological Effects of Ephedrine Alkaloids on Human $\alpha_1$- and $\alpha_2$- Adrenergic Receptor Subtypes," *Journal of Pharmacology and Experimental Therapeutics* **2007**, *322*(1), 214.

6. Applequist, W.L.; Avula, B.; **Schaneberg, B.T.**; Wang, Y-H.; Khan, I.A. "Comparative Fatty Acid Content of Seeds of Four *Curcubita* Species Grown in a Common (Shared) Garden," *Journal of Food Comp. and Analysis* **2006**, *19*, 606.
7. Bharathi, A.; Wang, Y-H.; Pawar, R.S.; Shukla, Y.J.; **Schaneberg, B.T.**; Khan, I.A. "Determination of the Appetite Suppressant P57 in *Hoodia gordonii* Plant Extracts and Dietary Supplements by Liquid Chromatography/Electrospray Ionization Mass Spectrometry (LC-MSD-TOF) and LC-UV Methods," *JAOAC* **2006**, *89*(3), 606.
8. **Schaneberg, B.T.**; Baugh, S.; Hoekstra, B. "The Science of Analyzing Tea," *Specialty Tea is Hot Report* **2006**, *6*, 173.
9. Kobaisy, M.; Tellez, M.R.; **Schaneberg, B.T.**; Khan, I.A. "Essential Oil Composition of Three Italian Species of *Ephedra*," *Journal of Essential Oils* **2005**, *17*(5), 542.
10. Crockett, S.L.; **Schaneberg, B.T.**; Khan, I.A. "Phytochemical Profiling of New and Old World *Hypericum* (St. John's Wort) Species," *Phytochemical Analysis* **2005**, *16*(6), 479.
11. Wei, F.; Cheng, K.L.; Ma, L.Y.; Jin, W.T.; **Schaneberg, B.T.**; Khan, I.A.; Lin, R.C. "Analysis of Aristolochic Acids and Analogues in Medicinal Plants and Their Commercial Products by HPLC-PAD-ESI/MS," *Phytochemical Analysis* **2005**, *16*(3), 222.
12. **Schaneberg, B.T.**; Khan, I.A. "Quantitative and Qualitative HPLC Analysis of Thermogenic Weight Loss Products," *De Pharmazie* **2004**, *59*(11), 819.
13. Schrader, K.K.; Foran, C.M.; Holmes, B.D.; Schlenk, D.K.; Nanayakkara, N.P.D.; **Schaneberg, B.T.** "Toxicological Evaluation of Two Anthraquinone-Based Cyanobactericides to Channel Catfish," *North American Journal of Aquaculture* **2004**, *66*, 119.
14. **Schaneberg, B.T.**; Khan, I.A. "Analysis of Products Suspected of Containing *Aristolochia* and *Asarum* Species," *Journal of Ethnopharmacology* **2004**, *94*, 245.
15. **Schaneberg, B.T.**; Molyneux, R.J.; Khan, I.A. "Evaporative Light Scattering Detection of Pyrrolizidine Alkaloids," *Phytochemical Analysis* **2004**, *15*, 36.
16. Tellez, M.R.; Khan, I.A.; **Schaneberg, B.T.**; Crockett, S.L.; Rimando, A.M.; Kobaisy, M. "Steam Distillation-Solid Phase Micro Extraction (SD-SPME) for the Identification of the Presence of *Ephedra sinica* in Herbal Preparations," *Journal of Chromatography A* **2004**, *1025*, 51.
17. Mikell, J.M.; **Schaneberg, B.T.**; Khan, I.A. "Isolation and Purification of Kava Lactones by High Performance Centrifugal Partition Chromatography," *Journal of Liquid Chromatography and Related Technologies* **2003**, *26*(18), 3069.
18. Schrader, K.K.; Nanayakkara, N.P.D.; Tucker, C.S.; Rimando, A.M.; Ganzera, M.; **Schaneberg, B.T.** "Novel Derivatives of 9,10-Anthraquinone are Selective Algicides Against the Musty-Odor Cyanobacterium *Oscillatoria perornata*," *Applied and Environmental Microbiology* **2003**, *69*(9), 5319.
19. Garrett, K.M.; Basmadjian, G.; Khan, I.A., **Schaneberg, B.T.**; Seale, T.W. "Extracts of Kava (*Piper methysticum*) Induce Acute Anxiolytic-Like Behavioral Changes in Mice," *Psychopharmacology* **2003**, *170*, 33.
20. Lata, H.; Andrade, Z.D.; **Schaneberg, B.**; Bedir, E.; Khan, I.; Moraes, R.M. "Arbuscular Mycorrhizal Inoculation Enhances Survival Rates and Growth of Micropropagated Plnatlets of *Echinacea pallida*," *Planta Medica* **2003**, *69*(7), 679.
21. **Schaneberg, B.T.** and Khan, I.A. "Qualitative Analysis of Forskolin in *Coleus forskohlii* (Lamiaceae) by Reverse Phase High Performance Liquid Chromatography," *JAOAC* **2003**, *86*(3), 467.
22. **Schaneberg, B.**; Mikel, J.; Bedir, E.; Khan, I. "An Improved HPLC Method for the Quantitative Determination of Six Triterpenes in *Centella asiatica* extracts and Commercial Products," *De Pharmazie* **2003**, *58*(6), 381.

23. Bedir, E.; Lata, H.; **Schaneberg, B.**; Khan, I.; Moraes, R. "Micropropagation of *Hydrastis canadensis*: Goldenseal a North American Endangered Species," *Plant Medica* **2003**, *69*(1), 86.
24. **Schaneberg, B.T.**; Crockett, S.; Bedir, E.; Khan, I.A. "The role of chemical fingerprinting: application to *Ephedra*," *Phytochemistry* **2003**, *62*(6), 911.
25. **Schaneberg, B.T.**; Applequist, W.L.; Khan, I.A. "The Qualitative Analysis of *Asarum* and *Aristolochia* Species for Aristolochic Acid I and II by HPLC," *De Pharmazie* **2002**, *57*(10), 686.
26. **Schaneberg, B.T.** and Khan, I.A. "Comparison of Extraction Methods for Marker Compounds in the Essential Oil of Lemon Grass by GC," *Journal of Agricultural and Food Chemistry* **2002**, *50*, 1345.
27. **Schaneberg, B.T.**; Green, D.K.; Sneden, A.T. "Dihydroagarofuran Sesquiterpene Alkaloids from *Maytenus putterlickoides*," *Journal of Natural Products* **2001**, *64*(5), 624.
28. Larson, G.M.; **Schaneberg, B.T.**; Sneden, A.T. "Two New Maytansinoids from *Maytenus buchananii*," *Journal of Natural Products* **1999**, *62*, 361.
29. Barnes, J.N.; **Schaneberg, B.T.**; Sneden, A.T. "Bistetrahydrofuranoid Acetogenins from *Rollinia sericea*," *Planta Medica* **1995**, *61*, 486.

**Conference Submissions and Talks**

1. "From Tree to Cup, the Journey of a Coffee Bean," **Brian Schaneberg**, 15th Annual Oxford International Conference on the Science of Botanicals, Oxford, MS, April 13-16, 2015.
2. "Coffee & Health: The Third Act," **Brian Schaneberg**, Mark Corey, Alan Leviton, Panelist, National Coffee Association Annual Convention 2015, Charleston, SC, March 13-14, 2015.
3. "The Growing Challenges Registering Product for a Global Roll Out," **Brian T. Schaneberg**, Sid Jhaveri, Anthony Pavel, Joshua Kim, James La Marta, Panelist, IFT Annual Meeting 2014, New Orleans, LA, June 21-24, 2014.
4. "Regulatory Updates on Coffee: Prop 65, FSMA and the FDA," **Brian T. Schaneberg**, Anthony Pavel, Oral, Specialty Coffee Association of America Annual Expo & Symposium, Seattle, WA, April 23-27, 2014.
5. "Method for the Determination of Catechin and Epicatechin Enantiomers in Cocoa-Based Ingredients and Products by Liquid Chromatography: Single-Laboratory Validation," Phil R. Machonis, Matt A. Jones, **Brian T. Schaneberg**, Poster, 125th AOAC International Annual Meeting & Exposition, New Orleans, NO, September 18-21, 2011.
6. "Science Behind Nutraceuticals: Compounds and Bioactives," **Brian T. Schaneberg**, Oral, IFT Online Course, September 17, 2010.
7. "Botanical Phytonutrients & Supply Chain Management," **Brian T. Schaneberg**, Oral, IFT Annual Meeting and Food Expo, Chicago, IL, July 17-20, 2010.
8. "From Confectionary to Cardiovascular Health," **Brian T. Schaneberg**, Oral, 7th Natural Health Products Research Society of Canada Conference, Halifax, Canada, May 23-26, 2010.
9. "Phytochemicals and Nutraceticals," **Brian T. Schaneberg**, Oral, US Pet R&D Competence Week, Franklin, TN, May 10-14, 2010.
10. "Analytical Methodologies for Cocoa Flavanols," **Brian T. Schaneberg**, Oral, International Conference and Exhibition on Nutraceuticals and Functional Foods, San Francisco, CA, October 31-November 4, 2009.
11. "Botanical Quality – A Case Study in Cocoa," **Brian T. Schaneberg**, Oral, USP Annual Scientific Meeting, Toronto, Canada, September 22-25, 2009.

12. "An Optimized Method for the Determination of Catechin and Epicatechin Enantiomers," Philip Machonis, Mollie Grover, Curtis Lawrence, Matt Jones, **Brian Schaneberg**, Poster, 123rd AOAC International Annual Meeting & Exposition, Philadelphia, PA, September 13-16, 2009.
13. "Challenges in Flavanol Analysis of Model Food Systems," Mollie Grover, Matt Jones, **Brian Schaneberg**, Poster, 123rd AOAC International Annual Meeting & Exposition, Philadelphia, PA, September 13-16, 2009.
14. "Reference Material Characterization and the Quality of Your Product," **Brian T. Schaneberg**, Oral, 99th AOCS Annual Meeting & Expo, Seattle, WA, May 18-21, 2008.
15. "An Improved HPLC Method for the Analysis of Tea Constituents," **Brian T. Schaneberg**, Oral, 5th Annual Natural Health Products Research Society of Canada Conference and Tradeshow, Toronto, Canada, March 26-29, 2008.
16. "Botanical Product Quality by HPLC Methods of Analysis," **Brian T. Schaneberg**, Oral, 121st AOAC International Annual Meeting & Exposition, Anaheim, CA, September 16-20, 2007.
17. "Simultaneous Determination of Xanthines, Catechins, and Theaflavins, in Tea Extracts and Beverages by HPLC," Brant Hoekstra, Brad Thoempke, Steve Baugh, **Brian T. Schaneberg**, Poster, 121st AOAC International Annual Meeting & Exposition, Anaheim, CA, September 16-20, 2007.
18. "An Improved HPLC Method for the Analysis of Diterpenoid Glycosides in *Stevia rebaudiana*," Brant Hoekstra, **Brian T. Schaneberg**, Poster, 121st AOAC International Annual Meeting & Exposition, Anaheim, CA, September 16-20, 2007.
19. "An Improved HPLC/MS Method for the Analysis of Escins in Common Horse-Chestnut (*Aesculus hippocastanum*)," Peter A. Perrone, **Brian T. Schaneberg**, Oral, 55th International Congress & Annual Meeting of the Society for Medicinal Plant Research, Graz, Austria, EU, September 2-6, 2007.
20. "An Improved HPLC Method for the Analysis of Diterpenoid Glycosides in *Stevia rebaudiana*," Brant Hoekstra, **Brian T. Schaneberg**, Poster, 55th International Congress & Annual Meeting of the Society for Medicinal Plant Research, Graz, Austria, EU, September 2-6, 2007.
21. "Analytical Techniques for the Quality and Safety of Botanicals," **Brian T. Schaneberg**, Oral, 17th Annual Society of Biomedical Research, Restin, VA, August 10, 2007.
22. "An Improved HPLC/MS Method for the Analysis of Escins in Common Horse Chestnut (*Aesculus hippocastanum*)," Peter A. Perrone, **Brian T. Schaneberg**, Poster, 48th Annual Meeting of the American Society of Pharmacognosy, Portland, ME, July 14-18, 2007.
23. "The Basics of Analytical Testing for Tea," **Brian T. Schaneberg**, Oral, World Tea Expo, Atlanta, GA, June 9-11, 2007.
24. "Determination of the Appetite Suppressant P57 in *Hoodia gordonii* Plant Extracts and Dietary Supplements by Liquid Chromatography/Electrospray Ionization Mass Spectrometry (LC-MSD-TOF) and LC-UV Methods," Bharathi Avula, Yan-Hong Wang, Rahul Pawar, Yatin Shukla, **Brian T. Schaneberg**, and Ikhlas A. Khan, Poster, The 47th Meeting of the American Society of Pharmacognosy, Arlington, VA, August 5-August 9, 2006.
25. "Isolation and Purification of Oleanane Triterpene Saponins From *Aesculus hippocastanum*," Peter A. Perrone, Qingwen Zhang, and **Brian T. Schaneberg**, Poster, The 47th Meeting of the American Society of Pharmacognosy, Arlington, VA, August 5-August 9, 2006.
26. "A Short and Efficient Synthesis of N-Methyltyramine Found In *Citrus aurantium*," Chongming Wu, Geewananda Gunawardana, **Brian T. Schaneberg**, James McChesney, Poster, 47th Annual Meeting of the American Society of Pharmacognosy, Arlington, VA, Aug. 5-9, 2006.

27. "Phytochemical Investigation of *Hoodia gordonii*, a South African Succulent Plant with Anorectic Activity," Yatin Shukla, **Brian Schaneberg**, Rahul Pawar, Bharathi Avula, and Ikhlas Khan, Poster, International Conference Quality and Safety Issues Related to Botanicals, Oxford, MS, August 15-18, 2005.
28. "Herbal Products from the Internet: Evaluation of Nephrotoxicity and Aristolochic Acid Content," Premalatha Balachandran, **Brian Schaneberg**, Ikhlas Khan, and David Pasco, Poster, 2004 International Congress on Natural Products Research, Phoenix, AZ, July 31-August 4, 2004.
29. "Single Lab Validation for the Determination of Components in St. John's Wort Raw and Finished Products by High Performance Liquid Chromatography with Photodiode Array Detection," **Brian Schaneberg**, Bharathi Avula, and Ikhlas Khan, Poster, 2004 International Congress on Natural Products Research, Phoenix, AZ, July 31-August 4, 2004.
30. "St. John's Wort Single Lab Validation," **Brian T. Schaneberg**, Oral, Supply Side East, Baltimore, MD, May 5, 2004.
31. "Analytical Testing of Dietary Supplements and Herbals," **Brian T. Schaneberg**, Oral, ChromaDex, Inc. Boulder, CO, November, 2003.
32. "Quantitative and Qualitative HPLC Analysis of Thermogenic Weight Loss Products," **Brian T. Schaneberg**, and Ikhlas A. Khan, Poster, 117th AOAC Int. Annual Meeting and Expo., Atlanta, GA, Sept. 14-18, 2003.
33. "Consistency/Variability Studies in Batches of 13 *Ginkgo biloba* Products by HPLC," **Brian T. Schaneberg**, Guoyi Ma, Erdal Bedir, Shabana Khan, Peter Goldman, Ikhlas A. Khan, Poster, 117th AOAC Int. Annual Meeting and Expo., Atlanta, GA, Sept. 14-18, 2003.
34. "Analysis of Products Suspected of Containing *Aristolochia* and *Asarum* Nephrotoxicity," **Brian T. Schaneberg**, Premalatha Balachandran, David Pasco, Ikhlas A. Khan, Poster, 117th AOAC Int. Annual Meeting and Expo., Atlanta, GA, Sept. 14-18, 2003.
35. "HPLC Chemical Profiling of Species Known or Suspected of Containing Aristolochic Acid: *Aristolochia*, *Asarum* Etc.," **Brian T. Schaneberg**, Premalatha Balachandran, David Pasco, Ikhlas A. Khan, Poster, 117th AOAC Int. Annual Meeting and Expo., Atlanta, GA, Sept. 14-18, 2003.
36. "Essential Oil Composition of Three Italian Species of *Ephedra*," Mozaina Kobaisy, Mario R. Tellez, Ikhlas A. Khan, **Brian T. Schaneberg**, Poster, 226th ACS National Meeting, New York City, NY, Sept. 7-11, 2003.
37. "Herbal Sexual Enhancers, Not So Herbal!," **Brian T. Schaneberg**, Markus Ganzera, Shabana Khan, Ikhlas A. Khan, Poster, 44th Annual Meeting of the American Society of Pharmacognosy, Chapel Hill, NC, July 13-16, 2003.
38. "Isolation and Purification of Kava Lactones by High Performance Centrifugal Partition Chromatography," Julie R. Mikell, **Brian T. Schaneberg**, Ikhlas A. Khan, Poster, 44th Annual Meeting of the American Society of Pharmacognosy, Chapel Hill, NC, July 13-16, 2003.
39. "Phytochemical Profiling of New and Old World *Hypericum* L. (Clusiaceae) Species," Sara L. Crockett, **Brian Schaneberg**, Ikhlas A. Khan, Poster, 44th Annual Meeting of the American Society of Pharmacognosy, Chapel Hill, NC, July 13-16, 2003.
40. "Lypophilic Constituents From *Ephedra sinica*," Erdal Bedir, **Brian Schaneberg**, Ikhlas Khan, Poster, 44th Annual Meeting of the American Society of Pharmacognosy, Chapel Hill, NC, July 13-16, 2003.
41. "HPLC Fingerprinting of *Ephedra* Species," **Brian T. Schaneberg**, Sara Crockett, Erdal Bedir, and Ikhlas A. Khan, Poster, 43rd Annual Meeting of the American Society of

Pharmacognosy and 3rd Monroe Wall Symposium, New Brunswick, NJ, July 27-31, 2002, Abstr. No. 7.

42. "Evaporative Light Scattering Detection of Pyrrolizidine Alkaloids and Some Corresponding *N*-Oxides," **Brian T. Schaneberg**, Russell J. Molyneux, and Ikhlas A. Khan, Poster, 43rd Annual Meeting of the American Society of Pharmacognosy and 3rd Monroe Wall Symposium, New Brunswick, NJ, July 27-31, 2002, Abstr. No. 8.
43. "Quantitative Analysis of Forskolin in *Coleus forskohlii* (Lamiaceae) by RP High Performance Liquid Chromatography," **Brian T. Schaneberg** and Ikhlas A. Khan, Poster, 43rd Annual Meeting of the American Society of Pharmacognosy and 3rd Monroe Wall Symposium, New Brunswick, NJ, July 27-31, 2002, Abstr. No. 6.
44. "Analysis of North American *Ephedra* Species for the Presence of Ephedrine Alkaloids," **Brian Schaneberg**, Martha Gay, Sara Crockett, Steven Musser, and Ikhlas Khan, Poster, 2nd Interim Meeting of the American Society of Pharmacognosy, Asilomar, CA, November 8-11, 2001.
45. "The Qualitative Analysis of *Asarum* and *Aristolochia* Species for Aristolochic Acid I and II by HPLC," **Brian T. Schaneberg**, Wendy, L. Applequist, and Ikhlas, A. Khan, Poster, 2nd Interim Meeting of the American Society of Pharmacognosy, Asilomar, CA, November 8-11, 2001.
46. "An Improved HPLC Method for Quantitative and Qualitative Determination of Six Triterpenes in Gotu Kola," **Brian T. Schaneberg**, Julie R. Mikell, Erdal Bedir, and Ikhlas A. Khan, Poster, 2nd Interim Meeting of the American Society of Pharmacognosy, Asilomar, CA, November 8-11, 2001.
47. "A Comparison of Extraction Methods for Marker Compounds in the Essential Oil of Lemon Grass by GC," **Brian T. Schaneberg** and Ikhlas A. Khan, Poster, 2nd Interim Meeting of the American Society of Pharmacognosy, Asilomar, CA, November 8-11, 2001.
48. "Evaluation of Genetic and Phytochemical Diversity Within and Among American Ginseng (*Panax quinquefolius*) Populations," Jennifer Cruse-Sanders, Sara Crockett, **Brian Schaneberg**, and Ikhlas Khan, Poster, 2nd Interim Meeting of the American Society of Pharmacognosy, Asilomar, CA, November 8-11, 2001.
49. "Genetic and Phytochemical Differentiation of Various Species of *Hypericum*," Sara Crockett, **Brian Schaneberg**, Andy Douglas, Sula Vanderplank, and Ikhlas Khan, Poster, 2nd Interim Meeting of the American Society of Pharmacognosy, Asilomar, CA, November 8-11, 2001.
50. "Modification of the Maytansinoid Diene Moiety," **Brian T. Schaneberg** and Albert T. Sneden, Oral, 28th Annual MALTO Medicinal Chemistry-Pharmacognosy Meeting-in-Miniature, University, Mississippi, May 20-22, 2001.
51. "Dihydroagarofuran Sesquiterpene Alkaloids from *Maytenus putterlickoides*," **Brian T. Schaneberg**, David K. Green, and Albert T. Sneden, Poster, 220th National Meeting of the American Chemical Society, Washington, DC, August 20-24, 2000, Division of Organic Chemistry.
52. "Dihydroagarofuran Sesquiterpene Alkaloids from *Maytenus putterickoides*," **Brian T. Schaneberg**, David K. Green, and Albert T. Sneden, Poster, 41th American Society of Pharmacognosy Meeting, Seattle, Washington, July 22-26, 2000.
53. "Dihydroagarofuran Sesquiterpene Alkaloids from *Maytenus putterlickoides*, and the Modification of the Maytansinoid Diene Moiety," **Brian T. Schaneberg**, Oral, Seminar at the National Cancer Institute at Fort Detrick, Frederick, Maryland, July 6, 2000.
54. "Modification of the Diene Moiety of Maytansine and its Homologues," **Brian T. Schaneberg** and Albert T. Sneden, 3rd Annual Graduate Research Symposium & Exhibit, Richmond, Virginia, April 14, 2000.

55. "Modification of the Diene Moiety of Maytansine and its Homologues," **Brian T. Schaneberg** and Albert T. Sneden, 218th National Meeting of the American Chemical Society, New Orleans, Louisiana, August 22-26, 1999, Division of Organic Chemistry, Abstr. No. 161.
56. "Modification of the Diene System of Maytansinoids," **Brian T. Schaneberg** and Albert T. Sneden, The 2nd Annual Graduate Research Symposium & Exhibit, Richmond, Virginia, April 9, 1999.
57. "Modification of the Diene System of Maytansinoids," **Brian T. Schaneberg** and Albert T. Sneden, Oral, 50th Southeast Regional Meeting of the American Chemical Society, Research Triangle Park, North Carolina, November 4-7, 1998, Abstr. No. 398.
58. "Modification of the Diene System of Maytansinoids," **Brian T. Schaneberg** and Albert T. Sneden, 15th Daniel T. Watts Student Research Symposium, Richmond, Virginia, October 20-22, 1998.
59. "Modification of the Diene System of Maytansinoids," **Brian T. Schaneberg** and Albert T. Sneden, 39th American Society of Pharmacognosy Meeting, Orlando, Florida, July 19-24, 1998, Abstr. No. P-122.
60. "Chemical and Phytochemical Investigation of Principles of *Maytenus putterlickoides*," **Brian T. Schaneberg** and Albert T. Sneden, 1st Annual Graduate Research Symposium & Exhibit, Richmond, Virginia, April 17, 1998.
61. "Chemical and Phytochemical Investigation of Principles of *Maytenus putterlickoides*," **Brian T. Schaneberg** and Albert T. Sneden, 14th Daniel T. Watts Student Research Symposium, Richmond, Virginia, October 21-23,1997.
62. "Chemical and Phytochemical Investigation of Principles of *Maytenus putterlickoides*," **Brian T. Schaneberg** and Albert T. Sneden, 49th Southeast Regional Meeting of the American Chemical Society, Roanoke, Virginia, October 19-22, 1997, Abstr. No. 365.
63. "Constituents of *Rollinia sericea* (Annonaceae)," Albert T. Sneden, James N. Barnes, Barbara L. Gilbride, and **Brian T. Schaneberg**, 46th Southeast Regional Meeting of the American Chemical Society, Birmingham, Alabama, October 16-19, 1994, Abstr. No. 365.

COVANCE
THE DEVELOPMENT SERVICES COMPANY



# CURRICULUM VITAE: DARRYL M. SULLIVAN

## CURRENT POSITION

| | |
|---|---|
| Title: | Associate Scientific Director |
| Department: | Food and Drug Analysis<br>Covance Laboratories Inc.<br>Madison, Wisconsin |

## EDUCATION

BS Biological Conservation with a minor in Biochemistry, University of Wisconsin-Madison, Madison, Wisconsin, 1975

### Additional Training

Six Sigma Green Belt Training. Covance Laboratories, Madison Wisconsin, 2003
GMP Compliance and Regulatory Update, Covance Laboratories, Madison, Wisconsin, 2001
Good Laboratory Practices (GLP) Covance Laboratories, Madison, WI, 2000, 2001, 2002, 2003, 2004
Building Loyalty Through Customer Service, Covance Laboratories, Madison, Wisconsin, 2000
Violence in the Workplace, Covance Laboratories Inc., Madison, Wisconsin, 2000
Total Quality Management System, sponsored by Covance Laboratories Inc., Madison, Wisconsin 1988, 1989, 1990, 1991
Supervisory Management Certificate Program, Management Institute, University of Wisconsin Extension, Madison, Wisconsin, 1985-1986
High Performance Liquid Chromatography Training School, Waters Associates, St. Louis, Missouri, 1979

### Additional Course Work

Graduate studies in biochemistry and limnology, University of Wisconsin-Madison, Madison, Wisconsin, 1976

## PROFESSIONAL EXPERIENCE

### 2008 - Present: Associate Scientific Director, Food and Drug Analysis

As the associate scientific director in the Food and Drug Analysis Department, Mr Sullivan is responsible for the overall scientific rigor of all testing programs. Mr. Sullivan brings new test methods, new technologies, and new innovations into the laboratory. He is then responsible for implementing and validating these methods and technologies.
Mr. Sullivan is the primary Covance liason to AOAC International, and other scientific assoaciations.

### 2000 – 2008: Manager of Business Development, Food and Drug Analysis

As a senior manager in the Food and Dietary Supplement Groups, Mr. Sullivan is responsible for the department's major food and nutraceutical testing programs. His responsibilities include design and

implementation of the testing programs, assuring the quality of the data, and communicating directly with the clients. Mr. Sullivan manages laboratory supervisors, scientists, technicians, and administrative personnel in carrying out these duties.
Mr. Sullivan is held accountable for the total performance of these testing programs. He is responsible for the quality of the data, the timeliness of the testing and the financial performance of the teams. Mr. Sullivan is expected to direct method development programs, problem solving projects, and new testing ventures.
In addition, Ms. Sorenson continues to assist scientific leaders with AOAC Single Laboratory Validation and Collaborative Studies and has led AOAC projects in the past.

CURRICULUM VITAE: DARRYL M. SULLIVAN

PROFESSIONAL EXPERIENCE (Continued)

1990 - 2000: Senior Client Manager, Food Chemistry

As a senior client manager in the Food Sciences Group, Mr. Sullivan provided a wide variety of services to both clients and the laboratory staff as an expert in nutritional, inorganic, and lipid chemistry. He consulted with and advised clients on regulatory issues, proper selection of assays, and understanding analytical results. He utilized his extensive experience in designing programs for a variety of projects, including major nutritional surveys, nutrition labeling programs, stability studies, and major research and development projects, and he assisted clients and laboratory staff with all aspects of these studies. Mr. Sullivan acted as a liaison between the laboratory and the client by providing technical direction and advice; he discussed results and methodology with the scientists and helped clients in their interpretation and understanding of the data. He also assisted the client service representatives by providing technical direction to individuals working directly with accounts.
Mr. Sullivan is very active in AOAC International; he served as a member of the Official Methods Board and chair of one of the Food Methods committees.

1987 - 1990: Technical Manager, Inorganic Analysis

Mr. Sullivan had the same supervisory duties as described under the Staff Scientist/Supervisor position. He also had the additional responsibilities of budget preparation, department cost analysis, and productivity analysis. Mr. Sullivan researched new analytical technologies and often published or presented his findings.

1981 - 1987: Staff Scientist/Supervisor, Inorganic Analysis

Mr. Sullivan managed the Inorganic Department, including supervision of the ICAP and Nonmetals, Atomic Absorption, and Proximate/Lipid Chemistry sections. This involved organizing and evaluating data, and performing or advising others on research of new methods or modifications of existing methods. These sections conducted a wide range of food and feed analyses for trace elements, heavy metals, organic and inorganic salts, proximate composition, and lipids. Much of the work was done as part of quality control or nutritional labeling compliance testing. Mr. Sullivan also supervised the Formulation Quality Control section which performed analytical testing for the Toxicology Department. Mr. Sullivan was instrumental in managing the startup of ion chromatography techniques at Hazleton, as well as in developing applications ofion chromatography to food analyses. He also managed other method development projects including gravimetric methods for total dietary fiber and a heavy metals screen by inductively coupled argon plasma atomic emission spectrophotometry.

1980 - 1981: Scientist II/Section Leader, Nutritional Adjuncts

As a section leader in the proximate and lipid chemistry area, Mr. Sullivan supervised scientists and technicians in the analysis of protein, moisture, ash, fat, fiber, carbohydrates, and calories in foods and feeds. Mr. Sullivan also worked on the analysis of fatty acids, cholesterol, plant sterols, and antioxidants.

CURRICULUM VITAE: DARRYL M. SULLIVAN

PROFESSIONAL EXPERIENCE (Continued)

1979 - 1980: Scientist, Nutritional Adjuncts

Mr. Sullivan worked in the Micro vitamin section where he regularly identified and quantified vitamins and amino acids in proteins, foods, and animal feeds using wet chemical techniques, high performance liquid chromatography, and an amino acid autoanalyzer.

1977 - 1978: Scientist, Pesticide Evaluation

Mr. Sullivan's primary responsibilities were the management and operation of the Drosophila mutagenesis laboratory. This involved leading long-term projects as well as method development and data analysis.

1975 - 1977: Development Engineer, Research Projects Corporation, Madison, Wisconsin

Mr. Sullivan researched and developed air movement and filtration systems for integration with a solar heating program.

PUBLICATIONS

Paske, N., Berry, B., Schmitz, J., Sullivan, D., "Determination of Low-Level Agricultural Residues in Soft Drinks and Sports Drinks by Liquid Chromatography/Tandem Mass Spectrometry: Single-Laboratory Validation" Journal of the AOAC INTERNATIONAL, 90 (2):521-533 (2007)

Paske, N., Berry, B., Schmitz, J., Sullivan, D., "Determination of Low-Level Agricultural Residues in Soft Drinks and Sports Drinks by Gas Chromatography with Mass-Selective Detection: Single-Laboratory Validation" Journal of the AOAC INTERNATIONAL, 90 (2):534-543 (2007)

Sullivan, D. M., Wehrmann, J., Schmitz, J., Crowley, R., and Eberhard, J., "Determination of Ephedra Alkaloids by Liquid Chromatography/Tandem Mass Spectrometry," Journal of the AOAC INTERNATIONAL, 86(3):471-475 (2003).

Lee S.C., Prosky L., Sullivan D.M. and Vincent R., "Evaluating an Analytical Method for Complex Carbohydrate Determinations," *American Association for Cereal Chemists, Inc., 41*:64-70 (1996).

Sullivan, D.M., "Cholesterol" *Analyzing Food for Nutrition Labeling and Hazardous*

*Contaminants,* (eds.) I. Jeon, W. Ikins, Ch. 4, pp. 77-86, Marcel Dekker Inc., New York, Basel, Hong Kong (1995).

DeVries J.W., Sullivan D.M. and Sungsoo L.C., "Carbohydrate/Dietary Fiber Analysis," *Methods of Analysis for Nutrition Labeling,* (eds.) D. Sullivan and D. Carpenter, Ch. 4, pp. 69-83 (1993).

CURRICULUM VITAE: DARRYL M. SULLIVAN

PUBLICATIONS (Continued)

Sullivan D.M., "Proximate and Mineral Analysis," *Methods of Analysis for Nutrition Labeling,* (eds.) D. Sullivan and D. Carpenter, Ch. 6, pp.105-109 (1993).

Sullivan, D. M., and Walton J.C., "The Needs of the Contract Laboratory in Regard to Reference Material," *Fresenius' Journal of Analytical Chemistry 338*: 580-581 (1990).

Kehoe, D. F. and Sullivan, D. M., "Determination of Gold in Tissue by Graphite Furnace Atomic Absorption Spectrophotometry," Journal of the Association of Official Analytical Chemists, 70(6):1, 153-1, 155 (1988).

Sullivan, D. M., Kehoe, D. F., and Smith, R. L., "Measurement of Trace Levels of Total Aluminum in Foods by Atomic Absorption Spectrophotometry," Journal of the Association of Official Analytical Chemists, 70(1):118-120 (1987).

Smith, R. L. and Sullivan, D. M., "Quantitation of Vegetable Sterols in Dairy Products Using Capillary Gas Chromatography," Journal of the Association of Official Analytical Chemists, 70(5):912-915 (1987).

Adams, M. L., Sullivan, D. M., Smith, R. L., and Richter, E. F., "Evaluation of Direct Saponification Method for Determination of Cholesterol in Meats," Journal of the Association of Official Analytical Chemists, 69(5):844-846 (1986).

Sullivan, D.M., "Methods for Low Level Sodium Analysis: An Overview," Arkansas Processing Crops Review, Vol. XXII (Issue 2), University of Arkansas (April 1985).

Sullivan, D. M. and Smith R. L., "Determination of Sulfites in Foods by Ion Chromatography," Food Technology, 39(7):45-48 (July 1985).

Greger, J. L., Sullivan, D. M., Goetz, W., and Daun, R. J., "Aluminum Levels in Foods Cooked and Stored in Aluminum Pans, Trays, and Foil," Journal of Food Protection, 48(9):772-777 (September 1985).

Sullivan, D. M., "Sulfate by Ion Chromatography," in Sulfur and Sulfur Amino Acids, O. Griffith and W. Jakoby (eds.), Methods in Enzymology, Academic Press, Orlando, Florida (in press).

PRESENTATIONS

Sullivan, D.M., "GLP Compositional Analysis of Biotech-Derived Foods/Crops," IFT Annual Meeting and Food Exposition, Chicago, Illinois, July 2003.

Randall Smith, Darryl M. Sullivan and James Wehrmann, "Implementing LC-MS/MS Analytical Applications in the Contract Laboratory," AOAC International Annual Meeting and Exposition, Atlanta, Georgia, September 2003.

CURRICULUM VITAE: DARRYL M. SULLIVAN

PRESENTATIONS (Continued)

Sullivan, D.M., "Compositional Analysis of Biotech-Derived Foods and Crops," AOAC International Annual Meeting and Exposition, Atlanta, Georgia, September 2003.

John Schmitz, Darryl M. Sullivan and James Wehrmann, "Validation of an LC-MS/MS Method for Quantitation of Ephedrine Alkaloids in Dietary Supplements," AOAC International Annual Meeting and Exposition, Los Angeles, California, September 2002.

Chad Scheuerell, Donald L. Hughes, Darryl M. Sullivan and James Wehrmann, "The Analysis of Acrylamide in Foods Using LC-MS/MS," AOAC International Annual Meeting and Exposition, Los Angeles, California, September 2002.

Sullivan, D.M., AOAC International Official Methods(sm) Program, "Actions of the AOAC Task Force to Develop/Validate Official Methods for Diet Supplement Analysis," IFT Annual Meeting and Food Exposition, Anaheim, California, June 2002.

Sullivan, D.M., "Problems and Pitfalls in Analysis of Foods, Feeds, and Crop Materials for Amino Acids," Pittsburgh Conference, New Orleans, Louisiana, March 2002.

Sullivan, D.M., "AOAC International Proactive Program of Work for Validating Analytical Methods for Dietary Supplements," SupplySide East International Trade Show & Conference, Secaucus, New Jersey, 2001.

Sullivan, D.M., "Low-Level Lactose Determination" Association of Official Analytical Chemists Meeting and Exposition, San Diego, California, 1997.

Sullivan, D.M., "Interlaboratory Collaboration Review, & Acceptance," Standardization and Validation of Methods for Characterizing and Analyzing Dietary Supplements Topical Conference, Baltimore, Maryland, 1996.

Sullivan, D.M., "Use of Reference Materials for Dietary Fiber Analysis in the Q.C. Laboratory," American Association of Cereal Chemists Meeting, Seattle Washington, 1992.

Sullivan, D. M., "Determination of Total Fat in Foods in Compliance with NLEA," American Association of Cereal Chemists Meeting, 1991.

Sullivan, D. M., “Comparison of Methods to Determine Total Fat in Food,” American Association of Cereal Chemists Meeting, Minneapolis, Minnesota, 1990.

Polywacz, J. P. and Sullivan, D. M., "Determination of Total Dietary Fiber in Food," Midwest Association of Official Analytical Chemists Meeting, Fargo, North Dakota, June 1987.

Sullivan, D. M., "Determination of Omega-3 Polyunsaturated Fatty Acids," Fall Association of Official Analytical Chemists Meeting, San Francisco, California, September 1987.

Sullivan, D. M. and Giegerich, J. R., "Determination of Iodine in Foods Using Ion Chromatography," Pittsburgh Conference, Atlantic City, New Jersey, March 1986.

CURRICULUM VITAE: DARRYL M. SULLIVAN

PRESENTATIONS (Continued)

Sullivan, D. M., "Ion Chromatographic Analysis of Foods," Spring Association of Official Analytical Chemists Workshop, Seattle, Washington, April 1986.

Giegerich, J. R. and Sullivan, D. M., "New Methods for Food Analysis Using Ion Chromatography," Midwest Association of Official Analytical Chemists Meeting, Lincoln, Nebraska, June 1986.

Kehoe, D. F. and Sullivan, D. M., "Quantitation of Selenium in Infant Formula Using Hydride Generation Atomic Absorption Spectrophotometry," Fall Association of Official Analytical Chemists Meeting, Scottsdale, Arizona, September 1986.

Sullivan, D. M., "Determination of Iodine in Food Using Ion Chromatography," Fall Association of Official Analytical Chemists Meeting, Scottsdale, Arizona, September 1986.

Sullivan, D. M. and Smith, R. L., "Total Dietary Fiber in Food and Food Ingredients," presented at the Annual Meeting of the American Association of Cereal Chemists, Toronto, Canada, October 1986.

Sullivan, D. M. and Giegerich, J. R., "Analysis of Sulfites and Other Anions in Food by Ion Chromatography," Pittsburgh Conference, New Orleans, Louisiana, February 1985.

Sullivan, D. M. and Smith, R. L., "Comparison of Atomic Absorption and Inductively Coupled Argon Plasma Atomic Emission Spectrometry for the Analysis of Infant Formula," 1st Association of Official Analytical Chemists Conference on Infant Formula, Virginia Beach, Virginia, May 1985.

Smith, R. L. and Sullivan, D. M., "Comparison of Chromatographic and Microbiological Procedures for the Determination of Tryptophan Content in Infant Formula," 1st Association of Official Analytical Chemists Conference on Infant Formula, Virginia Beach, Virginia, May 1985.

Sullivan, D. M., "Ion Chromatographic Determination of Sulfites," Fall Association of Official Analytical Chemists Meeting, Washington, DC, October 1985.

Burkhart, M. O. and Sullivan, D. M., "Determination of Total Dietary Fiber in a Wide Variety of Food Products," Midwest Association of Official Analytical Chemists Meeting, Chicago, Illinois, June 1985.

Sullivan, D. M., "Ion Chromatographic Method for the Determination of Sulfites," Association of Official Analytical Chemists Sulfite Task Force Meeting, Washington, DC, August 1985.

Sullivan, D. M., "Quantitation of Sulfite in Foods Using Ion Chromatography," LabCon Central Meeting, Chicago, Illinois, October 1985.

Sullivan, D. M., "Ion Chromatographic Determination of Sulfites," Fall Association of Official Analytical Chemists Meeting, Washington, DC, October 1985.

Burkhart, M. O. and Sullivan, D. M., "Measurement of Total Dietary Fiber in a Wide Variety of Food Products," Fall Association of Official Analytical Chemists Meeting, Washington, DC, October 1985.

CURRICULUM VITAE: DARRYL M. SULLIVAN

PRESENTATIONS (Continued)

Sullivan, D. M., Giegerich, J. R., and Addison, T. A., "Ion Chromatography: A New Approach to Anion Analysis in Food," Midwest Association of Official Analytical Chemists Meeting, Minneapolis, Minnesota, June 1984.

Sullivan, D. M., Smith, R. L., and Richter, E. F., "Quantitation of Vegetable Sterols in Dairy Products Using Capillary Column Chromatography," Fall Association of Official Analytical Chemists Meeting, Washington, DC, October 1984.

Sullivan, D. M., "Aluminum in Food," Conference on Aluminum Analysis in Biological Materials, University of Virginia, Charlottesville, Virginia, June 1983.

Sullivan, D. M., "Determination of Selenium Levels in Feed After Dry Ashing," Midwest Association of Official Analytical Chemists Meeting, Ames, Iowa, June 1983.

Adams, M. L., Sullivan, D. M., Smith, R. L., and Richter, E. F., "Evaluation of a Direct Saponification Method for the Determination of Cholesterol in Meats," Fall Association of Official Analytical Chemists Meeting, Washington, DC, 1983.

PROFESSIONAL MEMBERSHIPS

Society for Applied Spectroscopy
AOAC INTERNATIONAL
Association of Official Analytical Chemists Sulfite Task Force, 1985-1986
Association of Official Analytical Chemists NLEA Task Force, 1993-1996
AOAC INTERNATIONAL Dietary Supplement Task Force, 2000-
AOAC INTERNATIONAL Dietary Supplement Task Force Chair, 2000-2003
AOAC INTERNATIONAL Official Methods Board Member, 1998-2001
AOAC INTERNATIONAL Official Methods Board Chair, 2001-2004
AOAC INTERNATIONAL Board of Directors, 2004-
Institute of Food Technologists

# ELIZABETH MUDGE



**3700 Willingdon Ave**
**Burnaby, BC, Canada**

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**E- Mail: Emudge@bcit.ca**

## Education

| | |
|---|---|
| 2016 – Present | PhD, Analytical Chemistry & Metabolomics<br>Department of Chemistry,<br>University of British Columbia, Kelowna, BC |
| 2009-2011 | M.Sc, Natural Product & Analytical Chemistry<br>Department of Agriculture, Food and Nutritional Sciences,<br>University of Alberta, Edmonton, AB |
| 2004-2008 | B.A.Sc, Food Science and Technology<br>Department of Processing Engineering and Applied Sciences<br>Dalhousie University, Halifax, NS |

## Professional Experience

| | |
|---|---|
| 2011-Present | Research Associate, Natural Health & Food Products Research<br>Centre for Applied Research & Innovation<br>British Columbia Institute of Technology, Burnaby, BC |
| 2009-2011 | M.Sc Candidate, Department of Agriculture, Food and Nutritional Sciences<br>University of Alberta, Edmonton, AB |
| 2008-2009 | Research & Application Support Scientist, Food Research Group<br>Ocean Nutrition Canada, Dartmouth, NS |
| 2007-2008 | Undergraduate Research Assistant, Atlantic Soft Materials and Complex Fluids Laboratory<br>Dalhousie University, Halifax, NS |

## Teaching, Supervising & Mentoring

| | |
|---|---|
| 2012-2016 | Student Mentor, British Columbia Institute of Technology<br>Mentoring of Biotechnology students at BCIT |
| 2011 | Teaching Assistant, University of Alberta<br>Provide assistance to students in Capstone Course. Mentored students on evaluation of alkylamide content in commercial Echinacea products. |
| 2008 | Teaching Assistant, Dalhousie University<br>Preparation of laboratory materials, provide assistance to students, marking for Food Processing course. |

**Professional Memberships**

- AOAC International, 2012-Present
- American Chemical Society, 2012
- Canadian Institute of Food Science and Technology, 2007-Present
- American Oil Chemists' Society, 2008-2009

**Research Dissemination**

*Journal Publications*

Brown PN, Mudge EM, Paley L. 2016. Determination of Phenolic Constituents in Echinacea Raw Materials and Dietary Supplements by HPLC-UV: Collaborative Study. J AOAC Int.99(5): 1197-1203.

Mudge E, Chan M, Vankataraman S, Brown PN. 2016. Curcuminoids in turmeric roots and supplements: method optimization and validation. *Food Anal Met. 9(5)*: 1428-1435.

Mudge E, Applequist WL, Finley J, Lister P, Townesmith AK, Walker KM, Brown PN. 2016. Variation of select flavanols and chlorogenic acid content of elderberry collected throughout the Eastern United States. *J Food Comp Anal. 47:* 52-59

Mudge E, Jones AMP, Brown PN. 2015. Quantification of pyrrolizidine alkaloids in North American plants and honey by LC-MS: single laboratory validation. *Food Addit Contam. 32(12):*2068-2077.

Mudge E, Paley L, Schieber A, Brown PN. 2015. Optimization and single-laboratory validation of a method for the determination of flavonolignans in milk thistle seeds by high-performance liquid chromatography with ultraviolet detection. *Anal Bioanal Chem*. *407 (25):* 7657:7666.

Brown PN, Yu R, Kuan C, Finley J, Mudge E, Dentali S. 2014. Determination of aloin A and aloin B in aloe vera materials and finished products by high pressure liquid chromatography: Single laboratory validation. *J AOAC Int. 97(5):* 1323-1328.

Sanchez Maldonado AF, Mudge E, Ganzle M, Schieber A. 2014. Extraction and fractionation of phenolic acids and glycoalkaloids from potato peels using acidified water/ethanol-based solvents. *Food Res Int*. *65*: 27-34.

Mudge E, Lopes-Lutz D, Brown P, Schieber A. 2013. Purification of phenylalkanoids and monoterpene glycosides from *Rhodiola rosea* L. roots by high-speed counter-current chromatography. *Phytochem Ana.l 24*: 129-134.

Mudge E, Lopes-Lutz D, Brown P, Schieber A. 2011. Analysis of alkylamides in *Echinacea* plant materials and dietary supplements by ultra-fast liquid chromatography with diode array and mass spectrometric detection. *J Agric Food Chem. 59*:8086-8094.

Lopes-Lutz D. Mudge E, Ippolito R, Brown P, Schieber A. 2011. Purification of alkylamides from *Echinacea angustifolia* (DC.) Hell. roots by high-speed counter-current chromatography. *J Agric Food Chem. 59*: 491-494.

Mudge EM, Mazzanti, G. 2009. Rheo-NMR measurements of cocoa butter crystallized under shear flow. *Cryst Growth Des. 9* (7): 3111-3118.

Mazzanti G, Mudge E, Anom E. 2008. In situ Rheo-NMR Measurements of Solid Fat Content. *J AOCS*. *85* (5): 405-412.

*Extended Abstract Publications*

Mudge EM, Betz JM, Brown PN (2016). The Importance of Method Selection in Determining Product Integrity for Nutrition Research. Advances in Nutrition, 7: 390-398.

Mazzanti G, Mudge EM. "Development of a rheo-NMR system to study the crystallization of bulk lipids under shear flow." *9th International Conference on the Applications of Magnetic Resonance in Food Science: Challenges in a Changing World*. September 2008. Reykjavík, Iceland. Guõjónsdóttir, M., Belton, P., Webb, G. Cambridge, UK. The Royal Society of Chemistry (RSC) Publishing, 2009, pp 89-96.

*Conference Abstracts*

Mudge EM, Murch SJ, Brown PN. Evaluating Phytochemical Variation in Medical Marihuana. Copenhagen, DK. July 2016. Poster at Joint Natural Products Conference.

Mudge EM, Murch SJ, Brown PN. Quantitation of Cannabinoids in Medical Marihuana Flowers and Oils. Halifax, NS. June 2016. Poster at Canadian Chemistry Society Annual Conference.

Mudge EM, Finley JF, Brown PN. Use of chemical profiling with chemometric analysis for determining adulteration in Panax species. Charlottetown, PEI. May 2016. Presentation and Poster at Natural Health Products Research Society Annual Meeting.

Mudge EM, Brown PN. 2015. Quantification of Mitragynine in Kratom Raw Materials and Finished Products by High-Performance Liquid Chromatography: Single-Laboratory Validation. Los Angeles, CA. September 28-30, 2015. Poster at 128$^{th}$ AOAC Annual Meeting and Exposition.

Mudge EM, Brown PN. 2013. Determination of pyrrolizidine alkaloids in British Columbia plants and honey by high-performance liquid chromatography with mass spectrometric detection: single-laboratory validation. Chicago, IL. August 25-28, 2013. Poster at 127$^{th}$ AOAC Annual Meeting and Exposition.

Mudge EM, Finley J, Lister P, Applequist W, Brown PN. 2013. Flavonoid content of elderberry collected in the eastern United States. Columbia MO. June 10, 2013. Presentation in Elderberry botany and ethnobotany section at 2013 Elderberry Symposium.

Mudge EM, Brown PN. 2012. Determination of major flavonoids in milk thistle raw materials and finished products by high-performance liquid chromatography with ultraviolet detection: Single laboratory validation. Las Vegas, NV. September 30 – October 3, 2012. Poster at AOAC Annual Meeting & Exposition.

Mudge EM, Paley L, Lopes-Lutz D, Schieber A, Brown PN. 2012 Optimization of flavonolignan analysis in milk thistle raw materials and finished products using HPLC-UV. Oxford, MS. April 16-19, 2012. Poster at International Conference on the Science of Botanicals.

Mudge, E., Lopez-Lutes, D., Ashmelash, Y., Brown, P., Ippolito, R., Schieber, A. (2010) Winnipeg, MB. June 1, 2010. Presentation in the Food Quality and Analysis section at the 2010 CIFST/AAFC Conference.

Mudge EM, Mazzanti G. 2008 Rheo-NMR measurements of solid fat content in cocoa butter crystallized under shear flow. Charlottetown, PEI. May 25-27, 2008. Poster in the Emerging Food Technologies section at the 2008 CIFST/AAFC Conference.

Mazzanti, G., Mudge, E.M. (2008) Development of a rheo-NMR system to study the crystallization of bulk lipids under shear flow. Reykjavík, Iceland. September 15, 2008. Presentation in the New Technologies section at the 9th edition of Applications of Magnetic Resonance in Food Science Conference.

Mazzanti, G., Mudge, E.M. (2008) Rheo-NMR system for the study of crystallization of bulk lipids under shear flow. Charlottetown, PEI. May 27, 2008. Presentation in the Emerging Food Technologies section at the 2008 CIFST/AAFC Conference.

Mudge, E.M., Anom, E.Y., Mazzanti, G. (2008) A rheo-NMR system for the determination of SFC under controlled shear flow. Seattle, WA, USA. May 21, 2008. Presentation in the Crystallization sub-section of the Edible Applications Technology section at the 99th AOCS Annual Meeting and Expo.

Mudge, E.M., Mazzanti, G. (2008) Rheo-NMR measurements of cocoa butter crystallized under shear flow. Seattle, WA, USA. May 21, 2008. Presentation in the Crystallization sub-section of the Edible Applications Technology section at the 99th AOCS Annual Meeting and Expo.

Mudge, E.M., Anom, E.Y., Mazzanti, G. (2008) A rheo-NMR system for the determination of SFC under controlled shear flow. Seattle, WA, USA. May 21, 2008. Presentation in the General Analytical sub-section of the Analytical section at the 99th AOCS Annual Meeting and Expo.

Mazzanti, G., Mudge, E.M. (2008) Rheo-NMR measurements of solid fat content in cocoa butter crystallized under shear flow. Halifax, NS. June 25, 2008. Poster in the Institute for Research in Materials (IRM) Annual General Meeting and Research Day at Dalhousie University.

**Distinctions**

- Certified Food Scientist (2014)
- Graduate Student Scholarship, Government of Alberta (2011)
- AFNS Graduate Student Research Award (2010)
- Queen Elizabeth II Masters Scholarship (2010, 2009)
- Graduate Research Assistantship Fund Tuition Scholarship (2009)
- University Medal in Food Science (2008)
- American Oil Chemists' Society Student Analytical Division Award (2008)

AOAC INTERNATIONAL

The Scientific Association Dedicated to Analytical Excellence®

# MEMORANDUM

**Date:** November 10, 2016

**To:** AOAC INTERNATIONAL Official Methods Board

**From:** Deborah McKenzie, Staff Liaison – AOAC Official Methods Board

**Subject:** II-b. OMB Liaison's Report to OMB

**A verbal report.**

The Scientific Association Dedicated to Analytical Excellence®

# MEMORANDUM

**Date:** November 10, 2016

**To:** AOAC INTERNATIONAL Official Methods Board

**From:** Deborah McKenzie, Staff Liaison – AOAC Official Methods Board

**Subject:** II-c. Proposal for AOAC Experts in AOAC AOAC *Performance Tested Methods*℠ Program

**Background:**

The AOAC Research Institute, a subsidiary of AOAC INTERNATIONAL, administers conformity assessment programs, namely the AOAC *Performance Tested Methods*℠ (PTM) Program and a version of the AOAC *Official Methods of Analysis*℠ (OMA) Program, and the Consulting Service. OMB is mostly familiar with the AOAC OMA program either through AOAC standards development activities and associated expert review panels (ERPs). ERPs administered by the Research Institute operate quite similarly to those associated with stakeholder panels, but for individually submitted methods not in response to a call for methods. The Consulting Service is an auxiliary service in which validation protocols are developed, reviewed, and approved that can be used in either the PTM and/or OMA programs.

The PTM program can be either an entry program or an end point for commercial proprietary rapid methods (test kits) and requires a full single laboratory validation along with an independent verification study. The end result of going through the PTM process is a certification of the method/test kit. Method developers are licensed to use the issued certification mark and a certificate with a synopsis of the method validation is posted on the AOAC website under the Research Institute and *PTM Validated Methods* tab.

A key component of the PTM program and the Consulting Service is the approval of validation protocols and the peer review of the PTM validation manuscript. The approval of validation protocols is the responsibility of the AOAC Expert, formerly known as the General Referee (GR). This person is someone who is knowledgeable of the expectations of the OMA programs and validation guidance and serves as a link between the programs. AOAC Experts are recruited for each area for which methods are submitted for PTM review and certification.

**Enclosures:** Credentials for two proposed AOAC Experts: one for seafood spoilage toxin methods and one for fats and oils methods. Also attached is information about the Research Institute, the programs, information on AOAC Experts.

**Recommendation:** To approve Jeff van de Riet as an AOAC Expert for Seafood Toxins; and to approve Michael Blumenthal as an AOAC Expert for Fats and Oils.

# AOAC Experts

- Formerly known as "General Referee"
  - Officially changed in 2008 to Process Experts
  - Modified to AOAC Experts in 2012 with onset of ERPs in RI
  - Guidance on validation of methods in specific technical areas
- AOAC INTERNATIONAL Volunteer appointment
- Maintains link with *Official Methods*$^{SM}$ expectations
- Participates in all Conformity Assessment activities
  - Participates in Consulting Service in reviewing and approving PTM validation protocols
    - Participates in the PTM program
    - A peer reviewer of PTM manuscripts - Not eligible for PTM Expert Reviewer honoraria
    - Determines PTM Modification Level
  - Participates in the *Official Methods*$^{SM}$ program as a member of an ERP
- Any ERP member can also serve in this capacity

# Current Listing of AOAC Experts

| Area of Expertise | AOAC Expert | Associated ERP |
|---|---|---|
| Antibiotic/Drug Residues | • Joe Boison | Veterinary Drug Residues |
| Vitamin & Nutrients | • Sneh Bhandari,<br>• Erik Konings | • Vitamin Assays,<br>• SPIFAN Nutrients |
| Natural Toxins Mycotoxins, marine spoilage toxins, | • Gordon Shephard<br>• Tetsu Goto<br>• Jim Hungerford<br>• **Jeff van de Riet** | |
| Food Allergens | • Terry Koerner<br>• Bert Popping | • SPSFAM Food Allergens<br>• Gluten Assays |
| Food Microorganisms (including pathogenic & non pathogenic bacteria, yeasts, molds, etc…) | • Yi Chen<br>• Tom Hammack<br>• Yvonne Salfinger | Microbiology Methods for Foods and Environmental Surfaces |
| Fats and Oils | •David Firestone*<br>•**Michael Blumenthal** | |

** Retired and no longer serving;* ***new and proposed candidates***

**From:** Dr. Michael M. Blumenthal [mailto:mmbphd@libralabs.com]
**Sent:** Monday, October 31, 2016 8:59 AM
**To:** Lakia Phillips
**Cc:** 'David L. Carrick'; Jerry R. Stockler
**Subject:** RE: AOAC Research Institute - Urgently Seeking Experts - reply

Dear Ms. Phillips,
I would like to participate as an Expert Reviewer for the development of five protocols for Malonaldehyde in Oils and Foods, Alkenol in Oils and Foods, Free Fatty Acids in Oils and Foods, Total Fat Content in Foods, and Lipid Peroxide in Oils in Foods. I have been an Associate Referee for AOAC on the topic of heated and oxidized oils under Dr. David Firestone, and have a Ph.D. degree from Rutgers Food Science Department specifically dealing with lipid chemistry, as well as an earlier undergraduate ACS certified Chemistry degree from Adelphi University. I am also currently an Adjunct Professor at Rutgers in the Graduate Program for the Food Science Department, and an Advisor to the Chairman of the department. I was very active in the past for the Institute of Food Technology and also the American Oil Chemists' Society, and won the respective Chang Awards from both in 2001 for my research in Lipid Chemistry and Food Lipid Chemistry.

I had to take medical leave from my laboratory from 2013 to 2015 for cancer treatment, continued consulting during treatment, and had returned to work in late 2015.

My independent contract and consulting laboratory (founded 1979) has relocated to:
Libra Technical Center, LLC
200 Centennial Avenue  Suite 140
Piscataway, NJ 08854

My personal Cell number is 732-754-5802, and is my preferred contact number for professional activities.

Attached please find my CV and Bibliography in MS Word format.

Best Regards,
Mike Blumenthal

Libra Technical Center, LLC
Michael M. Blumenthal, Ph.D., FAIC
200 Centennial Avenue
Piscataway, NJ 08854

**CAREER OVERVIEW**

**Michael Mark Blumenthal, Ph.D.**

**Citizenship:** U.S. **Birthplace:** New York City **Date of Birth:** October 21,1942
e-mail:mmbphd@libralabs.com
Cell:(732)-754-5802
**Business Address:** Libra Technical Center, LLC (and Libra Laboratories, Inc.)
200 Centennial Avenue Suite 140 Piscataway, NJ 08854 (New Lab to open July 2016)
Toll Free US & Canada TEL: 855-441-5200 TEL: 732-667-5626 FAX: 732-667-5572

**Present Job:** Founder (1979), and President, of Libra Laboratories, Inc., and Managing Partner of Libra Technical Center, LLC, an independent, contract and consulting laboratory and litigation support business, The business is known for its unique and broad technical capabilities regarding FDA regulated products and processes, packaging technology, and specialty chemicals. Litigation support covers industrial forensics, expert witness/testimony services, and intellectual property investigations and reports. Current profile on Linkedin.com – Michael M. Blumenthal.

Dr. Blumenthal is also an Adjunct Graduate Professor (Programs) at the Rutgers University Food Science Department, and on the Advisory Council to the Chairman of the Department.

**Family Status:**

**Spouse's Name:** Trean Korbelak Blumenthal, M.S. Chemistry, QA Specialist

**Names of Children:**

Jennifer Blumenthal Bryant, married, M.S. Ed.-Computer Science
Alexander Joseph Blumenthal, married, MBA (Marketing & Management)

**Education:**

Dr. Blumenthal began his education and his "career" as a chemist/scientist at age 6, when he set up his first home laboratory that he continued, and expanded all through his school years and beyond, including original independent research work. He is very widely read and has developed his own advanced expertise in a number of scientific and technology fields, such as computers and industrial archaeology. In turn, he has become a distinguished and recognized educator in his own right, and an outstanding writer and international lecturer in technical fields...

**Grammar School:** Public School 79, Bronx, NY (K-6) and Island Park School, L.I., NY (6-8)
**High School:** Oceanside High School, NY (9-12): Academic / Scientific Regents Diploma: New York State Regents College Scholarship (1960), Nassau County Science Congress - *1st Prize* for Chemistry and 2nd Grand Prize Overall (1960) (400 Contestants).

**College or University:**

B.A. Chemistry (ACS Certified-Honors), Adelphi University 1969 (Research Biophysical Chemistry) [attended school on academic scholarships and supported family with full time work].

M.S. Food Science, Rutgers University, 1972 (Dissertation-Flavor Chemistry)
M. Phil. Food Science (Honors), Rutgers University, 1973 (Research Analytical Spectroscopy)
Ph.D. Food Science, Rutgers University, 1974 (Dissertation Oil and Fat Chemistry):
Graduate Student Representative to Faculty Discussions and to University Accreditation Board. GPA 3.9+ out of 4.0 (Summa cum Laude); Graduate Professor and Advisor: Dr. Stephen S. Chang. Dr. Chang was a primary visitor to China to open trade under the Nixon Administration. Dr. Chang was also President of two major Professional Societies; Chairman of Food Science Dept.

Dr. Blumenthal has served as invited Lecturer and Adjunct Professor, in both Food Chemistry and Food Science, at Rutgers University, and was previously appointed by the State of NJ Commission on Science and Technology to be a Peer Reviewer for the Center for Advanced Food Technology, judging its R&D programs. Dr. Blumenthal has also served as a member of a number of graduate committees on behalf of Ph.D. candidates at Rutgers University, and has mentored a number of candidates to achieve their Ph.D., and offered internships, doctoral, and postdoctoral research training positions at the Libra Technical Center for many years.

**Professional Career:**

**Thomas J. Lipton,** Inc., Englewood Cliffs, NJ, 12/62-10/64. Research Technician, Protein Research. Product and process development: Advanced feasibility of continuous vegetable protein fiber spinning process at lab scale; helped produce the first pilot plant batches of a variety of seed protein isolates of high purity. Analytical research: Seed protein isolation and characterization by chemical and physical techniques. Analysis of animal protein hydrolyzate to identify a desirable low-volatility, flavorful moiety. Hands-on optimization of continuous electrophoresis of complex biochemicals. Was part of an advanced research team that pioneered many methods and processes that have become integral parts of food production today, including instant soups and meat analogues. First learned scientific / engineering computer programming (Fortran); and funds tracking (Cobol) (1962) on GE timeshare mainframe..

**Free-Lance Literature Researcher and Scientific Writer,** N.Y 11/64-5/65. Contract scientific writer and bibliographer while attending City University of New York to study history, literature, and mathematics. Topics of professional reports were inks and dyes, foods, plastics, analytical microscopy, and history of science.

**DCA Food Industries, Inc.,** New York, NY, 5/65-9/66. Food Technologist / Research Assistant. Process and product development: Project technician in microwave processing to fry and irradiate doughnuts simultaneously. Experimental designs produced stable glazes and coatings of defined character for baked goods. Analytical services: Analysis of gums / polysaccharides by two-dimensional TLC for deformulation. Studied factors leading to rheological control of mixing problems. QC lab chemist. Used mechanical skills in designing and modifying lab and pilot plant equipment. Participated in development of processes which were patented to give DCA a unique leadership position in low pressure extrusion technology (continued programming on Sperry Univac mainframe computer).

**Adelphi University,** Garden City, NY, 9/60-6/62 and 9/67-6/69. Chemistry Department, Dr. Frederick A. Bettelheim, Research Advisor. B.A. Chemistry Research: (1) Isolation of Chondroitin Sulfates from Pig Embryo Skins and Umbilical Cords; Spectrophotometric Tracking of Deliberate Denaturation of Hyaluronidase (involved in arthritis control); (2) Developed simple, inexpensive apparatus and methodology for characterizing human saliva's viscosity, specific gravity, and surface tension in 5 minutes, using only 2 mL of fresh fluid; (non-invasive diagnostic technique) for Cystic Fibrosis project. Received ACS Professional Certification. Declined offer of full-tuition scholarship to attend biochemistry graduate school, in order to pursue Food Science graduate studies, because of an intense interest in agricultural commodities as raw materials, the complexities of “engineering” processed foods for eventual manned space travel, and a commitment to fostering the public health through availability of “synthesized” food rather than medicine. Continued Programming in BASIC on Wang Desktop computer.

**Rutgers University**, New Brunswick, NJ, 7/69-2/74. Food Science Department, Dr. Stephen S. Chang, world-renowned fats and oils and flavor chemist, major professor. ***M.S. Research:*** Isolation of unstable sulfur volatiles generated biosynthetically from plant (onion) tissue. Microanalytical fractionation and identification of volatiles, using chromatographic and micro-spectrometric techniques. ***Ph.D. Research:*** Established near-perfect mathematical (computer) correlations between sensory panel statistics and gas chromatographic profiles of volatiles isolated from used frying oils. GC/MS identification of key chemical species that could be measured to predict sensory character. Four outstanding-rated graduate seminars presented. Also very active leader in university graduate student-faculty programs, e.g., physical plant, safety, financial aid, and presentation techniques. Graduate Student Representative on Faculty Panels. Graduate student representative to Department Accreditation Examiners. Continued programming on IBM 360.

**Aarlab, Inc.,** Jersey City, NJ, 1/70-2/74. Co-founder and President, Consulting Services Laboratory. Simultaneously with graduate school program, organized and obtained funding for an independent, problem-solving chemistry lab with broad capabilities both in synthesis and analysis for formulation and consultation. Directed staff in analysis of unusual and non-routine samples. Administered budget, work schedules, project responsibilities, preparation of reports, solicitation of new clients, and setting corporate goals. Developed methods for synthesis and ultrapurification of fluorescent microscopy dyes, analysis of beer and wines, and tocopherol recovery. Business interest bought out.

**Best Foods / CPC International,** Union, NJ., 3/74-1/76. Group Leader, Fats and Oils Research. Process and product development: Project leader for designed experiments leading to the development of chemically and physically modified corn oil and other fat products. Patent disclosures for five new approaches to the commercial processing of edible fats and oils, and fat replacers. Analytical research: Benchwork to introduce differential and derivative spectrophotometry for the analysis of minor constituents in lipids. Project leader in the development of a predictive (shelf-life) sensory method based on original statistical models. Leader and teacher in presentation and project proposal writing skills: experimental design and statistical analysis / validation of data. Internal consultant to packaging, sensory, analytical research, and process engineering research groups.

**DCA Food Industries, Inc.,** New York, NY, 5/76-1/80. (Second Tour). Project Manager: Food Systems. Directed the development of a high-temperature steam, continuous process to replace pre-frying as a unit operation in the manufacture of fabricated frozen foods. This included all aspects of the project: writing the technical business plan, budget, schedule, staffing, vendor selection, process/product development, regulatory clearances, field installation, participation in marketing, and project closure. Responsible for patent specification writing and filings with patent attorneys. Project involved, overall, the direct and indirect management/supervision of more than 200 people. Extensive staff development and team formation to write mission statements and operating guidelines; led project management system re-development according to engineering principles. Developed Lab Quality Assurance systems. Wrote patent infringement prosecution documents. Liaison to universities and professional societies on behalf of the corporation. Served on Project Selection and Review committee. Designed and programmed a microcomputer (TRS-80 Model I) simulation of a new process (1978); introduced response surface methodology for data reduction and process development (1979).

**Libra Laboratories, Inc.,** and its sister companies, Metuchen, NJ 1/80-present. Founder / Entrepreneur, CEO, and Director of Research. Conceived, developed, founded, and funded a state-of-the-art consulting research GMP laboratory. Established international reputation as an

expert in the art, science, and control of food service and industrial frying oils, and their applications. Developed a new understanding / paradigm, of significant economic importance, of the physical chemistry of how foods cook in oils.

Invented and patented internationally a novel solventless chemistry rapid testing technology. Developed initial applications of the technology in the use of a quick, simple, safe, cost-effective and environmentally "green" reagent-gel delivery system that has now been commercialized to permit either, in-lab, at-line, or in-field quick testing for real-time process control to optimize food quality, safety, and production economics. This technology can also be used safely and economically in educational institutions to teach descriptive chemistry, and in R&D/process & product development laboratories to make instant measurements to obtain information immediately on the progress of the work.

Acts in both executive management capacity and as scientific / research program director, mentoring numerous scientists, both staff and visiting investigators. Consults for many industrial concerns, government agencies, and academic and research institutions worldwide. Wrote and commercialized the first Project Management software with graphics, for microcomputers (1978) and the first project-oriented LIMS (lab information management system) software, to schedule, plan, and control lab resources and workload, featuring classical Gantt charting to track progress along with data (1982). Founded Gantt Systems, Inc. in 1984 to further commercialize the software products. Evolved Libra Laboratories, Inc. (1979) into Libra Technical Center, a world-class research / analytical lab which also develops new applications for the solventless chemistry technology, and other products; and Test Kit Technologies, Inc. (1994), which commercializes the technology, and manufactures and markets Libra's quick test kits and industrial testing products internationally.

Dr. Blumenthal is widely sought out as a lecturer and interviewee, and a lead feature article in the August 29, 1996 Los Angeles Times describes his work in the area of greater understanding for control of the very-widely used frying process and its complex chemistry. This is just one example; he has been on radio and television on a number of occasions. He is invited to lecture and teach all over the world, and has done so in Europe and Asia, especially. He is widely published in both the scholarly and the trade literature, where practitioners at many levels and in many organizations can benefit from the application of his discoveries and insights.

Dr. Blumenthal conceived and designed a popular Short Course, for continuing education of food science professionals, called "Deep-Fat Frying: Theory and Practice", which includes all aspects of this $75 billion-a-year (U.S. alone) industry. This course has been taught since 1989 at the University of California, Davis, Rutgers University, and other locations and has now been adopted by the Institute of Food Technologists (IFT) and the American Association of Cereal Chemists (AACC) for regular presentation by others. Dr. Blumenthal is now presenting independently a "Master Class on Frying Science and Technology" for international instruction at an advanced level. He is frequently invited to be a peer reviewer of journal articles, government grant proposals, and other prospective publications. He is the invited author of the chapter on Frying Technology in the highly regarded book, Bailey's Industrial Oil and Fat Products, 5th Edition. He is in the process of writing, in connection with distinguished U.S. and foreign colleagues, a definitive electronic book on the science and technology of deep-fat frying, fried food quality, and safety / assurance through proper measurement and control practices.

**Major non-professional interests:**

Sherlock Holmes; model railroading and railroad history: microcomputers and their applications at a very advanced level; techniques of sculpture and painting of the 19th century; archaeology and anthropology; “hard” science fiction, space travel / colonization; martial arts, and his grandkids.

**Memberships in societies, clubs and other organizations:**
American Institute of Chemical Engineers
American Chemical Society (ACS)
American Institute of Chemical Engineers
Institute of Food Technologists (I FT) Professional Member
American Oil Chemists' Society (AOCS)
American Association of Cereal Chemists (AACC)
The Society of Sigma Xi
AOAC International (Associate Referee for Research Topic: Heated and Oxidized Oils).
Association of Consulting Chemists and Chemical Engineers (ACC&CE): Cert. #856.
Baker Street Irregulars
National Model Railroad Association
Mensa. Dr. Blumenthal has given lively and popular presentations at Mensa meetings on food topics: ex.- 'The Nutritional Fate of a French Fry" and "Chocolate: Sociology and Science", and the esoteric subjects he masters such as the History of German and French Origins of Modern Forensic Science, the Human Mind and Virtual Reality, and the “Consulting Business” of (Conan Doyle’s) Sherlock Holmes. His comprehensive knowledge of a wide array of subjects combined with a sense of humor and outstanding presentation skills always draw a large, appreciative crowd who learn about food science and technology, interpretations of Victorian Literature, and the art of public speaking.

**Previous honors granted and date received for professional work during or Subsequent to university education:**
First and Grand Prizes, Nassau County Science Congress, N.Y. (medals), 1960
Regents College Scholarship, N.Y. State, 1960
President, Dakin Chemical Society, ACS Student Affiliate Chapter, 1969
President, Food Science Graduate Students' Assoc., IFT Student Chapter, 1973
American Oil Chemists' Society Honored Student Award, 1974
American Oil Chemists' Society Bond Award (Runner-up), 1974
Officer/Director, American Oil Chemists' Society Northeast Section 1991-1994
IAMFES Award for Best Article of the Year in the Environmental Area, 1993.
Appointment by the State of New Jersey Commission on Science and Technology as Peer Reviewer for a NJ Center for Excellence, the Center for Advanced Food Science and Technology (CAFT), 1992.
Lipidforum, Helsinki, Finland, 1994 major conference: recognized by this assembly of the foremost European fats/oils/lipids scientists by invitation to present three papers and the conference keynote closing summation.
American Oil Chemists’ Society Stephen S. Chang Award, 2001— major “fats and oils” award
Institute of Food Technologists Stephen S. Chang Award, 2001—major “flavor” award
Institute of Food Technologists-Distinguished Lecturer (2002-2005)

**U.S. Department of Agriculture (USDA) Grant Award** 1997-99 ($110,000.): "Chemical Basis of Crust Formation in Deep-Fried Potatoes". Dr. Blumenthal was the Principal Investigator and Dr. Karen Schaich of Rutgers University, the Co-Investigator, jointly leading a university/industry team to study lipid-polysaccharide interaction in potatoes fried in oils of varying stages of degradation, and determine the relationship between frying oil chemistry, lipid-polysaccharide complexation, and structure and texture of potato crust. This project has agricultural, nutritional, and economic significance because of the extremely widespread consumption of fried potatoes. It is estimated that of the 16.5 million tons of potatoes produced annually, fully half are used for French fries or potato chips. The statistics on the value of oilseed crops used to produce the costly fats and oils used in deep-frying are equally impressive.

This industry/academia project was the first instance of Rutgers University's being a paid subcontractor to a private research company, and required a new type of contract.

**Descriptions of major work**

## A New Paradigm of Deep-Fat Frying

Deep-fat frying is one of the most widely used methods of food production, and is practiced all over the world. It is a **$75 billion a year industry in the U.S. alone, and estimated to be twice that worldwide.** An extremely wide variety of types of foods are fried and oil blanched, and frying fats and oils are valuable and ever-more-costly agricultural commodity products. Extensive research is being done in the U.S. and abroad on new oilseed varieties, genetically enhanced oils, and processes and procedures to improve the nutritional profile, stability, and other important properties of fats and oils used for food, and, in particular, for deep frying. In addition, the quality, safety, nutritional and aesthetic values of many agricultural products - the foods fried - are affected significantly by the frying process. The proper conduct of frying operations is essential for food quality, safety, nutrition, and economics. Until now, it has been largely an art.

Dr. Michael Blumenthal has developed a powerful new scientific understanding of the dynamic forces and factors that affect frying processes, and his research has led to **a new paradigm.** He has approached the problem of the degradation of edible fats and oils during frying processes from a **physical chemistry / engineering / systems perspective, focusing on heat and mass transfer, going beyond the traditionally-studied organic chemistry of frying oils.** His research explores the entire frying **system** and the **interactions** between frying fats/oils and the foods fried, the equipment and processing aids used, ingredients coming in, and the complex chemistry at work between the heated surfaces, the degrading oil, leachates from the food, entrained and reactive oxygen, and the constantly changing surface and interior of the dehydrating food.

**Dr. Blumenthal has proposed (and subsequent research has confirmed) a new paradigm of surfactancy as the mediator of heat transfer between frying oil and largely aqueous food.** The theory states "Surfactants are responsible for the surface and interior differences in fried foods, as induced by aging oils." Using the systems approach and analyzing thousands of samples, Dr. Blumenthal's laboratory established a large database from which he deduced a simple mathematical relationship between the concentration of surfactants and the variations in food quality typically seen in food production and food service. Surfactants increase as oil is used and degrades. Control of surfactants enables proper cooking and optimization of food quality, food stability, oil economics, and system productivity.

However, in degrading oil, as surfactant concentrations are increasing, leading to the oil "wetting" the food, the specific heat of the oil is increasing from that of fresh oil (linearly) with the accumulation of polymer species, which form due to oxidation and thermally abusive conditions. This increased specific heat causes poor cooking due to insufficient heat being available in the oil on the wetted surface. The formation and accumulation of smaller molecular species such as free fatty acid increases thermal conductivity, which factor controls the rate of replenishment of energy to oil at the food's surface. Without proper heat transfer into the interior of the food, even the microbial safety of fried foods such as chicken is compromised.

The Gaussian curve that describes the relationship between the surfactant and polymer and other polar material concentrations and perceptible food quality has been named the **Frying Quality Curve,** and it portrays regions corresponding to initialization, normalization, optimization,

degradation, and termination of the suitability for continued use of a frying oil. This Frying Quality Curve has been widely reproduced, cited, and quoted by other researchers, teachers, and authors, as the model that now leads to insights critical to the understanding of the chemistry of frying oil degradation.

Prior research has tended to focus on the extremes of how to refine fresh oil, or, conversely, the potential health hazards of abused oils. Dr. Blumenthal's work concentrates on how to **optimize and maintain** frying processes to sustain the desirable, central properties of the oil in order to produce the best quality food in the most economical way. The new paradigm of frying is therefore not only an original and creative contribution to a fundamental understanding of the chemistry of complex food systems, but is also a practical basis for producing a superior array of quality food products: an ideal combination of the theoretical and practical in food chemistry and food technology.

**Solventless Chemistry**

Dr. Michael Blumenthal has invented and patented a novel chemical reagent delivery system that has enormous potential to revolutionize the way many chemical measurements are made. A series of gels, of varying properties, depending on the application, enables chemical reactions, such as color tests, to be performed entirely without solvents or toxic materials, in disposable vials, thus eliminating typical hazards of chemicals to the worker and the environment, as well as permitting real-time quality control, by allowing measurements to be made right at the production line, thus "taking the lab to the line", even where food is being processed/produced. In addition, the tests can be, and initial applications have been made quantitative and highly correlated to corresponding laboratory procedures. Their ease of use makes it possible for non-chemists to perform tests with confidence and speed, and eases the workload burden on agricultural and food chemists by allowing screening testing to isolate from large numbers of samples, only those requiring closer investigation.

Working with colleagues, Dr. Blumenthal has developed a first application of solventless chemistry tests for use in deep-fat frying control. As a natural outgrowth of the new paradigm of frying, described above, process control is facilitated by being able to make the relevant rapid measurements directly at the site where deep-fat frying is being done. Therefore, the first series of tests commercially available that use the new solventless chemistry are the VERI-FRY® internationally trademarked tests for free fatty acids, alkaline surfactants, and total polar materials (total accumulated non-triglycerides).

These tests are used by hundreds of snack food producers, industrial manufacturers, and food service establishments, as well as regulatory inspectors and also researchers who wish to develop products or processes with speed and efficiency by being able to make rapid and accurate measurements at low cost and without environmental hazards. The solventless chemistry technology combines simplicity with sophistication and is virtually limitless in application. An extension of existing tests into the measurement of fat rancidity in milk has enormous economic ramifications. Dr. Blumenthal has prototyped over 300 chemistries with this new technology. The portability, compact format, and archival character of the tests (finished tests can be stored and re-read later or at another location!), coupled with their reliability, safety, and speed, offer tremendous access to those, including in developing economies, wishing to have real-time quality control, do rapid screening testing, or demonstrate chemical principles in teaching situations where chemicals are now severely limited due to hazards and liability potential or environmental problems.

**Appraisal and evaluation:**
Dr. Michael Blumenthal's work has spanned an extremely wide array of contributions to, and studies of, the chemical sciences, and in particular as they apply to the products of agriculture and their manufacture into food products. He has been a member and leader of research teams creating key processes fundamental to food processing today. At Libra Technical Center, his work has directly affected more than 500 companies for which he and his colleagues have consulted and performed laboratory research and analyses. More than 400 organizations have used the new rapid testing technology to improve quality control and process economics.

In the last 30+ years, Dr. Blumenthal has directed operations resulting in more than 500 industrial consulting reports available on-line within Libra, in addition to his publications and private industry reports, and he has overseen the preparation of more than 1000 on-line analytical reports for a global customer base. Thus he has founded an enterprise in which independent science can be conducted confidentially and with an enormous database of recorded knowledge and experience behind it, as well as an enterprise that creates new technologies and new products for application of chemical principles to better foods, fats, and oils. Dr. Blumenthal's experience and ability to understand and translate extremely complex chemical systems into elegant, reliable, simple tools is a very rare combination.

His **new Paradigm of Frying** is not only a creative and powerful achievement in a specific area of food chemistry, but also serves as a model for an approach to solving problems in the complex world of the total chemical events which occur in a living system from agriculture which is brought into an engineering / manufacturing environment. He has shown the way for an extremely useful strategy for converting chemical principles to the economics of food production.

The **power to predict** is one of the most compelling aspects of Dr. Blumenthal's contributions. Both the Frying Paradigm and the Solventless Chemistry technology are a direct outgrowth of the pathway that began with Dr. Blumenthal's studies on saliva, as part of a cystic fibrosis project. This study enabled an understanding of physiology and the limitations of sensory work. In his Master's Degree research on onion flavor chemistry, Dr. Blumenthal was able to understand what to look at when doing mathematical pattern recognition. In his Ph.D. research, he was able to achieve an unparalleled degree of correlation of instrument measurement with the human sensory experience: by the use of computerized pattern recognition methods, he was able to achieve nearly perfect prediction of the sensory evaluation by using only **2 peaks** from a complex flavor chromatogram. The technique he developed is now used by the most advanced flavor houses in the creation of natural-tasting and -smelling analogs made from synthetic materials.

The **New Paradigm** of Deep-Fat Frying has taken thousands of chemical events, in all the numerous combinations and permutations of oils, foods, frying systems, environments, personnel, etc., and reduced the measurements needed to predict food quality, shelf-life, oil usage, and so on, to only **3 tests,** one of which (Total Polar Materials) has regulatory applications in Europe, where the oil must be discarded before it reaches the statutory limit, and yet for which the corresponding laboratory procedure is so prohibitive in its cost, time, and expertise required, that only after-the-fact compliance can be established.

Through Libra's **Solventless Chemistry** technology, these 3 tests can be performed by anyone, anywhere, anytime, to achieve true process and quality control. They allow the prediction of food quality, shelf-life of packaged foods, and process economics, all from the oil's condition. They put safe, simple and accurate measurement systems in the hands of those who must make decisions before things go wrong. The technology can be extended to an enormous array of applications and solves many of the problems that prevent easy and frequent chemical measurements and

studies today. This is truly a contribution to the ease and widespread use of chemistry for everyone's benefit.

Another important aspect of Dr. Blumenthal's work in food chemistry has been his **teaching** role. He is consistently selected as among the best faculty in his adjunct professor lectures and short courses at Rutgers Univ. and elsewhere. He is invited to speak all over the world, and has given many presentations and seminars at industrial firms, universities, research institutes, and government agencies, for example, in England, Spain, the Netherlands, Scandinavia, Japan, Malaysia, Germany, France, and all over the United States. Through short courses and symposia, he has taught many hundreds of scientists the principles of food chemistry in a total systems approach. The new paradigm has led to major advances in the application of food chemistry to food chemical process engineering, and provided a new generation of researchers with fresh directions to explore. Graduate programs now exist inspired by Dr. Blumenthal's work and teachings, for example:

Prof. Brian Farkas :Univ. of N.Carolina,(now at Perdue) bulk heat & mass transfer studies
Prof. Rosana Moreira, Texas A&M Univ.: heat and mass transfer with regard to conversion of ingredients to a food
Prof. Philip Handel, Drexel Univ.: strength of surfactancy effects
Prof. Israel (Sam) Saguy, Hebrew Univ. of Jerusalem: understanding the interface between heat transfer medium and surface of cooking food
Prof. V.M. Bala, Univ. of Georgia: textural changes induced in food by aging oil
Prof. Karen Schaich, Rutgers Univ.: lipid-polysaccharide interactions

The potential importance and impact of the **Solventless Chemistry** technology are enormous, and have only begun to be imagined. In an age of increasing health, safety, and environmental concerns, such a measurement science can only have widespread benefits, no matter what the arena of application, but especially so in the field of food quality control, where the measurement technology must not threaten the product or the environment, and so until now, no quantitatively reliable chemistry could be done in the vicinity of the food itself. For lab, plant, field, restaurant, institutional, or classroom use, this technology can revolutionize measurement science.

Dr. Michael M. Blumenthal has advanced food chemistry, the proper processing of the products of agriculture and synthesis so that they are enjoyed and not wasted, and the measurement sciences in ways yet to be fully realized, but of undoubted importance and power. He has shared his findings and insights widely, to the benefit of industry, government, and the academic world.

Dr. Blumenthal’s background is profiled (Michael M. Blumenthal) on Linkedin.com with new entries and updates as time allows.

# Michael M. Blumenthal, Ph.D.

**SELECTED PRESENTATIONS. PATENTS, AND PUBLICATIONS**

## BIOPHYSICS

Bettelheim, F.A., and M.M. Blumenthal (1969) "A New Parameter Measuring the Rheological Properties of Saliva", Cystic Fibrosis Club Abstracts

## COMPUTER SCIENCE/MANAGEMENT

Between 1978 and 1986 Dr Blumenthal designed from scratch, and then wrote or co-coded some of the first large-scale microcomputer scientific/engineering software with graphics, and commercialized some of those programs on TRS-DOS and DOS for sale by Libra Laboratories, Inc. and Gantt Systems, Inc. The most important of those commercial programs were Gantt-Pack® (a standalone database-based project management system), Stat-To-Plotter"" (linking Tandy's Statistics and Database programs together with output to color, multi-pen plotters), and Master-File (the first full-text storage and retrieval database system, and the first ever with unlimited capacity). Larger customers were government contractors and agencies, healthcare companies, publishing houses, and even groups within the media and entertainment businesses. The software activities were eventually abandoned following the industry's transition to GUI's (graphical user interfaces), and the rise of publicly funded software companies. Dr. Blumenthal chose to return to primarily scientific work, and teaching others to effectively use computers.

Blumenthal, M.M. (1991) 'The Challenge of Computerizing...The Real Impact on You, Your Staff, and Laboratory Performance", Proceedings of FOODLABS '91, the First Annual Conference on Equipping, Managing, and Working in the Food Laboratory of Tomorrow: Adams Mark Hotel, Philadelphia, PA, May 1-3.

Blumenthal, M.M. (1992) "PCs [Personal Computers] in Research and Production Laboratories", American Oil Chemists' Society INFORM, Vol. 3, No. 5, pp. 574 - 581, May

Duerr, J.S. and M.M. Blumenthal (2002) Success Factors for Small Business, Presidential Symposium, ACS National Meeting, Boston

## FLAVOR

Blumenthal, M.M. (1972) "A Study of Volatile Onion Flavors", M.S. Thesis, Rutgers University.

Blumenthal, M.M. and S.S. Chang (1973) "A Method for Obtaining Reproducible Quantitative Gas Chromatograms of Volatiles Isolated from Foods", J.Agric.Food Chem., 21:6, 1123-1126.

M.M. Blumenthal (1974) "Adventures in Modern Microchemistry", invited lecture presented at the F.D.A. Philadelphia District Science Branch Seminar

M.M. Blumenthal (1974) "Research on a Budget and Pattern Analysis", invited lecture presented at the Monell Chemical Senses Center, Philadelphia, Pa.

Blumenthal, M.M. (1974) "A Model System for the Evaluation of the Effect of Different Fats and Oils on the Flavor of Simulated Deep-Fat Fried Foods", Ph.D. Thesis, Rutgers University.

Chang, S.S., and M.M. Blumenthal (1975) "Effect of Different Fats and Oils on the Flavor of Deep Fat Fried Foods", in Lipids. Vol. 2, R. Paoletti, G. Jacini, G. Porcellati, eds., Raven Press, New York, pp 481-489

Blumenthal, M.M., J.R. Trout, and S.S. Chang (1976) "Correlation of Gas Chromatographic Profiles and Organoleptic Scores of Different Fats and Oils after Simulated Deep-Fat Frying", J.Am. Oil Chem.Soc. 53:7, 496-501.

Blumenthal, M.M. (1997) "How Food Packaging Affects Food Flavor", Food Technol. 51:1, 71-72 &74

## TEXTURE

Blumenthal, M.M. and K. Schaich (1998) 'The Chemistry and Texture of French Fried Potato Crust", (a fully funded proposal to the United States Department of Agriculture) Accepted after peer review, and completed - Report and additional publications in preparation with additional

information. Exceptional industrial support with materials and supplies. Academic and commercial spin-offs anticipated.

**FRYING OIL CHEMISTRY AND CONTROL**

**Blumenthal, M.M. and J.R. Stockier (1982) "Frying Oil Evaluator Method and Composition", U.S. Patent 4,349,353.**

Blumenthal, M.M., J.R. Stockier, and P.J. Summers (1985) "Alkaline Contaminant Materials in Used Frying Oils: A New Quick Test", J.Am.Oil Chem. Soc., 62:9, 1373-1374.

Blumenthal, M.M. and J.R. Stockier (1986) "Isolation and Detection of Alkaline Contaminant Materials in Used Frying Oils", J.Am.Oil Chem. Soc., 63:5, 687-688

**Blumenthal, M.M. and J.R. Stockier (1988) "Method and Test Kit for Determining the Amount of Polar Substances in Fat", U.S. Patent # 4,731,332.**

Blumenthal, M.M. (1988) "Rapid Test for Deterioration of Frying Oil", Presented at the Symposium Honoring Dr. Stephen S. Chang at the Annual Meeting of the American Oil Chemists Society, May 9, Phoenix, AR. (first presentation of the Frying Quality Curve and the concept of research and study on the optimum region of oil performance, rather than just the extremes.)

Blumenthal, M.M. (1990) "Technology of Fats & Oils in Product Development", presented at "Designer Foods and Cancer Prevention", 1st Symposium on Phytochemicals (anticancer micronutrients), Rutgers University, East Brunswick, NJ, Jan. 8

Firestone, D., R.F. Slier, and M.M. Blumenthal (1990) "Regulation of Frying Fats and Oils", Food Technol., 45:2, p.90-94

Blumenthal, M.M. (1990) "Regulation of Frying Fats", Presented at Chemistry and Technology of Deep-Fat Frying, Short Course at the University of California, Davis, CA, May 16-18

Blumenthal, M.M. (1991) "Una Nueva Perspectiva de la Quimaca y Fisica de las Frituras por Inmersion", Alimentaria, 28:(225), 65-70

**Blumenthal, M.M., J.R. Stockier, and H.M. Van Tassell (1991) "Method and Apparatus for Determining Non-Triglycerides in Oil", U.S. Patent # 5,055,410 and 14 International Equivalents. (Solventless Chemistry Gel Technology)**

Litovsky, J., T. Korbelak, and M.M. Blumenthal (1991) "Pruebas Rapidas para Frituras de Buena Calidad", Alimentaria, 28:(225), 97-104 (also available in English translation, Reprint available upon request.)

Firestone, D., R.F. Stier, and M.M. Blumenthal (1991) "La Regulacion de los Aceites y Grasas de Fritura", Alimentaria, 28:(225), 71-76.

Blumenthal, M.M. (1992) "Rapid Testing Methods for Frying Oils", presented as invited lecture at Leatherhead Research Institute, Leatherhead, U.K., October

Blumenthal, T.K., M.M. Blumenthal, R.F. Stier, and J.R. Stockier (1993) "Solventless Chemistry for Environmentally Safe Quality Control", presented at American Oil Chemists' Society Annual Meeting, Anaheim, Calif., April 28. (reprint available on request)

Blumenthal, M.M. (1993) "Oils and Fats - Total Polar Measurement as a QC Control", presented as invited lecture at the 5th European Snack Association Technical Conference and Exhibition, Vienna, Austria, Oct. 3-6

Blumenthal, M.M. (1994) "Dynamics of Deep-Fat Frying"; "Means of Prolonging the Stability of Frying Oils"; "Frying - Uses and Abuses": all three presented as invited lectures at LIPIDFORUM: Seminar on Deep Fat Frying, Helsinki, Finland, Oct. 18-19. Dr. Blumenthal received the honor of also being invited, by Dr. Ingmar Wester and Dr. Christian Gertz, noted European authorities in fats and oils chemistry, to present the Seminar Overview and Closing Remarks as well.

Nair, M.C. and M.M. Blumenthal (1995) "Collaborative Study of the VERI-FRY TPM Rapid, Solventless, Colorimetric Reagent Gel Method for Determination of Polar Materials in Used Frying Fats and Oils", AOAC International (under ISO Harmonized Protocol), in final committee approval status

Nair, M.C. and M.M. Blumenthal (1995) "Collaborative Study of the VERI-FRY FFA-350 Rapid, Solventless, Colorimetric Reagent Gel Method for Determination of Percent Free Fatty Acids (Titratable Acidity) in Fats and Oils", AOAC International (under ISO Harmonized Protocol), in final committee approval status

## PROCESS MODELING & OPTIMIZATION

Blumenthal, M.M. (1962) "Lanthanides from the Laboratory", Adelphi University Science Journal, Garden City, NY

Blumenthal, M.M. (1987) "Optimum Frying: Theory and Practice", 2"*d* Edition, Monograph series, Libra Laboratories, Inc., Piscataway, N.J.

Blumenthal, M.M. and B. Friedman (1988) "Improving Quality of Cooking Fluids by Continuous Recirculation and Treatment in Zone with Compound to Selectively Reduce Surfactants", U.S. Patent filed.

Blumenthal, M.M. and Stier, R.F. (1988) "Frying Research Provides New Perspectives", Hornblower, IFT Northern California Section, 40:2

Blumenthal, M.M. (1988) "Accurate Analysis and Modeling of Microwavable Foods through Use of In-Store Computers", Proceedings of International Conference on Micro-Ready Foods, pp.7-18 and 209-218, Princeton, NJ, October 6-7

Blumenthal, M.M. (1989) "Principles of Product Development", Graduate Course in Food Science and Technology Management, Rutgers University, New Brunswick, NJ, Sept-Dec.

**Blumenthal, M.M. (1990) "A New Look at the Chemistry and Physics of Deep-Fat Frying",** presentation at the Libra-organized, standing-room-only (>500 attendees) Symposium: "The Chemistry and Technology of Deep Fat Frying", at the Annual Meeting of the Institute of Food Technologists (IFT), Anaheim, Calif., June 16-20. **(Landmark presentation: presents the new paradigm of understanding of frying systems and chemistry)**

**Blumenthal, M.M.(1991) "A New Look at the Chemistry and Physics of Deep-Fat Frying", Food Technol., 45:2, p.68-71, 94. (Landmark paper: presents new paradigm of understanding of frying systems and chemistry)**

Blumenthal, M.M. and R.F. Stier (1991) "Optimization of Deep-Fat Frying Operations", Trends in Food Science and Technology, 2:6, p. 144-148

Blumenthal, M.M. (1994) "Frying Theory" and "Oil Filtration and Treatment: Are These Technologies Effective, and Why?" Institute of Food Technologists short course on Frying, Atlanta, GA, June 24-25

Blumenthal, M.M. (1996) "Quantitative Frying: Methodology and Analysis", presented at the 1996 Annual Meeting of the American Oil Chemists' Society, Indianapolis, Indiana (Tied together thermodynamics, oil chemistry, surfactant theory, food sensory properties, and the chemical and microbiological toxicology of fried food)

Blumenthal, M.M., J.R. Stockler, S. Sundaram, and F. Serafin (2003) Method and Routine for Treating Frying Oils with a Food Simulacrum that Mimics Grain Based Foods, AIChE Meeting, San Francisco, November 2003

## FRYING TECHNOLOGY

Blumenthal, M.M. (1989) "Frying Oil Technology: Historical Perspectives", Presented at Chemistry and Technology of Deep-Fat Frying, Short Course at the University of California, Davis, CA, April 3-5, 1989

Blumenthal, M.M. (1989) "Food Frying: Principles and Evaluation", Presented at Chemistry and Technology of Deep-Fat Frying, Short Course at the University of California, Davis, CA, April 3-5, 1989

Blumenthal, M.M. (1989) "Future Frying Research Areas", Presented at Chemistry and Technology of Deep-Fat Frying, Short Course at the University of California, Davis, CA, April 3-5, 1989

Blumenthal, M.M. (1992) "Introduction and Acceptability of Edible Oils", Presented at "the Chemistry and Technology of Deep-Fat Frying" Short Course Sponsored by Rutgers University Continuing Education, February 25-27
Blumenthal, M.M. (1992) "Food Frying: Principles and Evaluation", Presented at "the Chemistry and Technology of Deep-Fat Frying" Short Course Sponsored by Rutgers University Continuing Education, February 25-27
Blumenthal, M.M. (1992) "Future Research Areas for Frying Oils", Presented at "the Chemistry and Technology of Deep-Fat Frying" Short Course Sponsored by Rutgers University Continuing Education, February 25-27
**Blumenthal, M.M. (1995) "Deep-Pat Frying Technology" Chapter (50+ pp.), Bailey's Industrial Oil and Fat Products, 5th Ed., Vol. 3, Chapter 11, Wiley-interscience, John Wiley &Sons**
Blumenthal, M.M. (1992) "Frying Technology", Encyclopedia of Food Science and Technology, pp-1278 - 1282, Y.H. Hui, Ph.D., Editor, Wiley-interscience, John Wiley & Sons
Blumenthal, M.M. (1993) "Quality vs. Shelflife: How to Get Both", presented as invited lecture in Short Course, "Extending Product Quality and Shelflife", American Institute of Baking (AIB), Manhattan, Kansas, April 13-15.
Blumenthal, M.M. (1993) "How Can a Laboratory Conduct a Reliable Frying Study?", invited lecture at IFT Eastern Food Science Conference VIII, Princeton, NJ, Oct. 18.
Blumenthal, M.M. (1992-1997, yearly) "Lipids: Applied Technology", presented as invited lecture at Rutgers University Short Course: "Introduction to Food Science: Principles and Recent Advances", every August. (Adjunct Professor activity)
Blumenthal, M.M. (1997) 'The Science and Technology of Frying", Food Technology International, pp.69-70, The International Review for the Food and Drink Processing Industries, published in association with the European Federation of Food Science and Technology
Blumenthal, M.M. (2000) "Frying Technology", Encyclopedia of Food Science and Technology, 2nd edition, pp.l 168 - 1172, Y.H. Hui, Ph.D., Editor, Wiley-interscience, John Wiley & Sons
Blumenthal, M.M., (2000) Understanding Frying, (electronic "Master Class" for Consulting Clients suitable for videoconferencing), now being prepared for new short courses and matching book.
Blumenthal, M.M. (2001) “A New Look at Frying Science “ Cereal Foods World, 46 (8) pp 352—354, August
Blumenthal, M.M. (2002) The VERI-FRY® Quick Test for Polar Materials: Acceptability and New Improvements, AOCS National Meeting, Montreal
Schaich, K. and M.M. Blumenthal (2002) A Distillation/Mass Spectrometric Method for Polar Fractions in the Crust of French Fries, AOCS National Meeting, Montreal
Dana, DF. , M.M. Blumenthal, S. Saguy (2002) The Effect of Water Injection on Oil Quality During Deep Fat Frying, AOCS National Meeting, Montreal
Blumenthal, M.M. (2003) 100 Years of Documented Frying Science and Technology Publications… So What is Left to Do? AIChE Meeting, San Francisco, November 2003

**In 1990, Dr. Blumenthal began a writing a series of articles with an employee (Mr. Stier) to set the tone for a shift in the technical offerings of Libra Laboratories, Inc. Dr. Blumenthal ended his participation in the popular series in 1995 and moved on to other professional activities in packaging safety and technology.**

## FOOD TECHNOLOGY

Editorial Series in Baking & Snack Magazine (1990 - 1995)

Stier, R.F. and M.M. Blumenthal (1990) "Heat Transfer in Frying", Baking & Snack Systems, Vol. 12:9, p. 15-19
Stier, R.F. & M.M. Blumenthal (1990) "Shelf Life and Package Selection", Baking & Snack Systems Vol.12:11 p. 13-16
Stier, R.F. and M.M. Blumenthal (1991) "Insurance Policy for Food Safety", Baking & Snack, Vol.

13:2,18-21,35
Stier, R.F. and M.M. Blumenthal (1991) "Multifunctional Fats and Oils", Baking & Snack, Vol.13:3, p.29-30, 32-33
Stier, R.F. and M.M. Blumenthal (1991) "Filtering Frying Oils", Baking & Snack, Vol.13:5, p. 15-18 Stier, R.F. and M.M. Blumenthal (1991) "Baked Foods and the Microwave", Baking & Snack, Vol.13:7, P.12-17
Stier, R.F. and M.M. Blumenthal (1991) "Frying and Health", Baking & Snack, 13:9, p. 27-30
Stier, R.F. and M.M. Blumenthal (1991) "Regulate Fats and Oils?", Baking & Snack, Vol.13:11, P.11-12,14,16,18
Stier, R.F. and M.M. Blumenthal (1992) "When the Inspector Arrives", Baking & Snack, Vol.14:2, p. 47-48,49, 52, 54 (Reprinted in Dairy, Food, & Environmental Sanitation, April 1993.)
Stier, R.F. and M.M. Blumenthal (1992) "Safety in the Processing Plant", Baking & Snack, Vol. 14:3, p. 22, 24, 28, 30
Stier, R.F. and M.M. Blumenthal (1992) "The Use of Rapid Methods for On-Line Monitoring", Baking & Snack, Vol. 14:5, p. 30, **32-35**
Stier, R.F. and M.M. Blumenthal (1992) "Additives and How They Act", Baking & Snack, Vol.14:7, p. 15-19,21
Stier, R.F., T.K. Blumenthal, and M.M. Blumenthal (1992) "Good Laboratory Practices: What Are They and How Can They Help Food Processors?", Baking & Snack, 14:11, p. 14, 16, 18-19 (Article reprinted in Dairy, Food, & Environmental Sanitation and won the IAMFES Award for Outstanding Achievement as the best article in the environmental area for 1993.)
Stier, R.F., and M.M. Blumenthal (1993) "Quality Control in Deep-Fat Frying", Baking & Snack, Vol. 15:2, p. 67-68, 71-74, 76-77 (reprint available upon request)
Stier, R.F. and M.M. Blumenthal (1993) "Plant Self-Inspection", Baking & Snack, 15:2, p. 53 ff.
Stier, R.F. and M.M. Blumenthal (1993) "Shelf-Life Lessons", Baking & Snack, 15:3, p. 45-46, 48-49
Stier, R.F. and M.M. Blumenthal (1993) "Howdy Partner" (about strategic business partnering), Baking & Snack, 15:5, p. 29-30, 31, 36
Stier, R.F., M.M. Blumenthal, and E.F. Stier (1993) "Using Sensory Panels (Part 1)", Baking & Snack, 15:7, p. 28 ff.
Stier, R.F., M.M. Blumenthal, and E.F. Stier (1993) "Using Sensory Panels (Part 2)", Baking & Snack, 15:8, p-71-72, 74, 76
Stier, R.F., T.K. Blumenthal, and M.M. Blumenthal (1993) "Getting Started with SPC/SQC", Baking & Snack, 15:9, P.47-48, 50, 52-53, 55
Stier, R.F., M.M. Blumenthal (1994) "Going to the Pilot Plant", Baking & Snack, 16:2, p. 41-42, 44-45
Stier, R.F., M.M. Blumenthal (1994) "Quality in Frying", Baking & Snack, 16:11, p.38, 40-42
Stier, R.F., M.M. Blumenthal (1995) "So, What's All This About ISO-9000?", Baking & Snack, 17:2, p.64-68

**INSTITUTE OF FOOD TECHNOLOGISTS (IFT)**
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| Mar. 4, 2004 | Louisiana Gulf Coast | Baton Rouge, LA |
| Sept. 23, 2004 | Lewis & Clark | Richland, WA |
| Oct. 4, 2004 | Long Island | New Hyde Park, NY |
| Nov. 10, 2004 | Bonneville | Salt Lake City, UT |
| Feb. 10, 2005 | Ozark | Rogers, AR |

From 2006 through 2015, Dr. Blumenthal has re-developed and expanded his research and testing

laboratory business holdings. The larger enterprise now offers bench-top to micro-pilot product and process development, industrial forensics, materials research, and safety and stability testing. The Libra Technical Center is a GMP compliant, FDA and Client inspected/audited, R&D, Analytical and Synthesis laboratory.

**AMERICAN CHEMICAL SOCIETY INVITED LECTURES**

Awards Ceremony

Inspirational and Motivational speech to the top 100 High School Graduating Seniors (Lower New York State and New York City) who declared a chemistry major in their accepting Colleges; presented by request at Adelphi University, June 2005

Princeton Section of ACS meeting at Princeton University

How a French Fry Fries (thermodynamics, chemistry, physics, biochemistry, mathematics, food science, and public health research), April 2009 – Celebrating 50 Years in ACS

**OTHER "PUBLICATIONS"**

As with any other scientist working in organizations and consultancies where updates, reports, white-papers, etc. are expected periodically, Dr. Blumenthal has "published" literally thousands of "reviewed" papers that will never be seen outside the organizations for which they were written under strict confidentiality. In order that some aspects from this private work are not lost, Dr. Blumenthal, with the cooperation of his associates and clients, has embedded special insights and teachings in his short courses, graduate classes as a Lecturer at Rutgers University, and other schools around the world, and in mentoring many interns, graduate students, and employees working in the technology companies he founded since leaving larger industry.

Dr. Blumenthal is currently writing books and monographs for eventual publication. He is studying new fields including development of optimized processes and products from botanicals, biofuels from renewable and recycled oils, purification and standardization of food, flavor, texture, and fragrance materials at "village farm" level, and the total synthesis of foods from non-cellular sources, for military, rescue, and long duration space missions (like the "Food Replicator" from Star Trek®) based upon his 1970 "how-to" seminar at Rutgers University.

Also, in returning to his original roots as a physical chemist in rheology, chromatography, thermal analysis, and microscopy. Dr. Blumenthal is training others, and applying that talent to "industrial forensics", a nascent field requiring a very broad base of knowledge of commodities, technologies, and experience of consumer and machinery products and how they are made. Dr. Blumenthal has, over many years, expanded his consulting practice to include expert witness services for the chemistry, engineering, food science, materials science, personal care, consumer products, packaging, lipid technology, stability, quality assurance, and laboratory management fields in which he is recognized.

# *CURRICULUM VITAE*

## PERSONAL:

**Name: Jeffrey M. van de Riet**

**Birth date:** February 5, 1968 **Citizenship:** Canadian **Language:** English

**Present Address:** 89 Robinson Road R.R. #1 Shubenacadie
Hants County, NS
CANADA
B0N 2H0

Work - (902) 426-3245
Home - (902) 758-1354

## EDUCATION:

1986-1990 Nova Scotia Agricultural College- Truro, Nova Scotia

B.Sc. (Agr.) from Dalhousie University in association with the Nova Scotia Agricultural College majoring in Agricultural Chemistry.
Undergraduate thesis: The determination of the level of Vitamin E in cattle feeds by High Performance Liquid Chromatography.

1980-1986 Hants East Rural High School
Milford, Nova Scotia
Grade XII Academic Diploma with Honours

## PROFESSIONAL EDUCATION:

2007 AOAC- Collaborative Study Design and Management
2007 Standards Council of Canada CAN-P-4E Technical Assessor Training
2006 Managing for Success
2000 Canned Foods- Thermal Process and Container Evaluation
St. Clair College of Applied Arts and Technology
1999 AOAC International ISO Guide 9000, Lab Guide 25
1998 NITP Module D-08, QMP Systems Verification
1998 Conflict Resolution and Confrontation Skills

## CURRENT RESEARCH ACTIVITIES/PROJECTS

- Development and validation of a Rapid Post-column Methodology for Regulatory Analysis of Paralytic Shellfish Toxins.
  - The project objective is to seek alternative methodology to replace the Mouse Bioassay (MBA) for regulatory monitoring of paralytic shellfish poison (PSP) toxins. Precolumn LC-FLD methodology has been investigated, compared to the MBA and deemed most applicable and is being validated and will be collaboratively studied.
- Development and validation of an UPLC MS/MS method of analysis for Fluroquinolone class of veterinary drug residues in aquacultured products.
  - The project objective is to produce and analytical method of analysis for residues of Ciprofloxaxcin, Enrofloxacin. Danofloxacin and Sarafloxacin in aquacultured products such salmon, shrimp and tilapia. The method will be used to monitor domestic and imported fish products for these residues to ensure a safe food supply for Canadian consumers.

- Development and validation of an UPLC MS/MS method of analysis for Erythromycin residues in aquacultured products.
  - The project objective is to produce and analytical method of analysis for Erythromycin residues in aquacultured fish products such as salmon, shrimp and tilapia. The method will be used to monitor domestic and imported fish products for these residues to ensure a safe food supply for Canadian consumers.

## WORK EXPERIENCE:

August/08 -present — Canadian Food Inspection Agency
Senior Research Co-ordinator- Chemistry

- Responsible for research projects involving the development, validation and implementation of new methodology for residues and marine toxins of concern or interest. Required to prepare and submit research funding requests, and ensure that research goals and objectives were met in a timely manner. Responsible the preparation of technical reports, scientific reports for publication in scientific journals
- Responsible for reviewing, revising and coordination of research proposal by the Dartmouth Laboratory. Including tracking objectives and milestones, and advising senior managers potential pressures preventing successful completion of approved projects.
- Responsible for the preparation of reports and providing advice to senior Program and Operations officials.
- Required to prepare procurement requests for capital equipment purchases and evaluate bid proposals

Manager – Dr. William Lanterman

July/01 -August/08 — Canadian Food Inspection Agency
Analytical Specialist- Unit Supervisor Drug Residue and Marine Toxin Team

- Responsible for supervising a team of chemists and technical lab staff responsible for the analysis of veterinary drug residues and marine toxins in Fish and fish products. Required to set goals, determine training requirements and evaluate performance for staff.
- Responsible for research projects involving the development, validation and implementation of new methodology for residues and marine toxins of concern or interest. Required to prepare and submit research funding requests, and ensure that research goals and objectives were met in a timely manner. Responsible the preparation of technical reports, scientific reports for publication in scientific journals
- Responsible for the preparation of reports and providing advice to senior Program and Operations officials.
- Required to ensure the negotiated service standards were met for samples received in the Unit and had the authority to arrange resources within the Unit to ensure this was goal achieved. Responsible for ensuring adherence to the laboratory's QA/QC System ( ISO 17025)
- Required to prepare procurement requests for capital equipment purchases and evaluate bid proposals

Manager - Mr. B.G. Burns

June/97 - July/2001 Canadian Food Inspection Agency
Contaminants Chemist

- Performed trace analytical analysis to determine the presence of toxic, and illegal substances in fish products using gas chromatography and liquid chromatography chemical techniques. Shellfish toxins and antibiotics were the main focus. Analyses for toxic elements using A.A. spectroscopy and species identification by electrophoresis and isoelectric focussing were also performed.
- Responsible for development of new methodology for residues and toxins of concern, submitting requests for new equipment, preparing and evaluating bid proposals.
- Supervision of technical lab staff and summer students by setting goals, determining training requirements and evaluating performance was also a part of the position.

Manager - Mr. B.G. Burns

Aug./91 - June/97 Department of Fisheries and Oceans, Canada
Contaminants Chemist

- Performed trace analytical analysis to determine the presence of toxic, and illegal substances in fish tissue using gas chromatography and liquid chromatography chemical techniques. Shellfish toxins and antibiotics were the main focus.
- Analyses for toxic elements using A.A. spectroscopy and species identification by electrophoresis and isoelectric focussing were also performed.
- Responsible for development of new methodology for residues of concern.
- Supervision of lab technicians and summer students by setting goals, determining training requirements and evaluating performance was also a part of the position.

Supervisor - Mr. B.G. Burns

## AWARDS:

| | |
|---|---|
| 1999 | CFIA Outstanding Achievement, Team Award |
| 1990 | Male Athlete of the Year, Nova Scotia Agricultural College |
| 1986 | MVP High School Varsity Soccer Team |

## SKILLS AND ABILITIES:

- Numerous long term periods of acting as Chemistry Section Manager during the absence or secondment of the substantive manager.
  - This involves handling information requests from Inspectors, managers, and directors. Approval of purchase orders for lab supplies and equipment. Supervision of other chemists and technical lab staff during these periods as well as summer students during the summer months was a job requirement.
- Member of the AOAC Presidential Task Force on Marine and Freshwater Toxins.
- Member of the Organizing Committee for the Joint meeting of the Eastern Canada Pesticide and Environmental Contaminant Workshop and the Northeast Regional Section of the

AOAC. I was responsible for the Trade Show portion of the conference, ensuring that the exhibitors had the material that was required, contracting the hall set up etc.

**Communication:**

- Coordinator and instructor for the B-10 Fish Borne Illness course, in Dartmouth Nova Scotia.
- Presented scientific papers at a variety of scientific conference such as AOAC Annual meeting and most recently at of the 6th International Conference on Molluscan Shellfish Safety. Blenhiem, New Zealand.
- Co-chair of the Halifax Laboratory Safety Committee for 2.5 years.
- Member of National Sample Tracking Harmonisation Committee

**Interests**: Camping, Hockey, Hiking, Hobby Farming

## PUBLICATIONS:

Rourke W.A., Murphy, C.J. Pitcher, G., van de Riet, J.M., Burns, B.G. Thomas, K.M. and Quilliam, M.A. (2008) Rapid Post-column Methodology for Regulatory Analysis of Paralytic Shellfish Toxins. J. AOAC Int. 91(3).

van de Riet, J.M., Murphy, C.J., Rourke, W.A., Burns, B.G., Thomas, K.M., Quillaim, M.A. (2008) Comparison of A Rapid Post-column Oxidation Method of Analysis for PSP Toxins, to AOAC Methods of Analysis. In Proceedings of the 6 th International Conference on Molluscan Shellfish Safety. Blenhiem, New Zealand. In Press.

Tittlemier, S.A., van de Riet, J., Burns, B. Potter, R., Murphy, C., Rourke, W., Pearce, H., Dufrensne, G. (2007). Analysis of veterinary drug residues in fish and shrimp composites collected during the Canadian Total Diet Study, 1993-2004. Food Additives and Contaminants 24(1)

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van de Riet, J. M., Potter, R. A., Christie-Fougere, M. and Burns, B. G. (2003). Simultaneous Determination of Residues of Chloramphenicol, Thiamphenicol, Florfenicol and florfenicol Amine in Farmed Aquatic Species by Liquid Chromatography / Mass Spectrometry. J. AOAC Int. 86 (3).

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Burns, B.G., J.G. Landry, J.M. van de Riet and M.W. Gilgan. 1996. The simultaneous determination of the residual components of Romet-30 and Tribrissen in salmonid products by HPLC. Can. Tech. Rep. Fish. Aquat. Sci. 2008: vi + 18 pages.

Burns, B.G., J.M. van de Riet, J.G. Landry and M.W. Gilgan. 1996. Liquid chromatographic determination of oxytetracycline content in fish tissue. Can. Tech. Rep. Fish. Aquat. Sci. 2124: vii+ 27 p.

van de Riet, J.M., B.G. Burns and M.W. Gilgan, 1995. A Routine HPLC-Fluorescence method for the Determination of the Diarrhetic Shellfish Toxins Okadaic Acid and DTX-1. Can. Tech. Rep. Fish. Aquat. Sci. 1985: vii +25p.

Gilgan, M.W., C. Powell, J. van de Riet, B.G. Burns, M.A. Quilliam, K. Kennedy and C.H. Mackenzie, 1994. The Occurrence of a Serious Diarretic Shellfish Poisoning Episode in Mussels from Newfoundland during the Late Autumn of 1994. In "Proceedings of the Fourth Canadian Workshop on Harmful Marine Algae", 1994 ed. by J.R. Forbes. Can. Tech. Rep. Fish. Aquat. Sci. 2016.

Gilgan, M.W. van de Riet, J. Dorey, M. and Burns, B.G.: The Detection of a DSP Contamination of Cultured Mussels from Nova Scotia, Canada by Bioassay, Immunoassay and Chemical Assay. Sixth International Conference on Toxic Marine Phytoplankton, Nantes, France Oct. 18-22 1993.

Gilgan, M.W., J. van de Riet, M. Dorey and B.G. Burns, 1993. The Detection of an DSP contamination of cultured mussels from Nova Scotia, Canada by bioassay, immunoassay and chemical assay. In "Harmful Marine Algal Blooms", 1995 ed. by P. Lassus, G. Arzul, E. Erard , P. Gentien and C. Marcaillou. Lavoisier Science Publishers, Paris.

## REFERENCES:

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# AOAC®
# METHOD CONFORMITY ASSESSMENT PROGRAMS

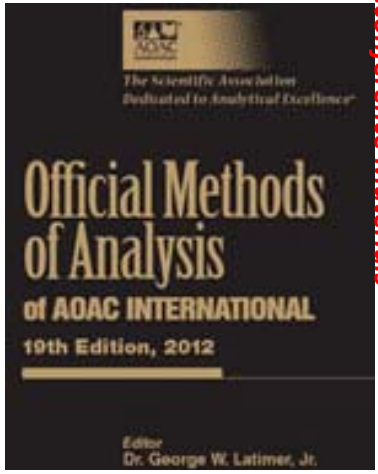
AOAC *Performance Tested Methods*℠
AOAC *Official Methods of Analysis*℠

*An Overview*

*Deborah McKenzie*
*AOAC INTERNATIONAL*
*AOAC Research Institute*

# AOAC Conformity Assessment

- *Official Methods of Analysis*SM
  - Traditional nonproprietary methods
  - Commercial/proprietary methods
  - Chemistry & Microbiology methods
  - Sole Source methods




- *Performance Tested Methods*SM
  - Commercial /proprietary methods
  - Chemistry & Microbiology methods

PERFORMANCE TESTED
AOAC
RESEARCH INSTITUTE
LICENSE NUMBER 000000

- Consulting Service (optional)*
  - For all methods

***Approved testing protocols***

** required for all harmonized assessments*

AOAC INTERNATIONAL

# Organizational Change in 2011-2012



## AOAC INTERNATIONAL

- Supported by industry or contract funding for standards development
- Stakeholder Panels create voluntary consensus standards – AOAC Standard Method Performance Requirements (SMPRs®) in priority areas
- Expert Review Panels (ERPs) determine candidate method(s)
- Method(s) evaluated using SMPRs
- ERPs review data for First Action and Final Action OMA status

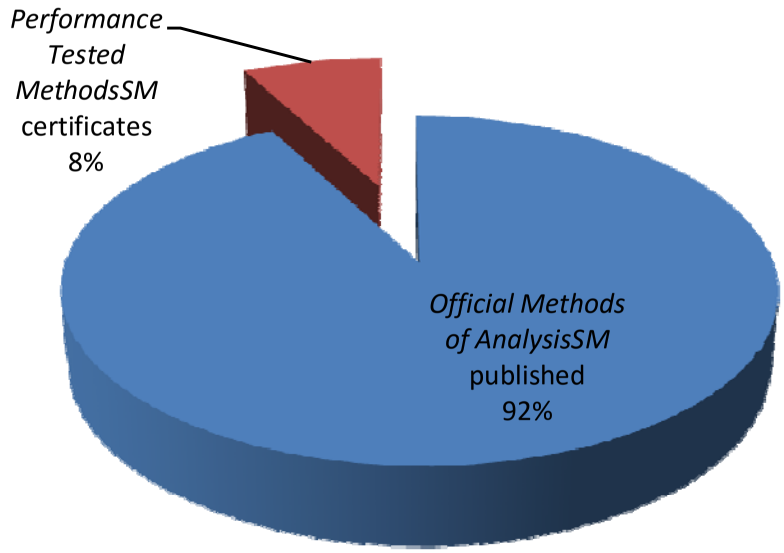
## AOAC Research Institute

- AOAC *Performance Tested Methods*$^{SM}$ (PTM) program
- AOAC *Official Methods of Analysis*$^{SM}$ (OMA) program
- Individual method submissions
- Conformity Assessment for proprietary/commercial and/or sole source methods
- Method evaluations based on AOAC guidelines in AOAC OMA appendices.

# AOAC Method Approvals: Compendium & Certifications



- Largest collection of analytical methodology
  - 2993 *Official Methods of Analysis*[SM]
    - *Traditional wet chemistry,*
    - *Instrumental methods*
    - *Sole Source/Commercial methods*
  - *251 current Performance Tested*[SM] *certificates*
    - *Rapid methods*
    - *Proprietary/Commercial technologies*



# AOAC Method Approval Programs



- AOAC *Performance Tested Methods*$^{SM}$ Program
  - Administered by the AOAC Research Institute
  - Endpoint is *Performance Tested*$^{SM}$ Certification of method

- AOAC *Official Methods of Analysis*$^{SM}$ Program
  - Administered by AOAC INTERNATIONAL with standards development
  - Administered by AOAC Research Institute for sole source methods
  - Endpoint is publication in the *Official Methods of Analysis of AOAC INTERNATIONAL*

# Sole Source/Commercial Rapid Methods



- AOAC Research Institute formed in 1991
  - Wholly owned subsidiary of AOAC INTERNATIONAL
  - Governance includes a separate Board of Directors and its sole voting member is AOAC INTERNATIONAL
  - Offers option of being a Contributing Member that has the benefits of PTM program fee discounts
  - Administers AOAC *Performance Tested Methods*$^{SM}$ Program and the AOAC *Official Methods*$^{SM}$ Program
  - Administers a service in which validation protocols are developed and approved, Consulting Service
  - Independent third party evaluation of test kits and rapid methods
  - Evaluates microbiology and chemistry based methods

# Basic Requirements of AOAC Programs



| Requirement | PTM Certification | First Action OMA | Final Action OMA |
|---|---|---|---|
| Method Developer | √ | √ | |
| Independent lab study | √ | | |
| Reproducibility Assessment | | √* | √ |
| Robustness | √ | | |
| Product Consistency | √ | | |
| Product Stability | √ | | |
| Instrument Variation | √ | | |
| User Feedback | √ | | √ |
| 3 panel expert reviewers | √ | | |
| Expert Review Panel | | √ | |
| Official Methods Board | | | √ |

- AOAC Research Institute uses expert volunteers and AOAC guidelines for its testing protocols and data collection
- Product consistency, product stability and instrument variation are all certification requirements

**required for commercial proprietary microbiology methods*

# AOAC *Performance Tested Methods*$^{SM}$ (PTM) Program



- Certification program for commercial/proprietary rapid methods


  - 250+ *Performance Tested Methods*$^{SM}$ (PTM) certificates in good standing

***Also referred to as PTM takes on average 6-9 months***

# AOAC® Performance Tested Methods℠



# PTM Program Summary

Submission of new candidate methods and modifications of PTM methods

Manuscript & package insert undergo peer review

Annual review of certified method and reissue of certification


AOAC RI contracts laboratory for independent evaluation of method

*AOAC Performance Tested*[SM] status granted or declined

***On average 6-9 months***

# Independent Laboratory Study



- Method developers may begin the method developer study right after the protocol has been approved.
- Independent Laboratory Study requires contract between AOAC Research Institute and the selected laboratory.
- **Only** AOAC Research Institute communicates with the independent laboratory. All other types of communication must be facilitated by AOAC RI and the project manager.
- AOAC Research Institute maintains a list of eligible laboratories on the AOAC website for consideration.

  http://www.aoac.org/testkits/recommendedlabs1.htm

# Manuscript Submission

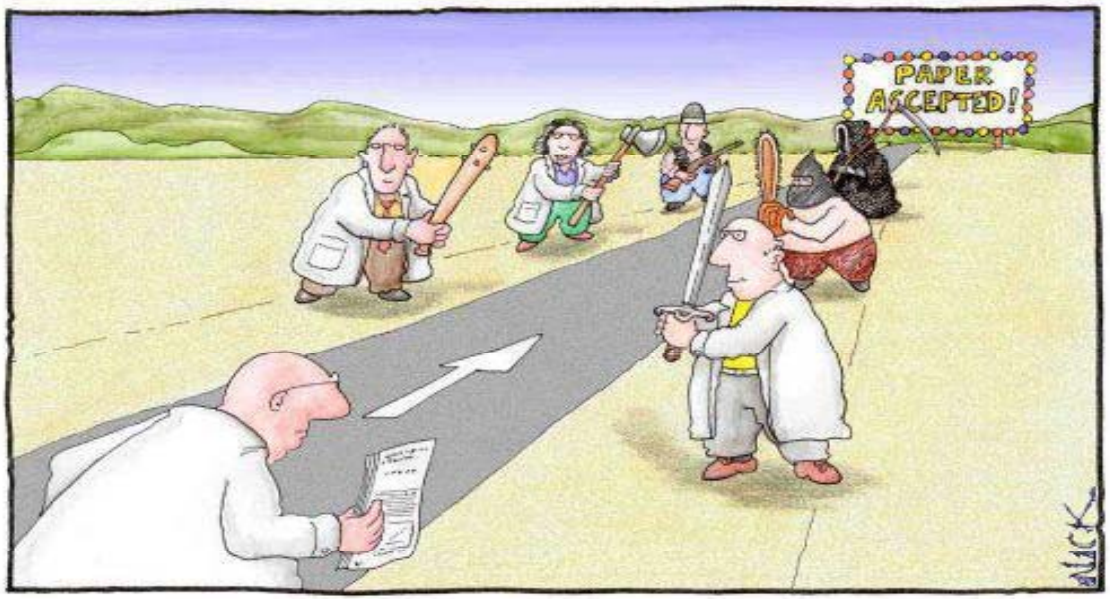


- Method developer drafts manuscript
- Manuscript consists of the method developer study report and the independent laboratory study report into one comprehensive validation study manuscript using PTM report template
- Validation study manuscript and package inserts/labels are submitted to AOAC RI for peer review

# PTM Peer Review



- Reviewed by a panel of three
  - **AOAC expert method volunteer** & 2 RI expert reviewers
  - AOAC expert method volunteer has been vetted by AOAC Official Methods Board
  - Initial review = 2 weeks
  - Second review = 1 week




Most scientists regarded the new streamlined peer-review process as 'quite an improvement.'

## Peer Review

- Technical merit of the method with respect to the collected data
- Package insert information with respect to the claims and supporting data information
- Editorial merit of the manuscript and clarity of the package insert information

# Certification



Certification package includes:

- Certificate
- Certification Mark with unique certificate number
- Draft AOAC website entry
- Information regarding publication in the *Journal of AOAC INTERNATIONAL* and the *Inside Laboratory Management* magazine
- Copy of a signed Certification Mark License Agreement and Use of the Mark

- All organizations with a certified PTM must execute AOAC Certification Mark License Agreement.
- Licenses use of the certification mark by the method developer.
- For organizations with more than one PTM, one agreement can suffice.
- Periodic review of agreement required.


**ALL CERTIFICATES ARE POSTED ON AOAC WEBSITE**

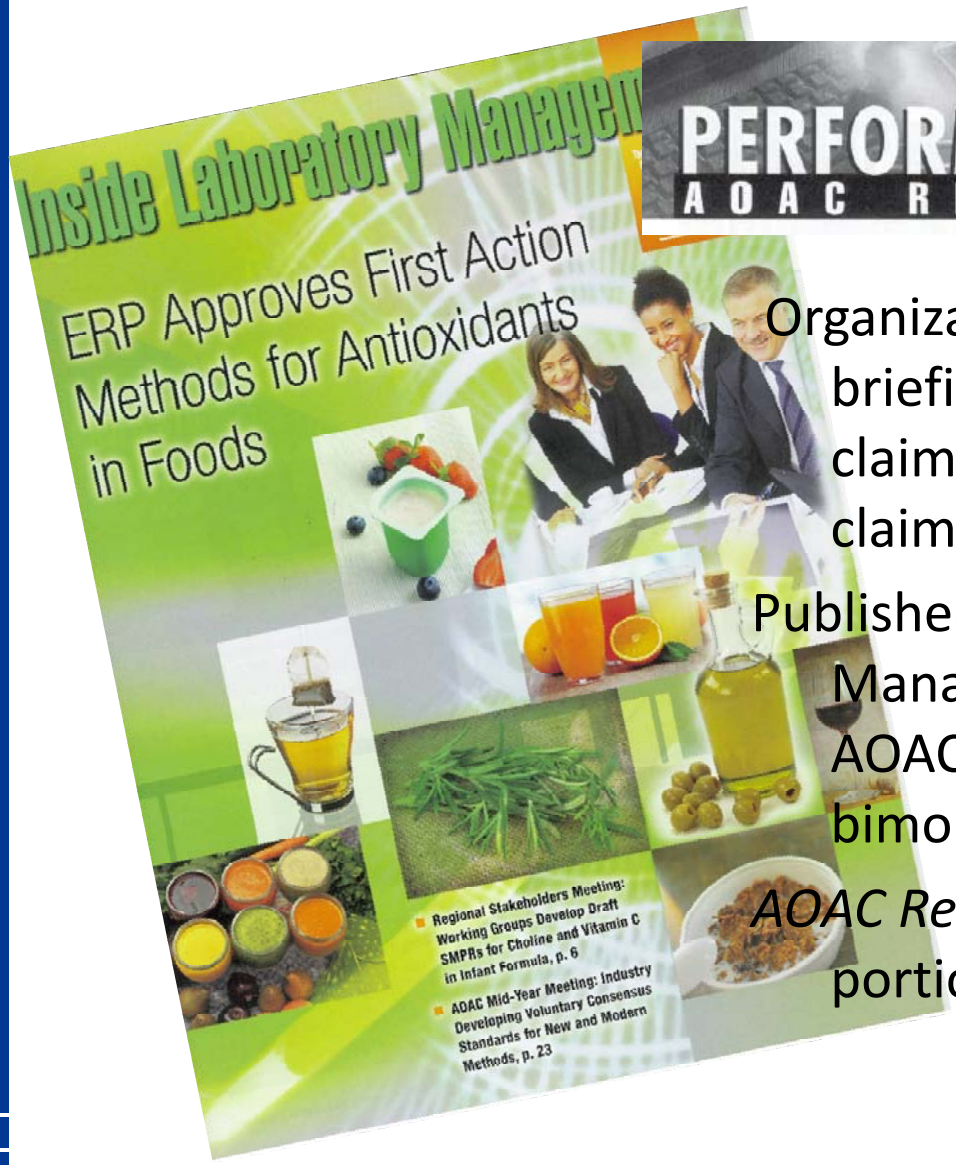
# PTM Certification Mark



- Use of the AOAC *Performance Tested*$^{SM}$ certification mark indicates that:
  - The method has been evaluated in the AOAC *Performance Tested Methods*$^{SM}$ program; wherein a minimum of one independent third party laboratory and a panel of independent experts deemed by consensus that the method has sufficiently demonstrated a set of claims and such information is clearly represented in the method's user information or instructions for use.
  - The method has been issued a current PTM certificate based on an annual review that demonstrated that all stated claims are consistent with the information on file from the method's latest successful PTM evaluation.
  - Organizations have executed a Certification Mark License Agreement with the AOAC Research Institute.
- Each method is issued an individual certification mark.

# Inside Laboratory Management







- Organizations with a certified method draft briefings on the validation study – highlighting claims and supporting information for the claims.
- Published in the AOAC Inside Laboratory Management magazine (ILM) which is an AOAC membership benefit – published bimonthly.
- *AOAC Research Institute News* is in the *Referee* portion of the ILM.

# Journal of AOAC INTERNATIONAL

- Approved PTM validation manuscripts are submitted by the manufacturer for publication in the *Journal of AOAC INTERNATIONAL*.

# Certification Renewal



- Certificates are renewed annually on a calendar year basis
  - January 1st through December 31st
  - Method developers attest that no changes have been made since the last certification by submitting fees and the following by a specified date in the November-December timeframe:
  - Documentation is reviewed and if no changes, a new certificate is granted for the next calendar year.
- Failure to disclose changes or to submit documentation could result in suspension or revoking of use of the PTM certification mark

# Modification to PTM Certifications/Method Claims



- Three levels of modifications for PTMs
  - Level 1 = only internal review and decision required
  - Level 2 = only method developer data with method volunteer review required
  - Level 3 = method developer study and independent laboratory study with peer review
- Level 1 and Level 2 modifications can be submitted as part of the PTM Annual Certification Renewal process
- Modification application must be submitted
- Modifications are determined on an individual basis

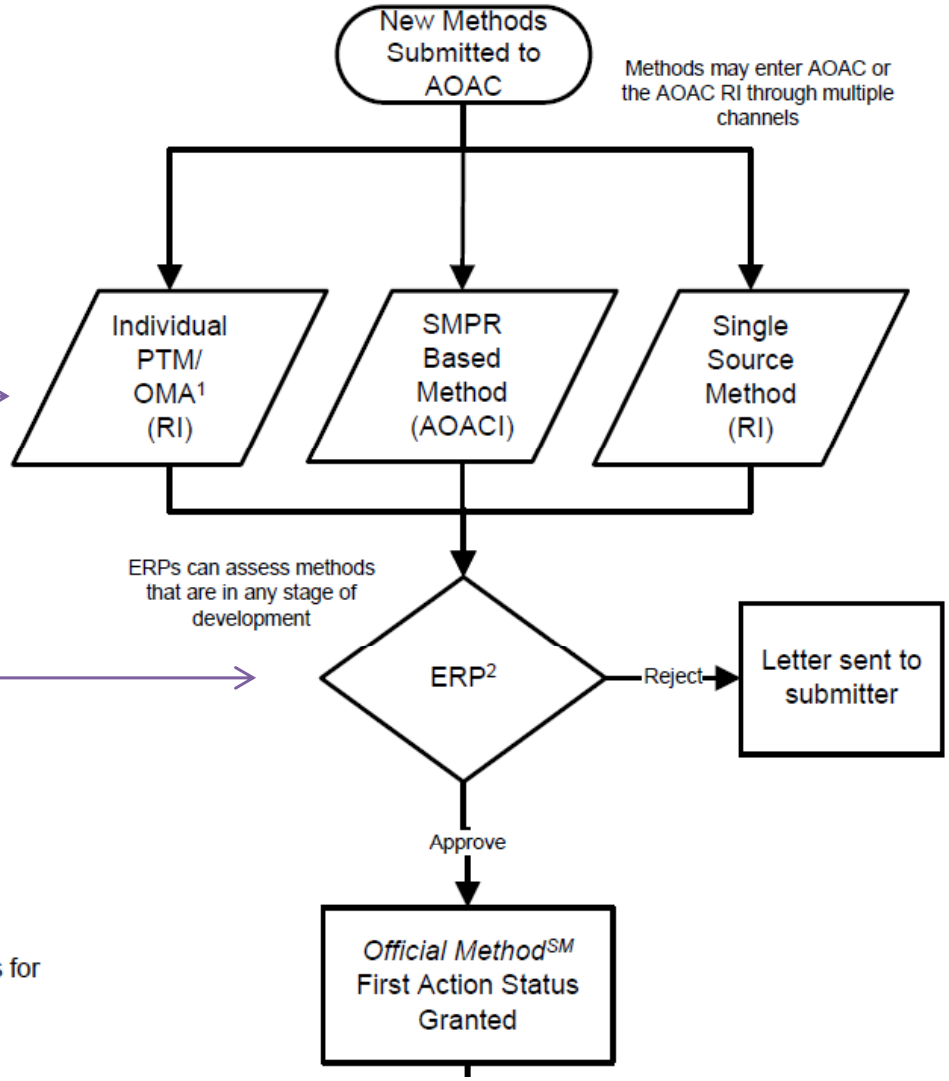
# Road to First Action OMA Status

**Terms:**

- PTM – *Performance Tested Methods℠*
- RI – Research Institute
- ERP – Expert Review Panel
- OMB – Official Methods Board
- SP – Stakeholder Panel
- SMPR – Standard Method Performance Requirement

**Three modes of entry and (program administration)**

**Expert Review Panels will review all methods for all three modes of entry.**




**Note**: Appeals process always available; see Alternative Pathway Guidelines for appeals process.

1 PTM certification previously issued, PTM reviewers will be ERP members
2 Unless otherwise provided for under a contractual agreement, AOAC will regularly convene ERPs twice a year: once during the Mid-Year Meeting and again during the Annual Meeting

# AOAC Expert Review Panel (ERP)



- All candidates are vetted by AOAC Official Methods Board (OMB)
- Approved members are appointed by President of AOAC
- ERP member must go through ERP Orientation
- ERP Review methods for AOAC First Action *Official Methods* status
- Adopt methods as AOAC First Action *Official Methods* status
- Tracks First Action methods for 2 years after adoption

# Final Action *Official Methods*



- During the Tracking Period:
  - ERP reviews any information on reproducibility, user feedback, etc.. using guidance by AOAC OMB (OMA, Appendix G)
- When ERP has sufficient information it can:
  - Make a recommendation for Final Action *Official Methods* status
  - Make a recommendation to repeal the method from the *Official Methods of Analysis of AOAC INTERNATIONAL*
- Official Methods Board
  - Reviews ERP recommendations and renders decisions on Final Action status or repeal

# Rapid Method AOAC Organizational Affiliates



- Microbiology methods must have collaborative study data prior to consideration for AOAC First Action OMA status
- ERPs can meet in person up to four (4) times per year in conjunction with AOAC meetings
- If an ERP needs a subsequent meeting during which to make a decision on a method for First Action OMA status, the subsequent meeting can be via web/teleconference

1. 3M Food Safety
2. BioControl Systems, Inc.
3. bioMérieux, Inc.
4. Bio-Rad Laboratories
5. DuPont Nutrition & Health
6. LabCorp
7. Merck KGaA - EMD Millipore
8. Neogen Corporation
9. QIAGEN
10. R-Biopharm
11. ROMER Labs
12. Thermo Fisher Scientific

# Consulting Service



- A separate optional service, but highly recommended prior to submission to the PTM program
  - Required for program harmonization projects
- Initiated with a Consulting Service Application submitted by Method Developer
- Development, review and approval of validation testing protocols
- Benefits of using the Consulting Service:
  - Understanding for both sides
  - AOAC has better understanding of the method and claims
  - Method Developer has better understanding of the requirements
- Can significantly reduce Method Developer time and cost
- Use of most current technical guidance, updates and requirements

# Consulting Service



## Method Developer Submits:

- Consulting application and remittance
- Method Claims
  - Target analyte(s)
  - Matrices
- Method instructions (package insert, user guide, directions for use)

## AOAC RI Provides:

- An assigned technical consultant to draft the validation outline documents.
- Overview of current technical requirements
  - Any relevant AOAC Guidelines
  - Appropriate reference materials/methods (if applicable)
- Specific validation protocols
  - Reviewed and approved by AOAC method volunteers

# Harmonization - Program to Program



- The PTM program provides the pre-collaborative study required by other validation programs.
  - serves as an entry to method validation
- The AOAC Consulting Service and the AOAC *Performance Tested Methods*[SM] are flexible to develop:
  - Joint validation testing protocols
  - Joint data collection arrangments
  - Separate or joint manuscripts reviews
- Each organization maintains its program administrative and method approval procedures

➢ *For additional information, please contact Deborah McKenzie, Sr. Director, AOAC Research Institute.*

- Programs harmonize with PTM
  - *Official Methods of Analysis*[SM]
  - Antibiotic drug residues in milk
    - US Food & Drug Administration Center for Veterinary Medicine and the National Conference on Interstate Milk Shipments
  - Health Canada – Bureau of Chemical Safety (Food Allergens)
  - MicroVal
  - AFNOR
  - NordVal

# AOAC on Validation Harmonization



- Must be both AOAC Organizational Affiliate and RI Contributing Membership (PTM-OMA studies)
- Must use AOAC Consulting Service and AOAC Technical Consultant assigned through entire process
- All applications and remittance for each program submitted
- Methods and manuscripts must be submitted in each program's format
- AOAC Committee on Safety and AOAC Committee on Statistics serve as resources
- PTM independent laboratory is the same as the expert laboratory for an ISO 16140 study
- Method developer responsible for PTM only requirements
- Each program maintains its own policies and procedures for reviews and approvals

- Programs harmonize with PTM
  - *Official Methods of Analysis*$^{SM}$
  - Antibiotic drug residues in milk
    - US Food & Drug Administration Center for Veterinary Medicine and the National Conference on Interstate Milk Shipments
  - Health Canada – Bureau of Chemical Safety (Food Allergens)
  - MicroVal
  - AFNOR
  - NordVal

THANK YOU.

QUESTIONS?