inform **August 2010** Volume 21 (8) 465–528

www.aocs.org

inform

AOCS

International News on Fats, Oils, and Related Materials

Keeping up with detergent chemistry

ALSO INSIDE:

Food and feed safety

Mass spectrometry and prions

Letter from AOCS' President

Call for Papers enclosed

Cincinnati

desmet ballestra
Science behind Technology

Food & Feed

Oils & Fats
Animal Feed

Chemicals for Life

Oleochemicals
Detergents, Surfactants & Chemicals
Soap

Biofuels

Biodiesel
Bioethanol
Biomass

www.desmetballestra.com

www.aocs.org

inform

AOCS

August 2010 Volume 21 (8) 465–528

Departments and Information

AOCS Mission Statement
To be a global forum to promote the exchange of ideas, information, and experience, to enhance personal excellence, and to provide high standards of quality among those with a professional interest in the science and technology of fats, oils, surfactants, and related materials.

inform • International News on Fats, Oils, and Related Materials
ISSN: 0897-8026 IFRMEC 21 (8) 465–528

Calendar

Bold type: *new listing*
For details on these and other upcoming meetings, visit www.aocs.org/meetings.

September

September 1–3, 2010. JAIMA/JSIA [Japan Analytical Instruments Manufacturers' Association/Japan Federation of Scientific Instrument Associations] Expo: 2010, Makuhari Messe, Japan. Information: www.jaimasis.jp.

September 7–11, 2010. 51st International Conference on the Bioscience of Lipids, Bilbao, Spain. Information: www.icbl.unibe.ch.

September 8–11, 2010. 8th Encuentro de Gerentes de la Industría de Grasas y Aceites Alimentarios (Meeting for Managers of the Edible Fats and Oils Industry), Mendoza, Argentina. Information: email: gabrielapage@asaga.org.ag or asaga@asaga.org.ar.

September 13–14, 2010. FAME Summit and Exhibition: Defining the Future Biofuels Market, InterContinental Hotel, Berlin, Germany. Information: http://greenworld-conferences.com.

September 13–15, 2010. International Biomass Valorisation Congress [rescheduled from April 20–22], Regardz Zilveren Toren Amsterdam, Netherlands. Information: www.biomass-valorisation.com.

September 14–18, 2010. 14th International Biotechnology Symposium and Exhibition, Palacongressi, Rimini, Italy. Information: email: ibs2010@adreacongrex.it; www.adriacongrex.it.

September 18–22, 2010. Association for Advancement of Industrial Crops 22nd Annual Meeting: 2010 New Crops: Exploring Diversity, Preserving Our Future, Fort Collins, Colorado, USA. Information: http://aaic.org/2010_meeting.htm.

September 21–23, 2010. Analytica China 2010, Shanghai New International Expo Centre, Shanghai, People's Republic of China. Information: www.analyticachina.com.

September 26–29, 2010. 124th Annual AOAC Annual Meeting & Exposition, Loews Royal Pacific at Universal Orlando, Orlando, Florida, USA. Information: www.aoac.org/meetings1/124th_annual_mtg/main_2.htm.

September 27–28, 2010. National Seminar on Palm Oil Milling, Refining, Environment & Quality, Magellan Sutara Harbour Resort, Kota Kinabalu, Sabah, Malaysia. Information: http://tinyurl.com/23d8zhv.

September 27–29, 2010. Fifth International Symposium on Oils and Fats: Trends and Innovations in the Technology of Oils and Fats, Hotel Nacional Inn, Campinas, São Paulo, Brazil. Information: http://www.oleosegorduras.org.br/ver_noticias.php?noticia_id=46&grupo_id=0.

September 28–29, 2010. Bioenergy International CANADA Expo & Conference, The Coast Plaza and Conference Centre, Calgary, Canada. Information: www.biofuelsinternationalexpo.com/canada.

September 28–29, 2010. NEREC [North European Renewable Energy Conference] 2010, Oslo, Norway. Information: www.messe.no/en/ntf/Projects/NEREC.

September 28–29, 2010. Advanced Biofuels Scale-Up Summit Worldwide, Ibis London Earls Court, London, England. Information: email: info@london-business-con-

Index to advertisers

*Corporate member of AOCS who supports the Society through corporate membership dues.

AOCS Meeting Watch

October 4–7, 2010. 7th World Conference on Detergents: New Strategies in a Dynamic Global Economy, Montreux Music & Convention Centre, Montreux, Switzerland. Information: www.aocs.org/meetings/montreux.

October 16–19, 2010. 9th International Symposium on the Role of Soy in Health Promotion and Chronic Disease Prevention and Treatment, Capital Hilton, Washington, DC, USA. Information: www.Soy-Symposium.org.

May 1–4, 2011. 102nd AOCS Annual Meeting and Expo, Duke Energy Convention Center, Cincinnati, Ohio, USA. Information: phone: +1 217-359-2344; fax: +1 217-351-8091; email: meetings@aocs.org; http://AnnualMeeting.aocs.org.

For in-depth details on these and other upcoming meetings, visit www.aocs.org/meetings.

ferences.co.uk; phone: +44 (0) 208 920 1400; www.advanced-biofuels-scale-up-worldwide.com.

September 28–30, 2010. 2010 Algal Biomass Summit, JW Marriott Desert Ridge Resort, Phoenix, Arizona, USA. Information: www.algalbiomass.org/events.

October

October 3–6, 2010. GERLI (Groupe d'Étude et de Recherche en Lipidomique), 7th Lipidomics Congress: Lipids in all states, Club Bellambra, Anglet Biarritz, France. Information: www.cbmn.u-bordeaux.fr/GERLI/index.php?tab=1.

October 3–7, 2010. Practical Short Course on Processing and Products of Vegetable Oil/Biodiesel, Food Protein Research & Development Center, Texas A&M University, College Station, Texas, USA. Information: http://foodprotein.tamu.edu/fatsoils/scvegoil.php.

October 4–6, 2010. 5th Soya & Oilseed Summit/Global Soybean & Grain Transport, Hyatt Regency Minneapolis, Minnesota, USA. Information: http://events.soyatech.com/conferences/GSGTSOS2010.htm.

October 4–7, 2010. 7th World Conference on Detergents: New Strategies in a Dynamic Global Economy, Montreux Music & Convention Centre, Montreux, Switzerland. Information: www.aocs.org/meetings/montreux.

October 6–7, 2010. Jatropha World 2010, Inntels Hotel Rotterdam Centre, Rotterdam, Netherlands. Information: www.cmtevents.com/aboutevent.aspx?ev=101040&.

October 12–14, 2010. World Congress on Emulsions, Cité Centre Congrès, Lyon, France. Information: www.cme-emulsion.com.

October 13–14, 2010. American Fats & Oils Association Annual Meeting, Grand Hyatt Hotel, New York City, New York, USA. Information: www.afoaonline.org/events.html.

October 16–19, 2010. Oilseeds and Oils 2010, Swissotel The Bosphorus, Istanbul, Turkey. Information: email: promo@apk-inform.com, ozip@apk-inform.com; www.agrimarket.info.

October 16–19, 2010. 9th International Symposium on the Role of Soy in Health Promotion and Chronic Disease Prevention and Treatment, Capital Hilton, Washing-

CONTINUED ON NEXT PAGE

inform
AOCS

2710 South Boulder Drive
P.O. Box 17190
Urbana, IL 61803-7190 USA
Phone: +1 217-359-2344
Fax: +1 217-351-8091
Email: publications@aocs.org

Advertising Instructions and Deadlines: Closing date is approximately the first of the month preceding date of issue. Insertion orders received after closing will be subject to acceptance at advertiser's risk. No cancellations accepted after closing date. Ad materials must be in final form for press upon materials' closing date. Materials received after deadline or requiring changes will be published at advertisers' risk. Send insertion orders and mechanical materials to advertising offices at the address listed above.

NOTE: AOCS reserves the right to reject advertising copy that in its opinion is unethical, misleading, unfair, or otherwise inappropriate or incompatible with the character of *inform*. Advertisers and advertising agencies assume liability for all content (including text, representation, and illustrations) of advertisements printed and also assume responsibility for any claims arising therefrom made against the publisher.

AOCS Advertising: Valorie Deichman
Phone: +1 217-693-4814; Fax: +1 217-351-8091
Email: valoried@aocs.org

Formerly published as *Chemists' Section, Cotton Oil Press*, 1917–1924; *Journal of the Oil and Fat Industries*, 1924–1931; *Oil & Soap*, 1932–1947; news portion of *JAOCS*, 1948–1989. The American Oil Chemists' Society assumes no responsibility for statements or opinions of contributors to its columns.

inform (ISSN: 0897-8026) is published monthly by AOCS Press, 2710 South Boulder Drive, Urbana, IL 61802-6996 USA . Phone: +1 217-359-2344. Periodicals Postage paid at Urbana, IL, and additional mailing offices. POSTMASTER: Send address changes to *inform*, P.O. Box 17190, Urbana, IL 61803-7190 USA.

Subscriptions to *inform* for members of the American Oil Chemists' Society are included in the annual dues. An individual subscription to *inform* is $175. Outside the U.S., add $30 for surface mail, or add $115 for air mail. Institutional subscriptions to the *Journal of the American Oil Chemists' Society* and *inform* combined are now being handled by Springer Verlag. Price list information is available at www.springer.com/pricelist. Claims for copies lost in the mail must be received within 30 days (90 days outside the U.S.) of the date of issue. Notice of change of address must be received two weeks before the date of issue. For subscription inquiries, please contact Doreen Berning at AOCS, doreenb@aocs.org or phone +1 217-693-4813. AOCS membership information and applications can be obtained from: AOCS, P.O. Box 17190, Urbana, IL 61803-7190 USA or membership@ aocs.org.

ton, DC, USA. Information: www.SoySymposium.org.

October 17–21, 2010. Federation of Analytical Chemistry and Spectroscopy Societies Annual Conference, Raleigh Convention Center, Raleigh, North Carolina, USA. Information: http://facss.org/facss.

October 18–20, 2010. Sustainable Cosmetics Summit, Paris, France. Information: www.sustainablecosmeticssummit.com.

October 19–20, 2010. 3rd Algae World Asia, Goodwood Park Hotel, Singapore. Information: www.cmtevents.com/aboutevent.aspx?ev=101038&amp.

October 19–21, 2010. European Forum for Industrial Biotechnology 2010, Sheraton Grand Hotel and Spa, Edinburgh, Scotland. Information: www.efibforum.com.

October 20, 2010. Cosmetic Technology Transfer Conference, Woodbridge Hilton, Woodbridge, New Jersey, USA. Information: email: steve@stephen-herman.com; www.nyscc.org/cttc.html.

October 20–22, 2010. OFI Asia 2010, incorporating OFIC 2010 (Oils & Fats International Congress 2010), Kuala Lumpur Convention Centre, Kuala Lumpur, Malaysia. Information: www.oilsandfatsinternational.com/publication.asp?pubid=28&nav=3&exid=160.

October 21, 2010. Jornada de Actualización de Mantenimiento en la Industria Aceitera (Sustainability in the Oil Industry), Holiday Inn Hotel, Rosario, Argentina. Information: email: gabrielapage@asaga.org.ar or www.asaga.org.ar.

October 22, 2010. Jornada de Actualización de Calidad en la Industria Aceitera (Achieving Quality in the Oil Industry), Holiday Inn Hotel, Rosario, Argentina. Information: email: gabrielapage@asaga.org.ar or www.asaga.org.ar.

October 24–27, 2010. American Association of Cereal Chemists, Savannah International Trade & Convention Center, Savannah, Georgia, USA. Information: http://meeting.aaccnet.org/reghotel/Registration.cfm.

October 25–29, 2010. National Renderers Association 77th Annual Convention, Ritz-Carlton, Naples, Florida, USA. Information: email: renderers@nationalrenderers.com; http://convention.nationalrenderers.org.

October 27–29, 2010. North American Industrial Coating Show, Indianapolis Convention Center, Indianapolis, Indiana, USA. Information: www.nace.org or www.powdercoating.org.

October 27–29, 2010. DIREC 2010 (Delhi International Renewable Energy Conference), Expo Centre & Mart, Greater Noida (National Capital Region of Delhi, India). Information: www.direc2010.gov.in.

October 31–November 4, 2010. ASA-CSSA-SSSA (American Society of Agronomy-Crop Science Society of America-Soil Science Society of American) 2010 International Annual Meetings, Long Beach, California, USA. Information: www.acsmeetings.org.

November

November 3–5, 2010. Cleaning Products 2010: Formulation, Innovation, Regulation, Hotel Monaco Alexandria, Alexandria, Virginia, USA. Information: www.cleaningproductsconference.com.

November 7–11, 2010. 30th Practical Short Course on Vegetable Oil Extraction, College Station, Texas, USA. Information: http://foodprotein.tamu.edu/extraction-protein/scvegoil.php.

November 8–9, 2010. Mini-Symposium on Lipids in a Developmental Perspective, Solstrand Hotel, Bergen, Norway. Information:

CONTINUED ON PAGE 512

WACKER SILICONES

WHICH HOUSEHOLD GOODS WILL HE BE BUYING ONE DAY?

Which is going to win out: a product's convenience, its environmental impact, the brand name, a bargain price? Whatever it is, we will work with you to develop solutions for tomorrow's successful products. That's why we already supply more than innovative silicone products for foam control in detergent formulations, or for endowing fabric softeners with additional features. We offer you 70 years of inventiveness and creativity as well as our own applications labs and production facilities around the world. And we have people who are dedicated to serving you and your market. Why not put us to the test? We care. Visit us at **www.wacker.com/household**

CREATING TOMORROW'S SOLUTIONS

Desmet Ballestra
Alkoxylation Technology

"ENHANCED LOOP REACTOR"

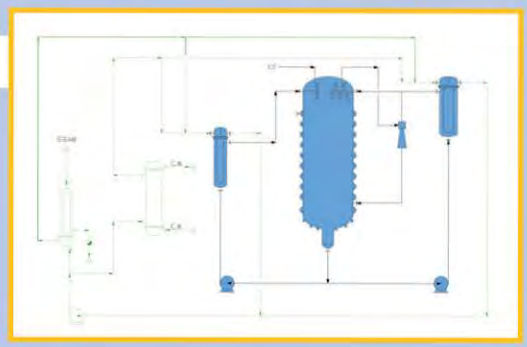
State of the Art Process for the production of Non-Ionic Surfactants

The new ELR is the most advanced reaction system for alkoxylation.

Thanks to the newly conceived gas-liquid mass transfer system it provides outstanding advantages and better cost effectiveness over the other available technologies.

Distinguishing features

- High homogeneity of reaction mass and accurate temperature control
- Low operating pressure
- Very high reaction rates
- Highest production flexibility
- Possibility to produce high molecular weight ethoxylates in a single step
- Manufacture of high quality products with a very low content of impurities and by-products



Safety of operation

The inherent safety of the "Enhanced Loop Reactor" technology prevents the occurrence of hazardous conditions, thanks to:

- No rotating or moving parts in contact with gaseous ethylene/propylene oxide
- Ethylene/propylene oxide fed in the gaseous phase
- Fully wetted reactor walls
- Continuously washed gaseous phase
- Explosion-proof reactor design

Contacts:
Ph. +39 02 5083217
email: Dept.sales@ballestra.com

detergents, surfactants & chemicals

desmet ballestra
Science behind Technology

www.desmetballestra.com

Letter from the President

As I mentioned in my address at the AOCS Annual Meeting & Expo in Phoenix, Arizona, it's an honor to be serving as your president for 2010–2011. I look forward to working with Jean Wills Hinton, our executive vice-president, and her outstanding staff as well as the Board of Governors.

Let me begin by letting you know that the Phoenix meeting was a huge success. We registered 1,640 attendees, nearly 10% more than last year, clearly reflecting a more positive economy and the relaxation of travel budgets. As is typical, 25% of our delegates came from outside the United States . . . in such a volatile economy, it's great to see non-US delegates choosing to use precious travel funds to join us. That speaks volumes to our value to that section of the membership. We're also very proud to see that our annual meetings continue to provide an excellent forum for students to make early connections. In 2010 about 180 students registered. Many thanks go to our academic colleagues who, in most cases, are providing both funding and encouragement for these future members and contributors to the scientific community and the Society. It's hard to imagine a more worthwhile mission than encouraging the growth of our young scientists and we will continue to work on ways to ensure that they feel involved and engaged at the conference.

One of our goals on the Board is to keep AOCS ahead of the change (especially communication and knowledge transfer technology) that surrounds all our lives and careers so that we can be of maximum utility and value to our members. With this as a focus area, we are beginning to assemble our strategy for the year, and my plan, via these letters, is to keep you informed and occasionally to ask for your input. Your ideas, opinions, and suggestions are important to AOCS. Comments, suggestions, and feedback on how we can serve you better can be provided anytime to the new AOCS website at www.aocs.org/goto/feedback.

As I've begun with the Annual Meeting, let's start there. The continued growth of the conference will be just one of our focus areas for the coming year. This is a successful conference by anyone's standards, but as in any successful venture, there are always opportunity areas. We can still make this a "must attend" event for even more of our members and indeed, nonmembers.

One opportunity area highlighted by data from 2010 is the need to increase the number of papers from our colleagues in the commercial/industrial sector. While the majority of conference attendees continue to be from the commercial sector (by a factor of 2), they remain significantly underrepresented in the area of papers. The program committee will be working on ways to remedy this through more invited papers, themed sessions and guidance for session chairs.

A continuing request is to avoid schedule overlap of talks within different divisions that would likely be of interest to the same audience. Work has begun to coordinate talks and/or themes that fall within chemical or physical transformations that are common to different disciplines. We can no longer plan exclusively within technical silos. Our members want answers to their problems, and for the most part, they don't care what discipline the answer comes from. In conjunction with this we will continue to work on ways for attendees to easily chart a map through the conference that lines up with their technical interests independent of divisional categorization in the program.

AOCS President J. Keith Grime speaks at the 101st AOCS Annual Meeting & Expo.

A third focus area is to introduce a few keynote speakers into the program to generate interest from a wider section of the AOCS community. This is not an attempt to switch emphasis from technical to business; our roots are and will remain in technical papers, both commercial and academic.

More as our strategy develops across several areas.

It's going to be an exciting year, and I look forward to working with you and for you.

J. Keith Grime
AOCS President 2010–2011

Detergent chemistry has hit the wall on clean, so it's going green

Mike Lafferty

The detergent industry is highly competitive, mostly recession proof, and, thanks to chemistry, always changing ever so slightly. It has been years, however, since cleaning chemistry has been the driving force in detergent innovation. Instead, the environment rules in laundry rooms and kitchens. In the United States, for example, on July 1 (2010) 15 states virtually banned phosphates from automatic dishwashing products. That will produce consternation in kitchens—dishes don't seem to come quite as clean without phosphorus, and detergent chemists are trying to figure out what to do.

For clothes, however, the question of "How clean is clean?" had been answered by the 1980s—at least in high-end products sold in North America, Western Europe, Japan, and Korea.

"The end point for formulators for laundry detergents is consumer satisfaction. Can they improve on that? Only marginally; garments are clean and probably smell fresh for probably 90% or more of consumers," said Warren Schmidt, a retired Shell chemist, who is now an industry consultant. "Advancement is driven less by soaps and cleaning and more by bleach and bleach activators and perfumes. Often, the number one way people tell if laundry is clean is, does it smell fresh."

DETERGENTS TODAY

Today, detergent manufacturers are pushing super-concentrated formulae to reduce packaging and transport costs, changes that address environmental concerns of consumers and economic concerns of formulators rather than new worries about defeating dirt.

Modern detergents are mixtures of surfactants (cleaning chemicals), builders (water softeners), bleaches (to whiten and remove stains), enzymes (to break down soils to simpler forms for removal by detergent), optical brighteners (to create a whitening effect), polymers (to prevent soils from resettling after removal during washing), and fillers. Worldwide, these chemical mixes vary. American consumers prefer liquids to powders by a 60–40 margin and the number of powdered detergents available in the United States has shrunk. In contrast, Europeans have a greater choice in detergents because of a wider range of consumer preferences, due in part, to there being many more nations and cultures in Europe. Still, European detergents are more often powders and tablets, except in France. Whereas 60% of the overall European market is powders and tablets, in France, most consumers prefer liquids.

Detergents in Western Europe and North America also have more surfactants, bleach, polymers, and enzymes than those in Africa, Asia, and Latin and South America. In developing nations, manufacturers walk a fine line between effectiveness and expense.

"To produce a product for this market is expensive and the people can't buy expensive," said Heliana Kola, a chemist at Columbus, Ohio, USA-based Battelle's detergent analysis program. "In Latin America, the Philippines, India, they still have a lot of work to do. These countries are poor so they use cheap ingredients. Western Europe, North America, Japan, and Korea are where you find modern detergents—where they care about performance of the product but also care for the environment."

Battelle scientists track household cleaning and laundry detergent formulations worldwide. Water-polluting phosphates, for example, have been chased completely from laundry detergents in North America, Western Europe, Japan, Korea, and China, replaced by zeolite, a mineral containing aluminum and silicate. They are also being phased out of products in Eastern Europe, Kola said, although they are still used in India and other Asian and Pacific nations. Even name-brand detergents can vary from region to region. "A product sold in Germany is not the same as in Turkey," Kola said.

A BRIEF HISTORY OF DETERGENTS

Detergents actually have a history as long as that of civilization. One of the first things people wanted after they set up house was, apparently, clean clothes. Ancient Babylonians and Egyptians had recipes for making soap. The Romans claim rights to the name when, according to legend, rain washed down the slopes of Mount Sappo, a mythical spot where animals were sacrificed. The rain washed the fat from the sacrificed animals into the Tiber River, along with alkaline ashes from the sacrificial fires. There, washerwomen found the mixture helped get their clothes clean. Animal fat and ashes remained the basis for soap making for thousands of years.

Modern detergents were spawned in 1916 when the first commercial synthetic surfactant was made in Germany from coal tar to get around the shortage of animal fats during World War I. Chemicals builders, which improve the cleaning ability of surfactants, were next to be added. They chelate calcium and magnesium ions in hard water, thus maintaining or enhancing the cleaning efficiency of the surfactant. Later inventions included optical brighteners—enzymes—that attach to fabrics. Now, detergents have up to six enzymes, each one with a particular function or stain target. Further enzyme development has been motivated by environmental concerns—in this case the desire for detergents to perform in a cold-water wash.

KEEPING UP WITH THE COMPETITION

Ironically, for such a competitive business, there are few secrets. Everyone wants to know what the competition is doing. Although some large companies have their own testing labs, many companies choose not to spend the money on a lab devoted only to analyzing the competition. In the only program of its kind, Battelle provides that service to detergent manufacturers and to companies that supply the chemical ingredients.

"By sharing the expense, companies can get the information at approximately 25% of the internal cost of running their own laboratory," said Franco Pala, who heads the operation at Battelle's Duxbury, Massachusetts, USA, lab. Competitors especially want to know trends. Are companies using a particular surfactant? Are they using more or less bleach or enzyme? "A detergent formulator needs to know what's in [a new name-brand product] almost immediately. They need to know in weeks, not months," Pala said.

In fact, Battelle does have an Early Warning System that, upon a client's request, provides the chemical composition of a significant new detergent product in short turnaround time, Pala said.

The detergents program was originally started at Battelle's former Geneva Research Centre, in Switzerland, when European companies wanted to know what their competitors were doing to reduce levels of water-polluting phosphates in detergents.

Battelle scientists have noted that Japan is now a leader in detergent innovation. The switch to concentrated formulations in high-end detergents actually began in Japan in 1987. Concentrates now completely dominate the market in developed countries, with super-concentrated liquid products entering the American market in 2006. Powder concentrates, in turn, spawned concentrated liquids. Today, compact powders are spreading into developing regions such as Latin America, Eastern Europe, and Southeast Asia.

WHAT'S COMING NEXT

The next major environment push may be a swing away from the petroleum-based surfactants that have dominated synthetic detergents since their invention—again in high-end products. Not many people think about the source of the cleaning agents in their soaps and detergents but retailers do, and "all natural" is increasingly "in" as a marketing strategy, at least in niche products.

"They're very interested in that claim. Price is not really an issue," said Schmidt.

For laundry detergents, the two most significant factors in the American market in the coming decade will continue to be consumer desire to use less energy—to launder their clothes in warm or even cold water—and regulations forcing manufacturers to build high-efficiency washing machines. Pressure to remove water-polluting phosphates from detergents also will continue.

Sodium tripolyphosphate (STPP or phosphate) has been the main cleaning agent in many detergents and household cleaners for decades. Phosphates do a great job by helping surfactants break down grease and remove stains, but they are difficult to remove from wastewater and often end up in rivers and lakes, where they promote algal growth and, eventually, eutrophication. Zeolite, the substitute for STPP, was not effective by itself at first, but scientists resolved the problem by combining it with a number of other ingredients such as sodium citrate and silicate.

This brings us back to the July phosphate ban in automatic dishwashing detergents. Removing phosphates from automatic dishwashing detergents has lagged because it has been difficult to come up with an effective replacement. Dishwashing-machine detergents contain only 1–2% surfactant because, otherwise, they would produce too many suds. Phosphate is a really key ingredient to enhance cleaning efficiency. In contrast, hand-dishwashing detergents contain up to 30% high-foaming surfactants. Making a lot of suds in the sink is part of the cleaning process, but using a hand-dishwashing detergent in an automatic dishwaster would produce a suds explosion.

Mike Lafferty, the retired science writer for The Columbus *(Ohio, USA)* Dispatch *newspaper, is a freelance journalist specializing in science, agriculture, environment, and education articles for newspapers, magazines, and electronic publications. He also is editor-in-chief of the* Ohio's Natural Heritage *book and, most recently, co-author of the book,* Ohio's Education Reform Challenges: Lessons from the Frontlines.

AOCS Press Book of the Month

Featuring a Special Value Package!

SAVE $20 off the already discounted price!

Soap & Detergent Package PKG-SD

A must-have collection of Soap & Detergent products including:

- *Astonishing Diversity of Natural Surfactants*, CD-ROM
- *6th World Conference on Detergents*, CD-ROM
- *Formulating Detergents & Personal Care Products*
  A Complete Guide to Product Development
- *Industrial Utilization of Surfactants*
  Principles and Practice

Value = List: $555 Member: $440

Package Price

List: ~~$400~~ **$380**

AOCS Member: ~~$300~~ **$280**

Visit **www.aocs.org/store** and search "PKG-SD" for chapter listings of each product.

To order www.aocs.org/store

Phone: +1 217-693-4803 | Fax: +1 217-693-4847 | Email: orders@aocs.org

Mention Promo Code BOM0810 when ordering to receive discount.
Offer expires September 13, 2010

Special Offer Purchase this Book of the Month and receive by email, a free sample eChapter, "*Manufacture of Multicolored and Multicomponent Soaps*" from the book *Soap Manufacturing Technology.* (valid email address required)

Contemporary and future regulation/legislation regarding food/feed safety and quality

Food and feed safety continues to be a paramount issue for all stakeholders, including consumers, producers, and federal and local governments. There is a general consensus that the current system, while providing adequate safeguards, could be improved. A number of proposals to revamp the system are currently being evaluated. In the United States, virtually all include significant revisions to the Federal Food, Drug, and Cosmetic Act (FFDCA) and will have a significant impact on both the food and feed industry. The following article, which addresses contemporary and future regulations/legislation regarding food/feed safety and quality, was compiled by Processing Division Chairperson Nurhan Dunford from a presentation given by Daniel G. McChesney, Director, Office of Surveillance and Compliance Center for Veterinary Medicine, Food and Drug Administration (FDA). The presentation was delivered at the Processing Division Luncheon held during the 101st AOCS Annual Meeting & Expo (Phoenix, Arizona, USA).

Federal laws and regulations regarding food and feed safety generally represent minimum requirements and apply to products in interstate commerce and those offered for import to the United States. State and local laws can be more stringent and generally take precedence over federal law, but they can only be applied within the state or locale. In the United States, both the FDA and the US Department of Agriculture (USDA) are responsible for regulating food safety. USDA's Food Safety & Inspection Service (FSIS) regulates food products resulting from the slaughter of most food animals and egg products. FDA regulates all other food products, including animal feed. In addition, USDA's Animal and Plant Health Inspection Service (APHIS) is charged with preventing and controlling the spread of plant and animal diseases and thus has an indirect role in food and feed safety.

The FDA is charged with enforcing the FFDCA and the food safety aspects of the Public Health Service Act (PHSA). The FFDCA defines food as "articles used for food and drink for man and other animals … and articles used for components of any such articles." Hence, feed is a subset of food and subject to regulation by FDA. Sections 402 and 403 of the FFDCA have a number of provisions for establishing adulteration and misbranding. Adulteration provisions of Section 402 state that a food/feed shall be deemed to be adulterated if it: (a)(1) bears or contains a poisonous or deleterious substance … injurious to health, (a)(2) contains an unapproved food additive, (a)(3) is unfit for food (filthy, putrid, etc.), (a)(4) is prepared, and/or held under insanitary conditions, and (a)(5) is a product of a diseased animal or animal that died other than by slaughter. According to the provisions of Section 403, a food/feed would be misbranded if: (a)(1) its labeling is false or misleading

in any particular or (a)(2) in the case of a dietary supplement to which section 411 applies, its advertising is false or misleading in a material respect or its labeling is in violation of section 411(b)(2).

US President Barack Obama made a personal commitment to improving food safety by calling it a "fundamental government responsibility." During a March 15, 2009, radio address, the President emphasized the need to improve the effectiveness of the current national food safety system and announced a Food Safety Working Group to examine the current issues and review various proposals for revamping the system. In July 2009 the Working Group released key findings for an upgraded food safety system.

The pending food/feed safety legislation developed by the US House and Senate shares the core principles cited by the Working Group:

- prioritizing prevention;
- strengthening surveillance and enforcement; and
- improving response and recovery.

The legislation has wide support among consumer groups, industry and trade associations. The good news is that Congress is on the verge of passing new legislation. Because of the separation of the Executive and Legislative Branches of government, FDA has had no direct input on the pending legislation. FDA has provided technical comments and information through the Congressional Hearing process. From FDA's perspective, there are three key concerns about food safety legislation: (i) Does it refocus the system to provide greater emphasis on prevention? (ii) Does it give FDA necessary legal tools to address new responsibilities? and (iii) Does it provide necessary resources? The draft legislation addresses points (i) and (ii). Different versions of the legislation contain user fee provisions, and fees for inspections, so there is an awareness of the resource issue. In addition, Congress has substantially increased FDA funding for food safety in the past few years.

Legislation pending in Congress supports a system focused on prevention. The new legislation would allow FDA to hold companies accountable for understanding risks with the food/feed they are responsible for and for preventing contamination. Food/feed production facilities would also be required to conduct hazard analyses, then write and implement preventive controls. Mandatory registration and re-registration of companies and their products would be part of the new system.

The legislation also calls for the establishment of performance standards for food-/feed-borne contaminants and the most significant resulting hazards. Recognizing that testing food and feed products at different stages of manufacturing and marketing is a key to ensure safety, the legislation requires recognition of accreditation bodies to accredit laboratories that can conduct sampling and testing of food. It also requires FDA to publish a list of accredited laboratories, develop protocols for recertification of laboratories, and clearly state how the resulting data from the laboratories will be used.

Obtaining routine access to records is a vital part of any food safety regulatory framework. A significant gap exists in this area of FDA's current authority. In the new system, FDA would be given explicit authority to access and copy food/feed records bearing on whether a product is adulterated,

misbranded, or in violation of the FFDCA during routine inspections.

The new legislation's Foreign Supplier Verification Program would provide FDA information about importers (registration). Importers would be required to verify that food/feed is not adulterated and is in compliance with allergen labeling requirements, to institute preventive control requirements, and to take steps to protect product safety.

Although FDA plans to increase foreign food inspections, mandated foreign inspections may not be the best use of FDA resources. Considering that there are approximately 230,000 foreign facilities, cost-effective oversight may be better achieved through third-party inspections. Authorization to use accredited third parties such as foreign regulatory agencies for foreign inspections would help to verify that imported foods meet the required domestic standards. FDA is currently conducting a pilot program using third-party inspectors.

Important parts of the new legislation are the new enforcement authorities and the minimum inspection frequencies for food and feed firms. The legislation provides additional enforcement authorities including mandatory recall and administrative detention (stop sale) of food/feed that is adulterated, misbranded, or otherwise in violation of the FFDCA. Currently FDA relies on states for stop-sale orders and legal arm twisting, as well as its own ability to publicize a problem with a product to get firms to initiate recalls of violating products. The new provisions in the legislation will greatly enhance FDA's ability to act quickly to protect public health. Both the House and Senate versions of the legislation contain provision for minimum inspection frequencies, although there are differences in the approaches. FDA is supportive of this, but to implement the requirement will require a consistent source of funding for inspections and the flexibility to adjust inspection frequencies based on risk and available resources.

Information-sharing authority is critical for FDA's mission because it speeds up epidemiological investigation and hastens tracing the problem back to its source. FDA needs to be able to give and get confidential commercial and trade secret information that can be shared with federal, state, and local government agencies and some international organizations.

Finally, FDA needs mechanisms to enforce requirements for hazard analysis and risk-based controls, as well as for enhanced traceback and recordkeeping. One version of the legislation makes noncompliance with the above requirements a prohibited act. A prohibited act supports seizure of the product but not necessarily other actions. If failure to comply with the above requirements resulted in the product being adulterated, it would support a variety of actions, including administrative detention and refusal of admission of imported feed/food to the country, and would make enforcement easier.

With regard to animal feed, FDA has undertaken a comprehensive feed safety review under the Animal Feed Safety System (AFSS) initiative. AFSS deliverables are part of the overall approach to food and feed safety. Currently, the AFSS Team is reviewing all aspects of feed safety oversight to develop ways to improve safety. They are focusing on risk-based programs with an emphasis on prevention.

A number of animal feed safety actions are currently being pursued. In 2010, we anticipate publishing two draft regulations, one revising the requirements for pet food labeling and the other establishing feed and feed ingredient definitions at the federal level. We have also prepared a draft guidance for safe on-farm practices for receiving, storing, and feeding of animal feed and feed ingredients for publication later this year.

It is anticipated that future feed regulation and inspection will become more risk based. The implementation of this approach will require industry, FDA, and other government partners to collaborate on identification of feed safety hazards. The development of new and improved mechanisms to control hazards is the key to a robust and effective food/feed safety system. We have already seen the federal government's commitment to this through increased budgets, increased emphasis on food and feed safety, more oversight, and proposed legislation that addresses a variety of gaps in the current system. In summary the changes coming in the area of FDA's regulatory authority and its approach to food and feed safety are arguably the most significant changes for FDA since 1938. ■

How do you benefit from being an AOCS member?

Ask one of our long

50+
YEARS OF MEMBERSHIP

Thomas H. Applewhite
A. R. Baldwin
Graham Barker
Fred Barrett
William Barry
Fred J. Baur
Joyce L. Beare-Rogers
Robert Behrmann
Fred Bieri
Raymond Bistline
Ram Blau
Dean Bredeson
Carl Brown
Travis L. Budlong
Arnold Carsten
George C. Cavanagh
John H. Chaloud
Giles Colbert
Lois Crauer
Dimitrios Dimitriou
Richard Dreyer
LeRoy Dugan, Jr
Harold Dupuy
Manuchehr Eijadi
Joseph G. Endres
Giles Farmer
Oliver Fiala
David Firestone
Charles H. Fisher
Edwin N. Frankel
William French
Carl W. Fritsch
Cecilia Gilmore
Martin E. Ginn
Linsley S. Gray
Edward L. Griffin, Jr
Erwin Grob
Lauro Gutierrez-Vela
Earl G. Hammond
Robert C. Hastert
Ralph T. Holman
Allen Howland
Glen Jacobson
Keith L. Johnson
William Johnson
Frank Jordan
Eric Jungermann
Nat Kessler
George A. Kopas
Ernest Koref
R. G. Krishnamurthy
Vincent P. Kuceski
Donald Kuemmel
Kenneth A. Kuiken
Edward Latondress
Daniel Leo
William Link
Norman Lovegren
Andrew M. Lubienski
Francis Luddy
Gerhard Maerker
Vaidyanath Mahadevan
Helmut K. Mangold
Edward McMullen
Lincoln D. Metcalfe
John R. Mitchell
Ahmad Moustafa
Noel Myers
K. Ananth Narayan
John H. Nelson
Nippon Yuryo Kentei Kyokai
Robert M. Pierce
Richard Purdy
Richard Reck
Edward Reid
Martin D. Reinish
Jim Ridlehuber
Louis Roman
Logan Roots
Milton J. Rosen
August M. Rossetto, Jr
Howard Roth
Andrew Rutkiewic
Werner H. Schmidt
Matej K. Schwitzer
Wayne Seto
William A. Singleton
Endre Sipos
Lloyd M. Smith
Jack Suriano
Aloys L. Tappel
Paul C. Thionville
Joseph Topps
Albert Tucker
Robert Uschan
Michael L. Valletta
Russell C. Walker
William Walker
Arthur E. Waltking
R. S. Watson
Norman H. Witte
Gerry C. Zekert
Karl T. Zilch
Helen Zmachinski

45-49
YEARS OF MEMBERSHIP

Lars Ake D. Appelqvist
Stanley Bader
Jose Becerra Rique
Daniel R. Berger
Anthony P. Bimbo
Robert M. Burton
Jorge J. Castellanos
David G. Cornwell
Jacqueline Dupont
David R. Erickson
Abraham S. Feigenbaum
George C. Feighner
Glenn Fuller
John E. Heilman
Murray Heimberg
Thomas B. Hilton
Robert J. Hlavacek
James M. Iacono
Jon Kabara
Morris Kates
C. Louis Kingsbaker, Jr
Arnis Kuksis
Robert E. Landers
Gary R. List
Theodore K. Mag
James C. McPherson, Jr
Poul Moeller
Oscar W. Neiditch
Toshiro Nishida
Ragnar Ohlson
Frank H. Passalaqua
Nicholas Pelick
Conrad W. Petersen
James B. M. Rattray
Maurice Rosenthal
Stanley Smith
Paul Sosis
John Van Haften
Leamon D. Williams
Randall Wood
F. Vernon K. Young

40-44
YEARS OF MEMBERSHIP

Phillip G. Abend
Robert G. Ackman
Verlin I. Allbritton
Don Banks
Hemendra N. Basu
Kurt G. Berger
Paul D. Berger
Giovanni Bigalli
C. William Blewett
Michael M. Blumenthal
Donald E. Britton
Glenn D. Brueske
Boyce H. Butler
Raoul J. P. Clarenc
Samuel Cohen
Jesse E. Covey
Richard Keith Downey
John A. Dupps, Jr
William M. Grogan
Frank D. Gunstone
Lynn A. Hawkins, Jr
John S. Kilpatrick
Ernest F. Kopka
Edward C. Leonard
Marcel S. F. Lie Ken Jie
John F. Marsden
James H. McClare
Don T. Morton
Richard A. Ormsbee
Jalam K. Punwar
James L. Roorda
Carl W. Schulze
Michihiro Sugano
Bernard F. Szuhaj

35-39
YEARS OF MEMBERSHIP

Jeannene A. Ackerman
Petar Alaupovic
Ardin L. Backous
H. Newton Beavers
W. Maurice Belcher
Ezra Berger
Marjorie L. Besemer
Jean A. Bezard
Michael J. Boyer
John B. Braunwarth
James A. Breazeale
Dennis J. Breitbart
Francis R. Cala
Edward J. Campbell
Martin C. Carey
Roy A. Carr
Douglas A. Cavanagh
Edith J. Conkerton
Clemence K. Dartey
Salil K. Das
James K. Daun
Robert Delaney
James H. Dyck
Edward Emken
Kok Leong Er
M. Paul Farr
Walter E. Farr
Ronald Field
Frank J. Flider
Thomas A. Foglia
David G. Forster
Daniel P. French
Edward A. Geiss
Stewart E. Gloyer
Manuel Gomez Ojeda
Stephen M. Greenberg
William J. Hausmann
Akira Hayashi
Yoshio Hirabayashi
Lawrence A. Johnson
Edward H. King, Jr
John K. G. Kramer
Giovanni Lercker
Philip A. Lofgren
Stanley C. Loft
Bruce E. McDonald
Douglas E. McLemore
David B. Min
Carter G. Naylor
Richard D. O'Brien
Douglas V. Okonek
Marshall Pike
William E. Prosise

"The value of AOCS is a pretty simple equation for me: AOCS has given me an excellent conduit for keeping up with technologies and people throughout my career, and involvement in AOCS committees and activities has allowed me to grow as an individual, and to have a lot of fun in working with a lot of interesting and talented folks."

—MICHAEL F. COX

"AOCS has provided me international exposure in lipid research, and without the Society, I would never have achieved my goals no matter how hard I worked. AOCS is like an extended family to me. I can connect up and rely on my fellow members, be they the young or the famous; together we move the boundary of lipid research further."

—MARCEL LIE KEN JIE

-standing members.

Roberta L. Richards Owens
Barry Sanders
Ronald A. Schnitzer
Kenneth F. Schoene
Ramon Segura
Walter A. Shaw
Hiroyuki Shimasaki
Carlos E. Soza Barrundia
Dennis K. Strayer
Nagao Totani
Ernie H. Unger
Shun Wada
Werner E. Wagner
Gary C. Walker
Peter J. Wan
Richard F. Wilson
Walter J. Wolf

30-34
YEARS OF MEMBERSHIP

Richard Adlof
Moghis U. Ahmad
Carl Amos
George E. Anderson
Rajindra Aneja
William E. Artz
Christopher Astley
George T. Battaglini
John E. Bauer
John Blachford
Kenneth F. Carlson
Judy A. Carter
John L. Cayias
Tristano Colloridi
Barrie F. Cruickshank
Michael F. Czuczak
Levente L. Diosady
Aris J. Domnas
Janet M. Duran
John W. Erdman, Jr
N. A. Michael Eskin
John R. Euber
Jeffrey Fine
Louis D. Fontana
Floyd E. Friedli
Ilija Gawrilow
F. Gerald Gomolka
Mumtaz Haider
Gerard L. Hasenhuettl
William Blake Hendrix
Bengt Herslof
Kian Hock Ho
Sandra Holloway
Joel H. Houston
Andre Huyghebaert
P. C. Jain
Yukio Kakuda
Michael P. Kennedy
Hiroshi Kihara
Daniel S. Lampert
George U. Liepa
Hans Lingnert
Earl Louviere
Edmund W. Lusas
Merle S. Masri
Paul D. McElroy
Yoshiro Miura
Darrel L. Muck
William David Nes
Frank T. Orthoefer
Ramesh Patel
Durk Pearson
Jesse Peoples
Adul Premprasert
Michael Pulliam
James M. Richmond
Ned M. Rockwell
Warwick J. Rush
Shridhar K. Sathe
Gloria T. Seaborn
Hector J. Sepulveda
Frederick P. Simonian
Harry E. Snyder
Paul J. Stern
Frank C. Tenent, Sr
Prakit Triyanond
Robert E. Wainwright
Kathleen Warner
William S. Welker
Pamela J. White
Neil R. Widlak
Mary Ann Williams
James E. Willits
Suk Hoo Yoon
Basiron Yusof
George J. Zimmerman

25-29
YEARS OF MEMBERSHIP

Masao Abe
Yvonne V. Agustin
Casimir C. Akoh
David J. Anneken
Rob Ariaansz
Marvin O. Bagby
Ernest R. Bean
Kenneth E. Beery
Bruno Berra
Philip A. Bollheimer
Harald Breivik
Steven J. Brouwer
Nestor M. Carballeira
Pete C. Cartwright
Uriel G. Cegla
Liew Chee Ping
John P. Cherry
Shiraz R. Chunara
Michael T. Clandinin
James Coon
Michael F. Cox
Janelle Crawford
A. Saari Csallany
Ralph S. Daniels
Christopher L. G. Dayton
Remi De Schrijver
Etienne M. Deffense
Deborah A. Diersen-Schade
Dennis Doroga
Thomas Earley
Wyatt N. Elder, Jr
Raul O. Ferrari
Murray Flashner
Alyce D. Fly
Dennis L. Fost
Knud A. Gerstenberg
Zana G. Gilliam
Leo G. Gingras
Harishchandra Goyal
Jeffrey E. Grahn
Maria A. Grompone
Monoj K. Gupta
John S. Guymon
Frank M. Hahn
Edward C. Hamill
Wolf Hamm
Tomas T. Hansen
Gudmundur G. Haraldsson
Jan A. Heldal
David F. Hildebrand
Dennis H. Hogan
Krister Holmberg
Yung-Sheng (Vic) Huang
Robert S. Humphreys
J. Edward Hunter
Ismail Hassan Hussein
Lucky Inturrisi
Yukihiro Ishikawa
Yutaka Itabashi
Ronald J. Jandacek
Foon Wing Kam
Dennis P. Karl
Kevin M. W. Keough
Jagesh Khaitan
Gary A. Knox
Dharma R. Kodali
Semih Sefa Koseoglu
Rodney Kuss
Dean Lao, Jr
Firouz Madadnoee
Rodney J. Mailer
Mehar S. Manku
Tatiana Marinkovic
Ted Matson
Richard E. McDonald
Ammanuel Mehreteab
Anand Menon
Richard A. Meyer
Robert P. Micciche
H. Steven Misner
Albert F. Mogerley
Hyam Myers
Hans Nieuwenhuis
Viggo Norn
Kari V. V. Nurmela
Harumi Okuyama
Ronald K. Ostroff
Richard J. Otterson
Thomas M. Pavlina
Harold H. Perry
Guy L. Posschelle
Andrew Proctor
Thomas J. Proffitt, Jr
Julius Rath
Lars Reimann
Otto Rohr
Pravit Santiwattana
Kiyotaka Sato
Edward T. Sauer
John F. Scamehorn
Timothy A. Scavone
Katherine Schmid
Jeffrey D. Scott
Edward S. Seguine
Bernard C. Sekula
Arnon Shani
Hyo-Sun Shin
Frederick C. Shook
Vijai K. S. Shukla
Satish C. Singhal
Patrick J. Slonecker
Thomas P. Smith
Jennie M. Stewart
Barrie Tan
Boon Keng Tan
Geok Chai Tan
Ban Geok Tay
Beverly Teter
Byron E. Thompson
Ralph E. Timms
Sanjay N. Trivedi
Reiko Urade
Frank G. Veldkamp
Charles Walters
Earl D. Weak
Michael J. Wint
Raymond S. C. Wong
Tony Yates
Gow-Chin Yen
Werner Zschau

This list was compiled in April 2010.

"My involvement in AOCS has provided unique leadership and mentoring opportunities in addition to helping me establish an international network of colleagues and friends I've come to depend upon. Within the Society, I obtain timely technical information and sharpen my leadership skills while having the freedom to try out new ideas and to positively contribute to the Society."

—JIM KENAR

News & Noteworthy

Briefs

The Nikkei news service reports that Japan's Nisshin OilliO Group Ltd. says it will double production of FOSHU (Foods for Specified Health Use) cooking oil in the coming fiscal year, as well as expand sales in other Asian markets. Nisshin factories in Yokohama, Kanagawa Prefecture, and Sakai, Osaka Prefecture, will increase production of Healthy Resetta, a brand of oil that is high in medium-chain triglycerides and is marketed as helping to prevent the storage of fat in the body.

■■■

Soybean planting in Brazil, the world's second-largest producer of the oilseed, may be delayed by dry weather caused by La Niña weather pattern, a forecaster told Bloomberg.com. Soybean planting for the next harvest year will take place from September to November 2010. The last soybean harvest in Brazil, which was completed in May 2010, was up 20% over the previous year to 68.7 million metric tons, the report noted.

■■■

Corn Products International, Inc. (Westchester, Illinois, USA) announced in June that it will acquire National Starch, a global provider of specialty starches, from AkzoNobel of the Netherlands. The two companies together will have nearly $5 billion in annual revenues. The acquisition, which has been approved by the boards of directors of both companies, is expected to close in the third quarter of 2010, subject to regulatory approvals.

■■■

The American Medical Association (AMA; Chicago, Illinois, USA) wants the US Food and Drug Administration to adopt more accurate labeling of *trans* and saturated fats. The AMA also said it would support policies that would make healthful foods more affordable and unhealthful foods more expensive. These position statements (and others) were adopted by AMA members at the group's annual meeting in June 2010. ■

OECD–FAO Agricultural Outlook 2010–19

Vegetable oils will be on average about 40% higher in the coming decade than current prices, according to the Organisation for Economic Cooperation and Development (OECD) and Food and Agriculture Organization (FAO) of the United Nations.

Although farm commodity prices have fallen from their record peaks of two years ago, they are unlikely to drop back to their average levels of the past decade, according to the annual joint report by the two agencies.

The *OECD-FAO Agricultural Outlook 2010–19* sees average wheat and coarse grain prices over the next 10 years between 15% and 40% higher in real terms (adjusted for inflation) than their average levels during the 1997–2006 period. Real prices for vegetable oils are expected to be more than 40% higher. Dairy prices are projected to be on average between 16% and 45% higher.

Rises in livestock prices over the next 10 years are expected to be less marked overall, although world demand for meat is climbing faster than for other farm commodities as increasing wealth among some sections of the population in emerging economies alters dietary habits.

Sustained economic growth in emerging markets is an important factor underpinning growing demand and higher prices. Continued expansion of biofuel output—often to meet government targets—will also create additional demand for wheat, coarse grains, vegetable oils, and sugar. Increasingly, higher production costs add upward pressure on prices, particularly where energy is used intensively.

GROWTH IN FOOD PRODUCTION

The *Outlook* sees global agriculture output growing more slowly over the next decade than in the past 10 years. Nevertheless, output remains on track with previous estimates to meet the 70% increase in world food production required to meet the market demand of estimated population levels in 2050. Brazil is by far the fastest growing agricultural producer, with output expected to rise by more than 40% between now and 2019. Production growth is also expected

CONTINUED ON PAGE 483

Acquisitions/mergers

United Natural Foods, Inc. (Toronto, Ontario, Canada) has completed its acquisition of the Canadian food distribution assets of the SunOpta Distribution Group business of **SunOpta Inc.** (Brampton, Ontario, Canada), for a total consideration of approximately C$68 million (almost $64 million) in cash.

■■■

Groep Vandemoortele is acquiring the margarine and frying fats activities of fellow Dutch company **Van Dijk Food Products**, which is part of the EFS Group BV. The transaction is subject to the approval of the competent competition authorities.

Commodities

CACAO/CHOCOLATE

Godrej Hershey reportedly is introducing chocolate products into India. The joint venture between Godrej (49%) and Hershey (51%) previously introduced chocolate syrup to the Indian market, according to FoodNavigator.com.

CANOLA/RAPESEED OIL

The latest farm cash receipt totals from Statistics Canada demonstrate that canola is the most valuable crop to Canadian farmers, according to Robert Hunter of the **Canola Council of Canada**. Farm cash receipts for canola in 2009 totaled just over $5 billion, higher than all other crops, including wheat, durum, soybeans, and corn, Hunter said in a statement.

FISH OIL/FISH MEAL

Chile's **Grupo Angelini** has initiated an Environmental Impact Assessment on a project that will result in a $42 million pharmaceutical-grade omega-3 fatty acid production plant in Arica. The facility will process 8,500 metric tons (MT) of fish oil annually, to produce 1,000 MT annually of naturally refined fish oil 18/12; 500 MT annually of triglyceride concentrates; and 1,500 MT annually of ethyl esters, according to the International Fishmeal and Fish Oil Organisation.

PALM OIL

AAK says that the palm oil in its Akofluid Pumpable Shortening—which is a blend of rapeseed and palm oils—is now fully certified by the Roundtable on Sustainable Palm Oil (RSPO) as being from sustainable sources.

■■■

Hong Kong's **Noble Group**, a global supplier of agricultural, energy, metals, and mineral products, has acquired a 51% stake in Indonesia's **PT Henrison Inti Persada**. Noble announced that it intends to develop approximately 32,500 ha of land for palm oil production in Sorong Regency, West Papua Province, Indonesia. This will be Noble's first project in the oil palm sector, the company said in a statement.

■■■

The European Commission's **Renewable Energy Directive** and its sustainability criteria will not affect Malaysia's palm oil exports to the region, according to European Union (EU) ambassador and head of delegation to Malaysia, Vincent Piket, in June 2010. "The EU will not block any Malaysian crude palm oil exports. Malaysian crude palm oil exports into the EU can continue just as they are today, with no new tariffs, quotas, restrictions, or conditions," he told the Bernama news agency in June 2010. The directive goes into effect on December 5, 2010.

SOY OIL

Universal Textile Technologies (UTT; Dalton, Georgia, USA) has introduced EnviroCel™ Home, the first soy-based, polyurethane carpet backing for the residential market. UTT first incorporated soy-based polymers into its carpet backing technology for industrial markets in 2004.

■■■

The steering committee of the **Soy 2020 Initiative** has decided "to focus efforts on exploring a collaborative, industrywide effort to increase protein levels [in US soybeans] by the year 2010." The Initiative was formed in 2008 by the US soybean industry to ensure continued competitiveness of US soybeans in the global marketplace. The quality of US soybeans, as measured by the combination of oil and protein content, has declined during recent years, according to a Soy 2020 statement.

■■■

US automaker **Ford Motor Co.** is expanding its use of biobased soy foam through almost its entire vehicle lineup in 2011 models. "There are more than two million Ford vehicles on the road today with bio foam content; Ford's use of bio foam has helped the company reduce its petroleum oil usage by more than three million pounds annually and carbon dioxide emissions by 11 million pounds," the company said in a statement.

SUNFLOWER OIL

The **Michelin** tire company is advertising its new luxury Primacy MXM4 tire as using sunflower oil "to help the tire to maintain its edge in wet and snowy weather and stop up to 19 feet shorter than its competitor." The company's proprietary Helio Compound+ reportedly helps maintain the elasticity of rubber at low temperatures, resulting in a better grip as well as shorter braking distances.

■■■

Trakya Birlik, an agricultural cooperative based in Edirne, Turkey, has purchased 21 MQC-5 benchtop nuclear magnetic resonance analyzers from AOCS Corporate Member Oxford Instruments America Inc. The instruments will be used as part of an initiative to improve sunflowerseed oil yield.

New ventures

Malaysia's **IOI–Loders Croklaan** has opened a new enzymatic interesterification plant in Rotterdam Maasvlakte, the Netherlands. A spokesperson for the company told FoodNavigator.com

that "some companies have been supplying smaller quantities to the market in the past, but the new plant has a capacity exceeding 100,000 MT/year." The company previously had only offered chemically interesterified oils; it has recently introduced its first ingredients made with the enzymatic process, the site noted. The brand name, Crokvitol, is borrowed from a margarine product made by Loders Croklaan in the 1960s that was aimed at promoting good heart health.

■■■

The **European Union** and **China** agreed in June 2010 to collaborate on research into consumer safety and to explore the potential risks from nanotechnology, FoodProductionDaily.com reports. The European Commission's Joint Research Centre (JRC) and the Chinese Academy of Inspection and Quarantine (CAIQ) signed a memorandum of understanding at a joint Food Safety Scientific Seminar at the Shanghai Expo. "The bodies, which provide technical support for policymakers, pledged to find new approaches to nanotechnology and toxicology, as well as improving consumer protection and pursue alternative methods of animal testing," the site noted.

■■■

Cargill (Minneapolis, Minnesota, USA) has signed an agreement with the Port Klang authority in Malaysia to construct a new vegetable oil refinery in the Port Klang free zone. According to the company, the refinery will cost $50 million and will double its existing specialty fats production capabilities to 950,000 MT/year. The plant is expected to be operational by mid-2011. ■

to be well above 20% in China, India, the Russian Federation, and Ukraine.

The report adds that although the world produces enough to feed its population, recent price spikes and the economic crisis have contributed to a rise in hunger and food insecurity. About one billion people are now estimated to be undernourished. The *Outlook* argues that agricultural production and productivity will need to be stepped up, while a well functioning, rules-based trading system will be crucial to fair competition and to ensure that food can move from surplus to deficit production areas.

Retail food prices initially remained high in many countries even after world commodity prices had fallen in the wake of the price surge of 2007–2008. As commodity prices fell, the contribution of food price increases to inflation fell sharply in 2009 in OECD countries but remained a key factor in some developing and emerging economies. Higher food costs, if sustained, will undermine food security, especially for the poor who spend a significant share of their budgets on food.

PRICE VOLATILITY

Price volatility is a key concern of policy makers as the recent shocks—production shortfalls and surpluses, low and high stock levels, oil price fluctuations, the global economic recession—have unsettled agricultural commodity markets.

However, the *Outlook* says that while short-term price volatility is now high, the evidence is inconclusive as to whether it has changed over the long run for major food crops. The report adds that the extent to which world price fluctuations are transmitted to domestic markets varies markedly across countries. Price transmission depends on a country's integration in world markets, its infrastructure and, often most importantly, its trade and agriculture policies.

Presenting the *Outlook* in Rome with FAO Director-General Jacques Diouf, the OECD's Secretary-General, Angel Gurría, said:

"The agriculture sector has shown resilience to recent price shocks and the economic downturn. On the whole, this year's outlook is cautiously more positive than in recent years. But going forward, governments should implement measures to ensure that farmers have at their disposal better tools to manage future risks, such as production contracts, insurance schemes, and futures markets."

Jacques Diouf agreed, warning that: "The role of developing countries in international markets is growing quickly, and as their impact grows, their policies also have an increasing bearing on conditions in global markets." He added: "This makes their role and contribution to global policy issues critical. Policy discussions must be global in scope, and we need to improve the framework for such exchange of views." He noted in this regard the ongoing reform of the Committee on World Food Security (CFS), which aims to strengthen CFS, making it a global platform for policy convergence and the coordination of expertise and action in the fight against hunger and malnutrition in the world.

The complete report (pdf) is available at http://tinyurl.com/AgOutlook.

Codex adopts guidelines for analysis, sampling

In its meeting on July 6, 2010, the Codex Alimentarius Commission (CAC) adopted new guidelines for analysis and sampling that will make it possible to run tests to authenticate food varieties such as fish species, to establish the presence of allergens, and to determine if foods are derived from modern biotechnology.

AOCS Technical Director Richard Cantrill and a number of AOCS members have participated in the development of the draft guidelines by the Codex Committee on Method of Analysis and Sampling. At the draft stage, the guidelines were known formally as the Guidelines on Performance Criteria and Validation of Methods for Detection, Identification and Quantification of Specific DNA Sequences and Specific Proteins in Foods.

In other actions, CAC adopted formal international limits for the amount of melamine allowed in food, infant formula, and animal feed. The maximum amount of melamine allowed in powdered infant formula is 1 milligram (mg)/kilogram (kg), and the amount of the chemical allowed in other foods and animal feed is 2.5 mg/kg. Melamine is an industrial contaminant high in nitrogen that is used as an adulterant to add economic value through the appearance of higher protein levels. In 2008, melamine adulteration in China caused the deaths of six Chinese infants and sickened 300,000 persons.

The 47-year-old Codex Alimentarius Commission, run jointly by the Food and Agriculture Organization and World Health Organization, sets international food standards to protect the health of consumers and ensure fair practices in the food trade. The results of its work form the Codex Alimentarius (Latin for "food code"), a set of international food safety and quality standards.

Canola export agreement extended

Canada has secured a one-year extension of an agreement that will allow canola producers to continue exporting their 2010 crops to China.

In November 2009, China imposed a quarantine order to block the importation of Canadian canola seed testing positive for the presence of blackleg, a fungal disease that can reduce canola yields.

For the marketing of the 2009 Canadian canola crop, China implemented a transition year during which Canadian canola testing positive for blackleg can only be delivered to a limited number of facilities. These locations are in areas where Chinese rapeseed is not grown, and the restriction is meant to reduce the chances of blackleg being transferred to the domestic rapeseed crop. The one-year extension means deliveries can continue to these ports.

Canada is undertaking cooperative studies with China to analyze ways to mitigate the transfer of blackleg to China's crop, and to undertake dairy feed trials to increase the value of canola meal in China, according to the Canola Council of Canada (CCC).

Canada exported 2.8 million metric tons (MMT) of canola seed to China in 2008/09. Under current restrictions, Canada's access is limited to 1.4 to 1.5 MMT annually, CCC said.

As of April 2010, Canada had shipped 1.62 MMT in 2009/10, with just over 1 MMT of that shipped before November 15, 2009.

SEAI bemoans "miserable fate" of oilseed crushing in India

The oilseed crushing industry in India is facing "serious difficulties," according to the Solvent Extractors' Association of India (SEAI).

In a memorandum sent to a number of Indian agency heads in June 2010, SEAI noted that most of the country's oil mills and solvent extraction facilities were operating at very low capacity or were closed, owing in large part to the zero import duty on vegetable oils.

Stocks of oilseeds were at a "record high" as of June 1, 2010, SEAI said. The trade association estimated an inventory of about 125 lakh tons (12.5 million metric tons) of uncrushed oilseeds.

The memorandum was sent to the heads of the ministries of Finance, Agriculture, Commerce, and Food Processing Industries.

Soy round table adopts standards

In June 2010, the Round Table on Responsible Soy (RTRS) adopted voluntary sustainability standards that aim to ensure that current soy production and further expansion of the crop will be done in an environmentally sound and socially responsible way that avoids clearance of forests and high conservation value areas. The standards also call for soy production to avoid polluting the environment and creating social conflicts.

The standards require producers to take certain measures to protect the environment. These include eliminating the most hazardous pesticides used in soy farming as well as prohibiting the conversion of forests and areas with high conservation value, such as rich savannahs.

Next, the RTRS must finalize its certification system to verify compliance with the standards and establish methods to trace soy shipments. Once this certification and traceability system is adopted, the RTRS

estimates that responsibly produced soy will be available as part of the next soy harvest in South American countries in March 2011.

The RTRS also agreed to develop a voluntary annex for RTRS members that wish to produce or trade in soy that is labeled as GM free.

The RTRS currently has more than 140 members, including major private interests in the soy industry, smallholder farmers, feed mill operators, traders, retailers, financial institutions, and social and environmental organizations.

Acrylamide down in food products: EFSA

Voluntary efforts to reduce levels of acrylamide in European food products are working but only in a limited number of food groups. That is according to the European Food Safety Authority (EFSA), which recently analyzed data from 2,000 food samples collected in 2008.

Significantly lower acrylamide levels were reported for French fries, fried potato products for home cooking, soft bread, bread not specified, infant biscuit, biscuit not specified, muesli, and porridge and other products not specified. EFSA also said potato crisps, instant coffee, and substitute coffee products, such as those based on barley or chicory, all showed significantly higher levels of acrylamide in 2008 compared with 2007.

Acrylamide is formed during high-temperature cooking by a heat-induced reaction between sugar and the amino acid asparagine.

Sterol health claim OK in Canada

For the first time in Canada, food companies will be allowed to promote food products fortified with plant sterols as lowering serum cholesterol levels.

On June 1, Unilever Canada's Becel pro.activ margarine became the first food product on grocery shelves to make a health claim about plant sterols.

In related news, Cognis achieved Novel Foods approval from Health Canada for its plant sterol ingredient in late May 2010.

China fishes for krill for first time

China has fished for the first time for krill in Antarctic waters.

The Antarctic and Southern Ocean Coalition, an environmental group based in Washington, DC, USA, reported the Chinese catch at 2,000 metric tons. The harvest is part of a five-year project to develop krill products for sale in China, including fish meal for aquaculture, and for export.

In related news, US retailer Whole Foods said in May 2010 it will stop selling krill supplements in its 270 stores in North America and the UK. The company based its decision on concerns over the impact of krill fishing on marine animals such as penguins, seals, and whales.

Krill are tiny, shrimplike crustacea that serve as the foundation of the Southern Ocean food web. Demand for krill oil is increasing as the omega-3 supplement market expands. ■

Call for Nominations

Stephen S. Chang Award

The Stephen S. Chang Award recognition shall consist of a jade galloping horse symbolizing the award and an honorarium. The late Stephen S. Chang, an AOCS past president, and his wife, Lucy D. Chang, sponsor the award.

The Award

The Stephen S. Chang Award recognizes a scientist, technologist, or engineer who has made significant and distinguished accomplishments in basic research that must have been utilized by industries for the development or improvement of products related to lipids. The awardee may be recognized for either one major breakthrough or an accumulation of publications.

A prospective recipient must agree to be present for acceptance of the award and to deliver an award address at the 102nd AOCS Annual Meeting & Expo. The award is made without regard for national origin, place of residence, race, color, creed, or gender.

Nomination Procedures

Nominations for the 2011 award must be submitted before October 15, 2010.

Candidate material should be sent to the AOCS Awards Program at awards@aocs.org.

The suggestions listed below may be helpful to nominators in addressing the mandatory criteria of industrial utilization.

1. Documentation of the application of research
   a. Patents received, licensing arrangements
   b. Specific examples of industrial use
2. Documentation for the development or improvement of products related to lipids
   a. Listing of new products, manufacturers, sales history
   b. Manufacturers' testimonials regarding product improvement resulting from their direct utilization of the basic research in specific products with comparative figures on sales or consumer acceptance

The nomination must include a letter from the nominator, at least three supporting letters, the nominee's curriculum vitae, and a list of major relevant publications, including patents.

www.aocs.org/goto/awards

Biofuels News

Briefs

SunPine AB officially opened its new SEK 250 million ($32 million) diesel production plant on May 17 in Piteå, Sweden. This second-generation biofuels company uses crude tall oil as feedstock to make renewable diesel. The major by-product is a tall oil pitch, which can be processed further to recover chemicals such as rosin and phytosterols. The goal is to produce 100,000 cubic meters of crude tall diesel annually, according to Magnus Wikman, president of SunPine.

■■■

Biorefinery developer ZeaChem Inc. (Lakewood, Colorado, USA) is building a new refinery in Boardman, Oregon, USA, where it will be converting poplar trees to cellulosic ethanol. The company broke ground in June on a $73 million, 250,000 gallons (1 million liters) per year facility, which will produce acetic acid and ethyl acetate as well as ethanol. ZeaChem's project is funded by their own monies as well as a $25 million grant from the US Department of Energy. The facility is expected to be online and producing fuel by 2011.

■■■

Six retailers in Japan announced a clothes recycling project in early June. The companies will collect unwanted textile items at their stores and turn them into bioethanol for use as boiler fuel. According to Jiji Press Ltd., the companies hope to collect 50 tons of textile products in the first year. The three participants are Aeon Co., Ryohin Keikaku Co., department store chain Marui Co., Tokyo-based jeans maker Edwin, Edwin group firm Amerikaya, and food delivery company Radish Bo-ya Co.

■■■

The US Department of Energy announced the investment of up to $24 million for three research groups to investigate commercialization of algae-based biofuels. The three consortia selected are: (i) Sustainable Algal Biofuels Consortium, led by Arizona

CONTINUED ON NEXT PAGE

GENERAL

Sweden moving away from oil-based energy

Biomass has now surpassed oil to become the number one source for energy generation in Sweden. The increased competition for logs and wood chips between the pulp industry and energy sector has pushed wood fiber prices to new highs, according to the Wood Resource Quarterly.

Sweden is one of the countries in the world that has come the furthest on the road toward fossil fuel independence. Last year, the Swedish government approved a plan to have renewable energy reach 50% of the total energy consumed in the country by the year 2020, reports the Wood Resource Quarterly. In addition, the country aims to be totally independent of imported fossil fuels for the transportation sector by 2030.

As an incentive for people to use more environmentally friendly vehicles in Sweden, there are currently no taxes on ethanol while there are high energy and carbon dioxide taxes (approximately $0.70/liter) on conventional gasoline and diesel. Tax incentives for purchasing low-carbon dioxide emission vehicles also have been in place since 2006.

The total energy consumption generated from biomass in Sweden grew from 88 tera watt hours (TWh) to 115 TWh between 2000 and 2009, while the usage of oil-based products (all imported) declined from 142 TWh to 112 TWh during the same period, according to the Swedish Bioenergy Association Svebio. Biomass surpassed oil to become the number one source for energy generation in 2009, accounting for 32% of the total energy consumption in the country. Biomass consumption is projected to increase by another 10% in 2011.

ALGAE

Algae biorefinery in New Mexico

Officials inaugurated what they called the world's first biorefinery designed specifically to extract biofuel from microalgae on June 7. The facility was constructed at the

State University (Mesa), which will investigate the acceptability of algal biofuels as replacements for petroleum-based fuels; (ii) Consortium for Algal Biofuels Commercialization, led by the University of California, San Diego, which will concentrate on developing algae as a robust biofuels feedstock; and(iii) Cellana, LLC Consortium (Kailua-Kona, Hawaii), which will examine large-scale production of fuels and feed from microalgae grown in seawater. ■

site of the Center for Excellence for Hazardous Materials Management (CEHMM; Carlsbad, New Mexico, USA) algae production ponds near Artesia, New Mexico.

CEHMM teamed up with Solution Recovery Services (Dexter, Michigan, USA) to develop the system, which can separate crude biodiesel fuel from the biomass byproduct. The latter is rich in nutrients and is being considered as a livestock feed supplement, said Douglas Lynn, executive director of CEHMM

The algae are being grown in water too salty to be used for drinking or irrigation. CEHMM is also exploring ways to purify wastewater from oilfields to be used in the algae process, he said.

According to Lynn, the project has the potential to produce 5,000 gallons of oil per acre (47,000 L/ha) per year.

Algae-derived fuel powers European flight

The European Aeronautic Defence and Space Company N.V. (EADS) made the world's first public flight of an engine powered solely by algae-derived biofuel at the ILA Airshow in Berlin on June 8. For several weeks before the Airshow, Austria-based Diamond Aircraft and EADS Innovation Works tested a Diamond DA-42 with Austro Engine AE300 diesel powerplants in flight; one engine used 100% biofuel and the other burned regular kerosene jet fuel.

The biofuel was supplied by German processor VTS from algae oil provided by Biocombustibles Chubut S.A. in Argentina.

Bench tests of the algae-derived fuel in the AE300 engine indicated a fuel savings of 5–10% over standard jet-A. Measurements on the exhaust gases showed that the algae-derived-fuel produced one-eighth the hydrocarbons of kerosene. Production of nitrogen and sulfur oxides was also lower compared to kerosene, owing to the low sulfur and nitrogen content of the fuel.

According to AviationWeek.com (dated June 7), EADS is on a mission to prove the viability of algae-based biofuels and is seeking to collaborate with Airbus, Boeing, and the aerospace industry to establish common standards for algae-derived biofuel.

EADS is not, however, interested in growing algae or refining them into oil. Instead, it will work with partners to develop the necessary industrial infrastructure to produce the economies of scale needed to make algae fuel commercially feasible.

Microalgae in China

The Boeing Company and the Qingdao Institute of BioEnergy and Bioprocess Technology, Chinese Academy of Sciences, announced the establishment of a joint laboratory to accelerate microalgae-based research leading to the commercialization of sustainable biofuels for the aviation industry in late May.

Al Bryant, vice president of Boeing Research and Technology–China, said, "We will be looking at technologies that can accelerate the implementation of biofuels and expand the scale of aviation biofuels production in China and worldwide."

Under the initial three-year agreement, the partners each will provide $500,000 in yearly funding, as well as in-kind services to support the lab's operation.

To date, Boeing has helped establish biofuels research programs at 13 universities and institutions in the United States, Australia, Europe, the Middle East, India, and China.

Growing algae in Nova Scotia

Gary Goodyear, Minister of State (Science and Technology) for Canada, announced the launch of an algal biofuel project at the National Research Council Institute for Marine Biosciences (NRC-IMB) in Halifax, Nova Scotia, on June 4. The project received about $5 million through the National Bioproducts Program and NRC-IMB. Preliminary work and engineering plans have been drawn up to build a 50,000-liter cultivation pilot plant at the Ketch Harbour facility.

A main component to help the algae grow will be carbon dioxide emissions from fossil fuel combustion. The project involves several industry partners including Carbon2Algae Solutions Inc., Coquitlam, British Columbia; POS Pilot Plant, Saskatoon; Ocean Nutrition Canada, Halifax; and Menova Energy Inc., Markham, Ontario.

Stephen O'Leary, an NRC researcher working on the project, told The Canadian Press (http://thechronicleherald.ca/Metro/9016700.html), "The main obstacles to commercialization are the scale of the technology." He added, "We can grow microalgae in our lab, we can harvest the biomass and produce a fuel and demonstrate that it will burn in an engine. The difficulty is being able to do that at an industrially relevant scale."

Carbon2Algae plans to grow algae in photobioreactors, using local strains of algae already acclimatized to the environment. Sixty-four species have been collected and studied so far by the biofuels project. Twenty-four have been brought

into cultivation, and four are under intense scrutiny, according to Globe-Net.com (June 15).

Toyota commits to investigating algae

According to Bloomberg.com (June 18), Hitachi Ltd., the research and development unit of Toyota Motor Corp., and more than 40 other Japanese companies and institutions have joined a national study into the potential for using algae to produce biofuels, cosmetics, and food.

Other participants besides Toyota (see *inform 21*:350, 2010) include autoparts maker Denso Corp., refiners Nippon Oil Corp. and Idemitsu Kosan Co., and soy sauce maker Kikkoman Corp. Tsukuba University is leading the study.

Denso, which is more than 20% owned by Toyota, has joined Keio University to research the green alga *Pseudochoricystis ellipsoidea*, which lives in ponds and hot springs.

The study group hopes to commercialize algal products as substitute for gasoline and diesel by 2020. Methods to extract algal oil must be developed first. The group's goal is to develop mass production technology for alternative auto and jet fuel within 10 years.

ETHANOL

Butanol as fuel

Several companies, including Butamax Advanced Biofuels LLC, a joint venture between BP and DuPont, have been pursuing the idea of using butanol as a fuel, in somewhat the same way as ethanol is used.

A recent US patent application (No. 20100136641) from Butamax found strains of *Lactobacillus* that are not natural butanol producers have increased tolerance to butanol when the membrane content of unsaturated *trans* fatty acids is increased. Feeding cells with unsaturated *trans* fatty acids increases their concentration in the membrane, which also can be accomplished by expressing a fatty acid *cis-trans* isomerase.

Ethanol from household/ commercial waste

INEOS Bio (Lyndhurst, Hampshire, UK) has received a £7.3 million (about $11 million) grant from regional development agency One North East and the UK Department for Energy and Climate Change to construct Europe's first advanced bioethanol from waste plant.

The INEOS BioEnergy Process Technology will be used to convert biodegradable household and commercial waste to carbon-neutral biofuel for use in cars and for generation of renewable electricity. The technology depends on an anaerobic fermentation step, in which naturally occurring bacteria convert gases derived from biomass into bioethanol.

The plant will be located at Seal Sands in the Tees Valley, and could be operational as early as 2012. The plant is being designed to produce 30 million liters of bioethanol annually.

CAS report on ethanol

CAS, a division of the American Chemical Society, released a report in June entitled "China takes lead in the commercialization of bioethanol." Among other things, the report found that scientific research on second-generation biofuels—fuels derived from non-food sources—has grown more than any other category of biofuel research throughout the last 40 years. The United States leads all other nations in the publication of scientific journal literature regarding bioethanol, but China is the global leader in the patenting of bioethanol discoveries.

Publication of research pertaining to second-generation bioethanol grew 586% between 2000 and 2009. Separating these publications into journal articles and patent documents showed that patent documents rose 2,341% between 2000 and 2009.

According to the report, "This shift in publication methods indicates that research organizations are increasingly choosing to stake claim on intellectual property regarding second-generation bioethanol research by patenting their discoveries. . . . The move toward patenting bioethanol research indicates an increasing global tendency for researchers to monetize and commercialize their discoveries."

Research on third-generation (from algae) production of ethanol, while confined to a much smaller number of publications, has increased rapidly since 2007. Over the past 40 years, the United States has lead in both journal articles and patents regarding third-general ethanol, and Japan has also been a strong player in this area.

The report is available as a free download from www.cas.org/newsevents/releases/research062410.html.

BIODIESEL

Instability of biodiesel

Research carried out by Joseph Suflita and coworkers at the University of Oklahoma (Norman, USA) has found that biodiesel can accelerate the corrosion of carbon steel used to manufacture pipelines, storage tanks, and other components of fuel manufacture, storage, and shipping systems.

In these studies soy-based biodiesel was stored under anaerobic conditions in the presence of microorganisms originating from aquatic and marine environments. The organisms had differing histories of exposure to hydrocarbons, biodiesel, and oxygen. Results showed all inocula could biodegrade biodiesel within one month. Metabolism of biodiesel accelerated the rate of both sulfate reduction and methanogenesis compared with controls.

Further analysis found that the fatty acid methyl esters of biodiesel were hydrolyzed to their component fatty acids, and in turn these were metabolized. The authors concluded that the acidic nature of these metabolites accelerates the pitting corrosion process of carbon steel, which is used throughout the fuel infrastructure.

The article appeared in *Energy Fuels 24*:2924–2928 (2010).

Australia, Peru allege dumping by US

Reuters news service reported that the Australian Customs and Border Protection Service is looking into a complaint by Biodiesel Producers Ltd. (Barnawartha, Australia) that the United States is dumping biodiesel onto the Australian market and undercutting domestic producers. The Customs agency made no immediate comment, but Biodiesel Producers warned that the United States could face possible duties.

Chris Attwood, general manager for Biodiesel Producers, told Reuters that US imports were being subsidized twice, once at home and a second time in Australia, where they are "getting a subsidy under the clean fuels grant." The Australian grant is worth almost $0.40 (US$0.35) per liter and is available until June 30, 2011.

National Biodiesel Board (Jefferson City, Missouri, USA) spokesman Michael Frohlich responded that there is no subsidy in the United States. (The $1.00 per gallon subsidy in the United States expired December 31, 2009, and had not yet been renewed by Congress as of late July 2010). ABC Rural News (Australia) quoted Frohlich as saying, "There is no tax incentive in place . . . so, unless this has happened in 2009 and they decided in June to 2010 to bring it to someone's attention, it's meritless."

The Australian biofuels industry maintains the exports about which they are complaining occurred in 2009.

Similarly, the anti-dumping body of the national government of Peru has decided to impose a duty of $212 per metric ton on US B100 (i.e., unblended biodiesel) entering the country as punishment for previous dumping claims. The government had determined that between December 2008, when the notice of potential dumping was filed, and June 2009, biodiesel was arriving 31.9% cheaper than local production (http://tinyurl.com/3xptsw7).

First commercial-scale jatropha crush

Mission NewEnergy Ltd., a vertically integrated biodiesel refiner headquartered in Osborne Park, Western Australia, announced in June that it had aggregated, crushed, and shipped commercial quantities of jatropha oil from its farming network in India to its biodiesel refinery in Malaysia.

Mission collected approximately 1,500 metric tons (MT) of seed, which it believes is the largest single accumulation yet of jatropha seeds. In a company report, Nathan Mahalingam, managing director of Mission NewEnergy, said, "We are extremely pleased with the Indian operation's ability to effectively consolidate mass quantities of seeds from such a wide geographic dispersion." He added, "The achievement of this milestone clearly demonstrates Mission's logistical capability to harvest commercial quantities of jatropha from the network built over the last three years."

Using only basic oil-expelling techniques, Mission extracted and shipped approximately 188 MT of crude jatropha oil. The company is now introducing solvent extraction methods that should lead to a significant increase in oil yield realization, from the current 16% to 20–30%.

Based on Mission's long-term contract farming rates, oil yields using solvent extraction processes, and after by-product realization, Mission's cost base for jatropha-based biodiesel is approximately $64 per barrel ($1.53 per gallon). This cost basis represents a 34% discount to the current price of ultra low sulfur diesel. ■

Briefs

When food manufacturers and chain restaurants reduced or eliminated *trans* fat, the reformulated foods usually ended up lower in their total amount of *trans* and saturated fat. That finding, published as a correspondence in the *New England Journal of Medicine* (*362*:2037–2039, 2010), "effectively disproves speculation that food manufacturers would merely replace partially hydrogenated oils—the source of artificial *trans* fat—with saturated fat from butter, lard, or palm oil," said the Center for Science in the Public Interest (CSPI) in a news release. (Two CSPI researchers worked with Darius Mozaffarian of the Harvard Medical School on the study.)

■■■

In a recent study, women who ate the most dairy fat saw a 26% reduction in heart attack risk, whereas men lowered their risk by 9%. Researchers from Sweden's Uppsala University looked at biomarkers of milkfat in 444 heart attack patients and 556 healthy controls for the study, funded partly by the National Dairy Council/Dairy Management Inc. The study appeared in the *American Journal of Clinical Nutrition* (doi: 10.3945/ajcn.2009.29054).

■■■

The nutrition and food safety watchdogs at the Center for Science in the Public Interest recently conferred their Xtreme Eating awards on nine items from seven US restaurant chains. Our favorite? A pancake meal with 1,380 calories and 34 grams of fat, including seven grams of *trans* fat. See the list of "winners" at http://tinyurl.com/2vqmman. ■

Health & Nutrition

The Food Guide Pyramid, first published in Denmark in 1978, was adapted by the US Department of Agriculture in 1992. In 2005, the iconic representation of presumed proper eating added a recommendation for daily exercise and became MyPyramid. So far, there have been no indications of whether or how the icon will change in 2010.

Dietary guidelines report released

The *Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans 2010* was released in June by the US Departments of Agriculture and Health and Human Services.

The *Guidelines* are reassessed and reissued every five years in light of emerging science and perceived public health needs. Among the suggestions in the committee's report:

- Decrease "solid" fat (saturated fat) intake from 10% of energy to 7%. Further, limit "cholesterol-raising" fats (saturated fats exclusive of stearate and *trans* fat) to less than 5–7% energy.
- Lower daily sodium intake to 1,500 milligrams (mg) from 2,300 mg.
- Eat more low-fat dairy products, vegetables, beans and peas, whole grains, nuts, seeds, and seafood. Specifically, the report recommends intake of 250 mg of long-chain polyunsaturated fatty acids per day via consumption of 8 ounces (about 227 grams) of fish per week.
- Cook more and eat out less.
- Understand the idea of "discretionary calories."

In taking aim at the growing problem of obesity, the committee recommended that children should greatly reduce intake of sugar-sweetened beverages and consume less fruit juice. "The single most sobering aspect of this report," Committee chair Linda Van Horn wrote, "is the recognition that we are addressing an overweight and obese American population. . . . Everything within this Report is presented through the filter of an obesegenic environment in critical need of change."

RECOMMENDATIONS ON FAT INTAKE

Stephen Phinney, a professor at the University of California, Davis, and a proponent

of high-protein diets, told the *LA Times* newspaper that he objects to the "continued demonization of saturated fats by the committee." He then cited the recent meta-analysis led by Ronald M. Krauss that found no association between saturated fat intake and heart disease or stroke (*American Journal of Clinical Nutrition 91*:502–509, 2010).

Likewise, Margo Wootan, director of nutrition policy for the Center for Science in the Public Interest (a consumer advocacy group based in Washington, DC, USA), takes issue with the recommendation to limit cholesterol-raising fats (saturated fats exclusive of stearate and *trans* fat) to less than 5% to 7% of energy, calling it "misguided."

"Stearate may not raise cholesterol levels, but it is still not clear whether it contributes to heart disease in other ways. The advice is too complicated, and impossible for people to follow, since stearate is not listed on food labels," Wootan said.

Walter Willett of the Harvard School of Public Health told the *Times* that the review "represents progress." However, he suggested that the recommendation that the percentage of total fat be less than 35% of calories is out of date.

"The best available evidence demonstrates that percent of calories from fat in a diet has no bearing on weight loss—a point the dietary guidelines committee acknowledges. It makes no sense to base the dietary guidelines on an outdated recommendation."

The final 2010 guidelines will be released later in 2010. The report is available online at http://tinyurl.com/DietaryGuidelines.

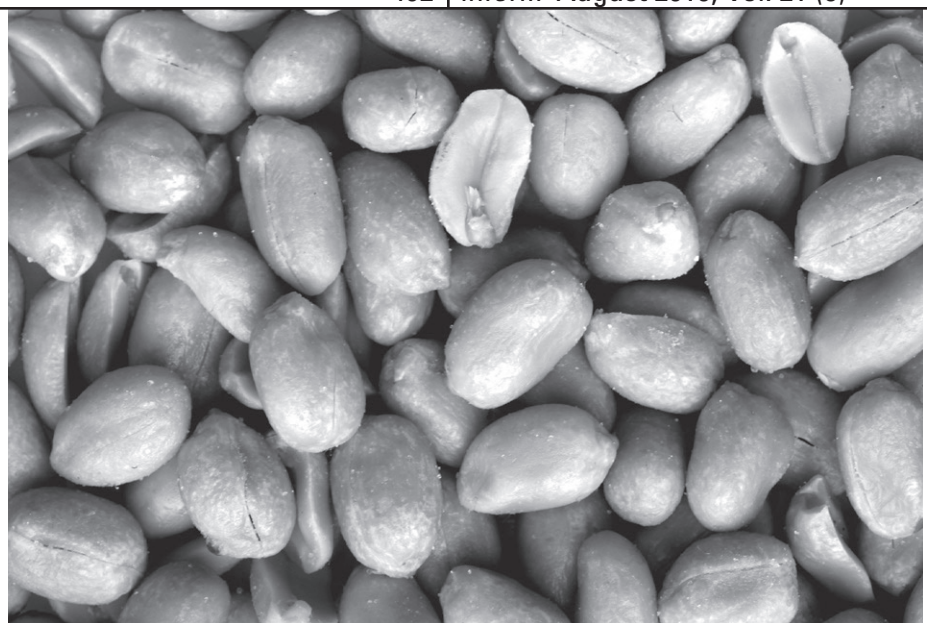
No benefit of omega-3s in women with type 1 diabetes

Consuming higher amounts of omega-3 fatty acids does not appear to lower heart disease risk for women with type 1 diabetes, according to a University of Pittsburgh Graduate School of Public Health study that was presented at the 70th Scientific Sessions of the American Diabetes Association, June 25–29, 2010, in Orlando, Florida.

The study (abstract number 1757-P) included 601 men and women enrolled in the Pittsburgh Epidemiology of Diabetes Complications Study, a long-term prospective examination of childhood-onset type 1 diabetes that began in 1986. Participants were diagnosed with type 1 diabetes between 1950 and 1980. Little is known about the effect of consuming omega-3 in people with type 1 diabetes, who are at much greater risk for heart disease.

During the course of the study, 166 participants (27.6%) were diagnosed with cardiovascular disease. Generally, omega-3 intake among participants was low. The incidence of heart disease was lowest in men who consumed the highest quantities of omega-3—more than 0.2 grams per day. Women who consumed similar amounts of omega-3 did not have lower rates of heart disease.

"Although omega-3 is typically associated with decreased risk for cardiovascular disease, this may not be the case for women who have type 1 diabetes," said Tina Costacou, lead author of the study and assistant professor of epidemiology, University of Pittsburgh Graduate School of Public Health. "Importantly, our study suggests we shouldn't assume men and women with type 1 diabetes are the same."



Peanut oil/flour and LDL cholesterol

Human clinical trials have demonstrated the presumed cardiovascular protective properties of peanuts and peanut oil in decreasing total and low-density lipoprotein cholesterol (LDL-C, or "bad" cholesterol) without reducing high-density lipoprotein cholesterol (HDL-C, or "good" cholesterol).

However, the cardiovascular effects of the nonlipid portion of peanuts have not been evaluated even though that fraction contains arginine, flavonoids, folates, and other phytochemicals that have been linked to cardiovascular health.

A new study led by A.M. Stephens of North Carolina State University (Raleigh, USA) evaluated the effects of fat-free peanut flour (FFPF), peanuts, and peanut oil on cardiovascular disease risk factors and the development of atherosclerosis in male Syrian golden hamsters. Each experimental diet group was fed a high-fat, high-cholesterol diet with various peanut components (FFPF, peanut oil, or peanuts) substituted for similar metabolic components in the control diet.

"Tissues were collected at weeks 0, 12, 18, and 24. Total plasma cholesterol (TPC), LDL-C, and HDL-C distributions were determined by high-performance gel filtration chromatography, while aortic total cholesterol (TC) and cholesteryl ester (CE) were determined by gas-liquid chromatography. Peanuts, peanut oil, and FFPF diet groups had significantly ($P < 0.05$) lower TPC, non-HDL-C than the control group beginning at about 12 weeks and continuing through the 24-week study. HDL-C was not significantly different among the diet groups. Peanut and peanut component diets retarded an increase in TC and CE," the researchers write.

The researchers conclude: "Because CE is an indicator of the development of atherosclerosis, this study demonstrated that peanuts, peanut oil, and FFPF retarded the

development of atherosclerosis in animals consuming an atherosclerosis-inducing diet."

Stephens and colleagues published their study in the *Journal of Food Science* (*75*:H116–H122, 2010).

Largest clinical study to date on n-3 and depression

The use of omega-3 supplements is effective among some patients with major, unipolar depression, according to a multicenter, double-blind, randomized clinical study out of Canada. Initial analyses did not clearly demonstrate the effectiveness of omega-3 supplementation for all 432 patients taking part in the study. Further analysis, however, revealed that omega-3 supplementation improved depression symptoms in patients diagnosed with depression unaccompanied by an anxiety disorder. Efficacy for these patients was comparable to that generally observed with conventional antidepressant treatment, according to the researchers. Participants received 1,050 mg of EPA (eicosapentaenoic acid) and 150 mg of DHA (docosahexaenoic acid) each day for eight weeks.

The study was directed by François Lespérance of the Centre de recherche du Centre hospitalier at the Université de Montréal and appeared in the *Journal of Clinical Psychiatry* (doi: 10.4088/JCP.10m05966blu).

Satiety and fatty acid type

Saturated, mono-, or polyunsaturated fatty acids all perform poorly when it comes to producing satiety, according to a new—albeit small—study. This contradicts previous studies that suggest polyunsaturated fats may be more effective at stopping hunger pangs.

"In this study we were unable to show differential changes in postprandial feelings of hunger or fullness, or changes in energy intake at a lunch meal when alterations were made to the fatty acid saturation of a high-fat breakfast," according to the researchers from the University of Auckland in New Zealand.

Eighteen healthy, lean men were assigned to receive breakfasts high in one form of the three fats—saturated (65% of lipids), monounsaturated (76%), or polyunsaturated (76%)—in a randomized crossover design.

"Whether a higher-dose lipid product administered as a preload rather than test meal, i.e., closer to the lunch meal, would elicit an appetite response is unknown," write the researchers.

"Certainly there is little consensus on effects of dietary lipid composition on appetite control from previous studies. Whether appetite may be altered by longer-term and sustained changes in dietary fatty acid composition also remains to be demonstrated," they concluded.

The study appeared in *Nutrition Journal* (doi: 10.1186/1475-2891-9-24).

NIH guidelines for soy research

Participants in a workshop sponsored by the US-based National Institutes of Health have developed guidelines on designing and evaluating clinical research studies investigating soy, representing the first guidelines of their kind in the field of soy research.

The guidelines are aimed at increasing the consistency of study design and validity of outcomes in future clinical research on soy, NIH noted in a news release.

Past results of clinical studies on soy have been inconsistent and difficult to compare, which could be attributed to a number of factors, including varying product composition and dosing, study adherence, and sample size. The new guidelines are intended to improve the quality of future research studies of soy.

The soy research guidelines address:

- The need for sound justification for studying the health effects of soy in humans,
- Approaches to understanding and ensuring product composition and integrity,
- Methods for assessing exposure to non-study soy and intervention adherence,
- Some appropriate analytical methods to test soy products,
- The importance of understanding how soy is processed and how it acts in the body, and
- The role that genetic makeup may play in the health effects of soy.

The guidelines appeared in *The Journal of Nutrition* (*140*:1192S–1204S, 2010). ■

Biotechnology News

Briefs

Business Daily Africa reported in July that Kenya plans to commercialize genetically modified (GM) cotton by 2012. Accompanying regulations are expected from the country's National Bio-safety Authority, which the news service said would likely spur crop trials from the Kenya Agricultural Research Institute. According to Felix M'mboyi, senior program officer for the African Biotechnology Stakeholders Forum, a taskforce has been formed to "ensure that commercialization of the crop is achieved within the proposed timeline."

■■■

BASF (Ludwigshafen, Germany) and Monsanto Co. (St. Louis, Missouri, USA) announced in July an expansion of their joint efforts to develop higher-yielding and stress-tolerant crops to include a fifth crop, wheat. In addition, the companies are increasing their investments in the collaboration, reflecting the leads and commercial prospects in the collaboration's early work. The collaboration that was established in 2007 includes the following crops: corn, soy, cotton, and canola. In the original collaboration, the two companies dedicated a joint budget of potentially $1.5 billion; the new agreement will result in a potential additional investment of more than $1 billion by the companies over the life of the collaboration.

■■■

Syngenta AG (Basel, Switzerland) and Bayer CropScience AG (Monheim am Rhein, Germany) announced a global cotton technology licensing agreement. Under the agreement, Syngenta has granted Bayer CropScience a world-

EU proposal could give member states final GMO say

In mid-July, the European Union (EU) unveiled a proposal that would allow all EU member states more freedom in individual policymaking for genetically modified organisms (GMO). Seen as an attempt to break the stalemate that has developed over the approval and use of GMO in EU countries, the European Commission's proposal would allow member states to "restrict or ban genetically modified crops, even after an EU approval procedure based on health and environment risk assessment has given a green light," reported *The Wall Street Journal*.

"Experience with GMO so far shows that member states need more flexibility to organize the coexistence of genetically modified and other types of crops," EU Health and Consumer Policy Commissioner John Dalli was quoted as saying. "The Commission is not in favor or against GMO. But in today's world, they are a reality and Europe cannot stand idle and deny itself the political responsibility to take decisions and implement a policy of responsible innovation."

Opposition to GM crops by EU member states, including a well-publicized move by some countries to ban Monsanto Co.'s MON 810 GM maize, has slowed and/or blocked approval of various GM crops for at least a decade (see, for instance, "Report examines EU biotech," *inform 20*:372 or "EU member states take action on GM ban," *inform 20*:305, 2009).

A number of interests have expressed concerns over the new proposal, though.

"These proposals appear to give carte blanche to ban safe and approved GM crops in any country or region regardless of the needs or wishes of their farmers," said Carel du Marchie Sarvaas, director for agricultural biotechnology at EuropaBio, the association that represents dozens of biotech and chemical companies, including BASF and Monsanto.

Helen Ferrier, chief science and regulatory affairs adviser for the UK's National Farmer's Union, voiced that group's opposition:

"We are very concerned that instead of making decisions based on science, member states can now legitimately use coexistence measures to restrict GM plantings and to

lower labeling thresholds at either national or regional levels. This has the potential to severely disrupt internal markets and cause uncertainty throughout the agriculture and food supply chains, as well as add further confusion for consumers. And it may also lead to severe political and legal pressure on national governments and compromise their ability to make science-based policy decisions about GM crops. We are against an approach that could put our farmers and growers at a disadvantage with our competitors, both across the EU and abroad."

Groups such as Friends of the Earth Europe also expressed opposition to the proposed law:

"While the commission is seemingly offering countries the right to implement national bans, in reality the proposal does the opposite, opening Europe's fields to GM crops. Governments that try to ban GM crops in their countries will find the bans overturned in court by biotech lawyers due to the weak legal basis of this short-term proposal," *The Guardian* (UK) quoted spokesperson Mute Schimps as saying.

The proposal will require approval from both the EU Parliament and a majority of member countries to become law.

In related news, Reuters reported in late July that the American Farm Bureau Federation asked the administration of US President Barack Obama to begin the process of sanctions against the EU because of its stance on GM crops. The federation argued that the EU is still in violation of a World Trade Organization "ruling against its 'de facto' moratorium on approving new varieties of biotech crops for sale in the 27-nation bloc."

"The inability of the EU to operate a timely and predictable regulatory process ended US corn exports (to the EU) in 1998 and has reduced corn by-products substantially," the federation was quoted as saying. "If the EU does not immediately begin to make timely, science-based regulatory decisions on pending and future applications, soybean exports also are at serious risk."

Use of GE crops by US farmers continues to grow

A USDA report released in July found that US farmers continue to choose genetically engineered (GE) crops over their conventional counterparts. Key findings from the USDA Economic Research Service (ERS) report, Adoption of Genetically Engineered Crops in the U.S., include:

- Adoption of GE soybeans is 93% in 2010 (up from 91% in 2009);
- Adoption of all GE cotton climbed to 93% in 2010 (up from 88% in 2009);
- Adoption of all biotech corn reached 86% in 2010 (up from 85% in 2009).

Sharon Bomer Lauritsen, executive vice president, food and agriculture, for the Biotechnology Industry Organization (BIO), issued the following statement in response to the report's findings:

"As expected, this year's data on adoption of genetically engineered crops provides more evidence that US farmers continue to value biotech varieties of soybeans, cotton, and corn for the economic and environmental benefits they provide.

"A report from the National Research Council [NRC] released April 13 notes, '(m)any U.S. farmers who grow genetically engineered crops are realizing substantial economic and environmental benefits . . . compared with conventional crops.' The report was commissioned and internally funded by NRC in order to evaluate the impact of GE crops on all U.S. farmers.

"The move to biotechnology and modern farming practices is reflected in the choices of farmers around the world. In 2009, 330 million acres of biotech crops were planted in 25 countries by 14 million farmers."

The USDA report summarizes the extent of adoption of herbicide-tolerant and insect-resistant crops since their introduction in 1996. Three tables within the report devoted to corn, cotton, and soybeans cover the 2000–2010 period by US state. For a copy of the report, visit www.ers.usda.gov/Data/BiotechCrops.

EFSA announces NGO meeting on risk assessment

In early July, the European Food Safety Authority (EFSA) announced its intention to call a meeting in September 2010 with environmental nongovernmental organizations (NGO) on its guidelines for the Environmental Risk Assessment (ERA) of GMO.

According to EFSA, their revised draft ERA guidelines are the result of two years'

wide, non-exclusive license for use of VIPCOT™ insect control technology in cotton. The VIPCOT technology expresses two insecticidal proteins that are effective against a number of cotton pests, including cotton bollworm (*Helicoverpa zea*, also known as the corn earworm) and tobacco budworm (*Heliothis virescens*).

■■■

Science Business reported in July that Europe's Court of Justice had handed down a ruling that Monsanto Co. "cannot prevent soy meal that contains a DNA sequence it holds the patents on being sold" in the European Union (EU). The ruling relates to the degree of protection afforded to biotech patents under the EU's Biotechnology Directive, which came into force a decade ago. According to Science Business, this first-of-its-kind ruling for the court "marks a significant restriction on the powers biotech companies can wield with their patents and at the same time sets out the boundaries for protecting intellectual property involving DNA sequences."

The court ruled that protection of DNA sequence patents is to be "purpose-bound," i.e., the court ruled that Monsanto could not argue for an extended patent protection of their DNA sequence—in this case, in the soy meal being sold—because the DNA sequences were no longer "performing the specific function for which they were patented."

"It [the court] roundly rejected Monsanto's argument that it should be entitled to the broadest possible protection to its Roundup Ready patent, that is to its DNA sequence as such,"

said intellectual property lawyer Jonathan Radcliffe.

■■■

In July, Syngenta Seeds, Inc. unveiled its Agrisure Artesian™ technology, a new brand name for its range of water-optimized hybrids and the newest addition to the Agrisure® family of high-performance trait products. A limited quantity of hybrids with this technology, which has demonstrated the potential to deliver 15% yield preservation under drought stress, will be available through the company's Garst®, Golden Harvest®, and NK® product brands. According to the company, Agrisure Artesian technology enables corn plants to use available moisture more efficiently, resulting in higher yields on drought-stressed acres including dryland and limited-irrigation farms. Growers on rainfed acres likewise can use Agrisure Artesian technology to help stabilize yields in years of inconsistent rainfall or in fields with variable soil types and moisture-holding capacity.

■■■

A policy brief, published by the UK Parliamentary Office of Science and Technology (POST) in June, examines the potential of GM insects in controlling insect-borne diseases and agricultural insect pests. Insect-borne diseases pose significant health risks to approximately half the world's population—malaria alone kills nearly one million people each year. Insects also damage livestock and crops. A single insect pest of maize can cause economic losses of up to $60 million in some African countries.

Control strategies have traditionally focused on the use of chemical insecticides or the Sterile Insect Technique (SIT) where laboratory-reared male insects, sterilized by radiation, are released to mate with wild females in a form of area-wide birth control. But new methods to manipulate genes, developed over the past decade, offer an alternative strategy: the use of GM insects. These can be used to control insect pests through population suppression or population replacement.

Suppression builds on the SIT, where insects are engineered to

work by scientists from all over Europe and demonstrate their commitment to staying at the forefront of recent developments in the field of GM plant ERA.

In the current draft, the scientific experts have strengthened requirements for GM applications submitted to EFSA for evaluation with respect to data generation, collection, and analysis. EFSA's GMO Panel has in addition further developed specific guidance on the evaluation of possible effects of GM plants on non-target organisms.

In December 2008 the Environment Council concluded that the implementation of the EU legal framework for GMO should be reinforced. Along with the other partners involved, including the European Commission and member states, EFSA is taking a number of relevant actions, including the continual revision of its guidelines. To complement this work, EFSA organized a series of technical discussions to bring together GMO Panel experts, stakeholders, and technical experts from the EU member states to exchange views on the scientific issues and various aspects of the guideline documents. Following this preparatory work, EFSA launched a public consultation on the draft guidance.

EFSA received 494 comments in response to its public consultation on GM plant ERA in March–April 2010. In addition, more than 2,000 viewers have consulted the web-streamed meeting with member state experts held in Berlin on June 17 where there was agreement among the 18 countries represented that the draft guidelines represented a significant step forward in GM plant ERA.

"EFSA aims to finalize the GM Environmental Risk Assessment guidelines by the end of the year, and dialogue with the environmental NGO forms an important part of our ongoing consultation. We recognize that some environmental NGO have questions about this complex scientific process, and we are ready to listen, engage, and exchange views with those actively involved in this field," Riitta Maijala, head of EFSA's Risk Assessment Directorate, said.

Organizations interested in attending this meeting are invited to indicate their area(s) of expertise in order to be considered for participation. Participants will be selected on a basis of their expertise in ERA, as well as their representing an organization with a broad base of grassroots organizations across Europe. To express interest in participation, please send an email to gmo@efsa.europa.eu by September 6, 2010.

Kernel sturdiness in quality protein maize

Researchers from Rutgers University (New Brunswick, New Jersey, USA) and the University of Nebraska (Lincoln) have discovered the basis for what makes corn kernels hard, a quality that allows corn to be easily harvested, stored, and transported. The findings could lead to better hybrids and increase the supply for people in developing countries who rely on it as a nutritional staple. The discovery explains how a breed of corn known as "quality protein maize" (QPM) incorporates two qualities essential for an economical and nutritious food crop: a source of key protein ingredients as well as a hard-shelled kernel.

In the paper entitled "γ-Zeins are essential for endosperm modification in quality protein maize" (*Proceedings of the National Academy of Sciences 107*:12810–12815, 2010) the authors reported that QPM kernel sturdiness results from threshold levels of a specific gene product encoded by two gene copies. Their investigation explains the role of this gene product in generating a protein

matrix around starch particles that imparts seed strength.

"While QPM was developed in the late 1990s, scientists have not had a thorough knowledge of how kernel strength could be achieved in a rational way," said Joachim Messing, professor of molecular genetics at Rutgers. "Our work contributes knowledge that will help other scientists develop better hybrids going forward, either through traditional breeding techniques or genetic engineering."

Corn is naturally low in lysine and tryptophan, amino acids that are essential to make corn an adequate source of protein. Some cultures supplement corn with soybeans or other sources of protein in human food and livestock feed. Yet there are societies, generally in South America and Africa, where people rely on corn as their sole source of nutrition.

"QPM has made strides in overcoming malnutrition in these populations, but to make it more available to people who need it, modern approaches to breeding called 'marker-assisted breeding' will be superior in adapting local corn varieties for these people," said Messing.

As part of the investigation, Rutgers postdoctoral researcher Yongrui Wu used a technique to eliminate, or "knock out," the expression of the genes that geneticists suspected were involved in QPM kernel hardness. After knocking out these two genes, responsible for producing proteins known as γ-zeins, Wu observed softer kernels in the offspring.

Detailed investigation of original and knockout kernels using electron microscopy revealed that soft kernels lacked a proteinaceous matrix interconnecting starchy components while providing structural integrity. Such structures were not present in the knockout offspring. The researchers therefore pegged the γ-zeins regulated by these two genes, labeled 16- and 27-kDa γ-zein, as key components of this molecular structure and, as a result, QPM's hardness.

Next regulatory step for dicamba-tolerant soybeans

Monsanto Co. (St. Louis, Missouri, USA) announced that it had taken a key step toward commercializing dicamba-tolerant soybeans, having recently completed regulatory submission to the US Department of Agriculture for dicamba-tolerant soybeans. Monsanto expects to complete regulatory submission to the US Food and Drug Administration and key global markets in the coming months.

Upon commercialization, Monsanto expects that the dicamba tolerance trait will be stacked with the Genuity® Roundup Ready 2 Yield® soybean trait to provide soybean farmers with more weed management options.

Don Weeks, professor of agriculture and natural resources, Xiao-Zhuo Wang, and Patricia Herman at the University of Nebraska discovered the dicamba tolerance gene. Monsanto has access to it through an exclusive licensing agreement with the university announced in 2005.

According to Monsanto, dicamba is an ideal tank-mixing partner for Roundup agricultural herbicides for both pre-plant and post-emergence weed control. It will enable better weed management in cotton farming where soybean is used as a rotation crop, said Alan York, professor emeritus of crop science and extension specialist for North Carolina State University.

Also in July, Reuters reported that Monsanto planned to "maintain the export approval status for Roundup Ready soybeans through 2021, seven years after the company's patent expires on the popular seed product."

The American Soybean Association responded to the news: "The American Soybean Association (ASA) is pleased that Monsanto has committed to ASA in a letter dated July 8, 2010, to maintain export market approvals for the first biotech soybean trait 'Roundup Ready' or 'RR1' through 2021. . . . With the patent on RR1 due to expire in 2014, and patents on other traits expiring in future years, ASA has been actively working to develop pathways that will facilitate the continued availability of traits to soybean farmers as single generic traits or as part of stacked traits after patent expiration.

"Monsanto's commitment to maintain export approvals worldwide for RR1 through 2021 will ensure export market access for US soybeans containing the RR1 trait for the next decade. ASA believes this commitment will also provide greater certainty to seed companies and university breeders so they can dedicate the time, money, and germplasm necessary to continuing to offer high-yielding soybean varieties containing the RR1 trait, including when it becomes a generic trait after 2014." ■

contain a "lethal gene" that ensures they have no viable offspring. And replacement strategies, also known as "gene drive" methods, involve permanently replacing wild insect populations with GM varieties altered to make them less able to transmit disease. Both strategies could complement existing efforts as well as provide several unique benefits. They target single insect pest species, work in inaccessible populations, and protect everyone in the release area regardless of socio-economic status.

Their use, though, is controversial. They are nearly impossible to monitor and are irreversible. Little is known about their potential long-term effects—for example, whether new genes would "jump" into other species.

The policy brief examines these issues and more; access it at www.parliament.uk/documents/post/postpn360-gm-insects.pdf.

■■■

In late July it was reported that US Secretary of Agriculture Tom Vilsack had received a letter signed by 75 members of Congress urging the US Department of Agriculture (USDA) to allow limited planting of Roundup Ready® alfalfa. The bipartisan group supports action by USDA that would allow farmers to plant seed that is being held in inventory while an Environmental Impact Statement (EIS) related to the product is completed.

The letter was supported by a coalition of agriculture groups that have encouraged timely completion of the EIS process on this biotech alfalfa variety. The groups include the National Council of Farmer Cooperatives (NCFC), National Milk Producers Federation (NMPF), and American Farm Bureau Federation (AFBF).

The letter comes on the heels of a recent Supreme Court ruling that found a lower court was in error when it placed a nationwide ban on the planting of genetically engineered alfalfa seeds. A draft EIS, developed by the USDA, found "no significant impact on the human environment due to granting non-regulated status to Roundup Ready alfalfa." ■

Surfactants, Detergents, & Personal Care News

Briefs

France's Rhodia announced in June that it is acquiring China-based Feixiang Chemicals (ZJG). More than half of Feixiang's sales of amines and surfactants occur in the Home and Personal Care market segment, Rhodia told CosmeticDesign-Europe.com, adding that the company plans to integrate Feixiang's specialty amine technologies into its Novecare business portfolio. Oliver Hufer, vice president of Rhodia Novecare's Home & Personal Care division, said "Asia-Pacific is a fast-growing region for the surfactants market, which is growing at approximately 10% in developing countries such as China and India, and at a lesser rate of around 3% in countries such as Japan and Australia."

■■■

Sasol is constructing a purified tri-ethyl aluminum (TEA) production unit at its Sasol Olefins & Surfactants (O&S) plant in Brunsbüttel, Germany. The facility, with an initial annual capacity of 6,000 metric tons, is expected to open in early 2012. Sasol O&S says it is the world's largest producer of TEA at its Ziegler unit in Brunsbüttel, Germany, and in Lake Charles, Louisiana, USA. TEA is mainly used as a co-catalyst in the industrial production of polyethylene and for the production of medium-chain-length alcohols.

■■■

Global specialty chemicals supplier Cognis has opened a new production facility for alkyl polyglucoside (APG) surfactants at its site in Jinshan, China. The company also produces APG surfactants in Düsseldorf, Germany, and Cincinnati, USA.

■■■

A new analytical method could spell the end of the use of shark liver oil-derived varieties of squalane, an emollient used in cosmetics. The substance is manufactured either by using olive oil distillates or, more controversially, with the liver oil of rare deep sea sharks. The new method is detailed in *Rapid Communications in Mass Spectrometry* (*24*:1810–1816, 2010).

■■■

BASF acquires Cognis

Germany's BASF agreed in June 2010 to pay Goldman Sachs Group Inc. and Permira Advisers Ltd. €3.1 billion ($3.8 billion) for specialty chemicals producer Cognis of Monheim, Germany. The deal moves BASF from No. 3 to No. 1 in the personal care ingredients market.

The two private equity firms acquired Cognis from Henkel AG in 2001 and cut 39% of the workforce, largely through the sale of the leather-processing and fatty-acids units. Currently, Cognis is segmented into three business units—care chemicals, nutrition & health, and functional products.

Cognis has about 5,500 employees and operates in 30 countries, with sales of €2.6 billion in 2009. BASF is based in Ludwigshafen, has around 105,000 employees worldwide, and posted sales of more than €50 billion in 2009.

The transaction, pending approval by regulatory authorities, is expected to close by November 2010.

P&G reformulates Tide and nixes Tide Basic

The Procter & Gamble Co. (P&G; Cincinnati, Ohio, USA) was scheduled to introduce its first major overhaul of liquid Tide laundry detergent in nearly a decade in July 2010, according to press reports.

The new Tide Actilift will be available in some varieties of Tide and includes active ingredients aimed at better removing stains as well as preventing them.

Chief Financial Officer Jon Moeller announced the change at a Deutsche Bank in Paris in June. He added that the products have been available in Europe since January 2010, where P&G's market share has increased two percentage points to almost 28%.

Moeller also said that all of the company's Tide and Gain powdered detergents will use one-third less packaging and will receive "formula upgrades." Those products will begin shipping in February 2011.

In other P&G news, the company is no

longer making Tide Basic, the less expensive version of Tide it began testing during the economic downturn. A P&G spokeswoman told *The Wall Street Journal* in June that "the test on Tide Basic ended recently," but the company declined to comment on why it has stopped making the product or what its findings from the test were.

Kao wins green chemistry award

Kao Corp. has announced that it won Japan's Minister of Economy, Trade and Industry Award for the Ninth Green Sustainable Chemistry (GSC) Award.

The award was given to Kao for its practical application of a surfactant synthesis process that has low impact on the environment by using subcritical water. "Alkyl glyceryl ether (AGE), a surfactant widely used in dishwashing detergents, shampoos, and skin cleaners, is synthesized from a hydration reaction of glycidyl ether," the company said in a statement. "While the conventional method uses a catalyst and solvent, the newly developed technology uses only water in a subcritical state, produced under high temperature and high pressure, thus eliminating the need for a catalyst and solvent for the chemical reaction," the statement continued.

Kao also said that the new technology dramatically reduces the reaction time from nine hours to three minutes. The process has been used at Kao's Wakayama Factory since 2005.

Dow and BASF win green chemistry award

The Dow Chemical Co. (Dow) and BASF received a 2010 Presidential Green Chemistry Challenge Award at a ceremony held at the Ronald Reagan Center in Washington, DC, USA, in June 2010.

The two companies were honored for their jointly developed hydrogen peroxide to propylene oxide (HPPO) technology that improves the production process of a key chemical intermediate, propylene oxide. Propylene oxide from the HPPO process can be used in a variety of applications—from home insulation, appliances, automobiles and furniture to aircraft de-icers, paints, brake fluids, and pharmaceuticals.

The award has been presented on behalf of the White House by the US Environmental Protection Agency annually since 1996. It recognizes breakthrough technologies that transfer sustainability principles from the research lab into the real world to enable environmentally responsible and economically viable routes to commercial chemical manufacturing. It is the seventh Presidential Green Chemistry award for Dow and the fourth for BASF.

The Dow-BASF innovation offers distinct economic and environmental benefits when compared to conventional propylene oxide (PO) process technologies. A joint study conducted by the two companies in 2007 using BASF's Eco-Efficiency Analysis tool revealed the new HPPO process reduces wastewater by 70–80% and energy use by approximately 35%, compared with existing PO technology. HPPO technology is also more environmentally friendly because no by-products are produced besides water. In addition, PO plants using the HPPO technology require up to 25% less capital to build than conventional technologies, as they have reduced infrastructure, a smaller physical footprint, and simpler raw materials integration.

The two companies opened the first commercial-scale HPPO production plant in 2008 at BASF's Antwerp, Belgium, facility. SCG-Dow Group is building a second plant based on this technology, which is scheduled to begin production in Map Ta Phut, Thailand, in 2011.

NPA requires "natural" fragrance certification

Beginning September 1, 2010, the Natural Products Association (NPA; Washington, DC, USA) will require all natural fragrances in finished natural products to receive certification in its Natural Standard for Personal Care Products program.

"This change effectively eliminates absolutes and concretes, common fragrance ingredients that require the use of petrochemical solvents for extraction, and purely synthetic additives," the trade association said in a statement. "NPA will continue to allow some synthetic preservatives, limited to those already allowed in the standard, in order to maintain the importance of safe ingredients yet emphasize the use of natural preservatives when applicable."

In addition, the group said it will publish an updated "allowed processes" appendix to include extraction, expression, and steam distillation "to encourage these manufacturing processes for fragrance mixtures." Companies will be required to submit a qualitative list to the NPA that includes the INCI (International Nomenclature of Cosmetic Ingredients) name and CAS (Chemical Abstracts Service) number of each component in the composition.

"NPA does not want to add additional and arduous labeling requirements for certified products, and will not require anything more than following current INCI labeling procedures where 'fragrance' is listed in the ingredient list," the statement continues. "Further clarification of using an asterisk (*) on the term 'fragrance' and placing a disclaimer underneath and outside the list stating the fragrance is natural is acceptable."

Graphene oxide: A surfactant?

Graphene oxide, a single-atomic-layered material made by reacting graphite powders with strong oxidizing agents, has

Lubrizol's Noveon Consumer Specialties business has introduced three new vegetable oil-derived surfactants for use in products making natural label claims. The surfactants—Chemccinate LSC-K, Chembetaine ACB, and Sulfochem CS-BZ—can be used in a wide range of products, the company said.

■■■

The American Cleaning Institute, the Washington, DC-based trade association formerly known as The Soap and Detergent Association, has unveiled a new website. The new site, www.CleaningInstitute.org, was introduced at the Institute's 2010 Mid-Year Meeting.

■■■

In June, the European Commission approved P&G's proposed acquisition of Sara Lee's air freshener business. The commission said the transaction would not significantly affect competition in Europe. ■

attracted interest from scientists because of its ability to convert easily to graphene—a material that could be used to produce low-cost carbon-based transparent and flexible electronics.

But to Jiaxing Huang, assistant professor of materials science and engineering, and his research group at the McCormick School of Engineering and Applied Science at Northwestern University in Evanston, Illinois, USA, graphene oxide itself is even more interesting. Huang and his group have studied the material for years and have discovered how to assemble these soft sheets like floating water-lily pads. They also used a camera flash to turn them into graphene, and invented a fluorescence-quenching technique to make them visible under microscopes.

Now, working with Kenneth R. Shull, professor of materials science and engineering, they have discovered that graphene oxide sheets behave like surfactants.

Graphene oxide has been known in the scientific world for more than a century and was largely described as hydrophilic, or attracted to water. But Huang and his research group thought that graphene oxide should be amphiphilic, because part of the graphene oxide structure is actually water repelling.

"We view graphene oxide as a soft material," Huang says. "For example, it is essentially two-dimensional polymers composed of carbon, hydrogen, and oxygen. They are also colloidal particles with very exotic shapes."

To test their hypothesis, Huang and his group put graphene oxide in carbonated water. They found that the sheets can hitchhike onto the rising bubbles to reach the water surface—just as a surfactant would. Next, they found that graphite oxide can disperse oil droplets in water.

This new insight into a fundamental property of the material, according to Huang, is important for understanding how graphene oxide is processed and handled. It could lead to new applications for the material.

Its surfactant properties mean it could be used as a dispersing agent for insoluble materials, such as carbon nanotubes. Common surfactants are nonconducting, so when used as a dispersing agent for conducting materials, they need to be removed from the material. Graphite oxide, which turns into conducting graphene through heating, would actually help conductivity.

The team's results appeared in the *Journal of the American Chemical Society* (*132*:8180–8186, 2010).

Nano-silver verboten in cosmetics

Nano-silver should no longer be used in cosmetics, according to the German Federal Institute for Risk Assessment (BfR).

Silver ions are used in consumer products such as cosmetics, food, and textiles because of their antimicrobial properties; silver particles in the nano range are increasingly being used by manufacturers, according to BfR. Until there is more research on the potential health risks of these materials, however, BfR recommends that manufacturers "refrain from using nano-silver in consumer products," according to Cosmetics-designEurope.com.

CONTINUED ON PAGE 527

People News/ Inside AOCS

Sharma accepts award for A.P. Organics

On Technology Day, May 11, Dhuri (India)-based A.P. Organics Ltd. was presented a National Award-2009 for successful commercialization of indigenous technology by the Technology Development Board, Union Ministry of Science and Technology. AOCS member **A.R. Sharma**, chairman and managing director of the company, received the award from the former president of India A.P.J. Abdul Kalam. The award carried a sum of Rs 10 lakh (about $20,000) and a trophy.

A.P. Organics Ltd. is a part of the A.P. Solvex Group of Companies, which has been a pioneer in developing eco-friendly, health-friendly, and economical processes for producing refined rice bran oil. The patent for the process is registered with the Government of India in the name of A.R. Sharma. This process has been further improved and made completely chemical-free by replacing the acid degumming process with an enzymatic degumming process developed by the Indian Institute of Chemical Technology, Hyderabad.

AOCS member A.R. Sharma (left) accepts the National Award-2009 from former president of India A.P.J. Abdul Kalam (right).

ARS awards

The US Department of Agriculture Agricultural Research Service (ARS) recognized AOCS member **George E. Inglett**, ARS Functional Foods Research Unit, Peoria, Illinois, for superior efforts in technology transfer on June 8. His award was for outstanding accomplishments in the invention and technology transfer of the multifunctional food ingredient Z-Trim, which contributes to healthier foods for people around the world.

In the same presentation ARS also recognized Area Senior Research Scientist **Randy C. Shoemaker**, ARS Corn Insects and Crop Genetics Research Unit, Ames, Iowa, for outstanding research in soybean genetics and genomics.

Palsgaard chairman retires

After 62 years, Palsgaard Chairman Knud Brix has retired. He began working for Palsgaard in 1948 as secretary to the owner Herbert Shou, who was the son of Palsgaard founder and inventor of the world's first synthetic emulsifier, Einar V. Schou. By 1966 Brix was both chairman of the Schou Foundation, which owns Palsgaard, and managing director of the company. Brix retired as managing director of Palsgaard when his son Birger Brix took over the position, but he continued to attend weekly management

meetings and remained as chairman of the Foundation.

Knud Brix retired from the Shou Foundation in the second quarter of this year.

Palsgaard A/S produces emulsifiers, stabilizers, and other ingredients for the food industry.

GOED expands its board of directors

The Global Organization for EPA and DHA (GOED), headquartered in Salt Lake City, Utah, USA, announced in June the expansion of its board of directors from eight to 14 to accommodate the association's recent membership growth. The board includes **David Shannon** (Croda), chair; **Baldur Hjaltason** (EPAX), vice-chair; **Robert Orr** (Ocean Nutrition Canada), treasurer; **Amanda Ruess** (DSM Nutritional Products), secretary; **Phillip Fass** (Martek Biosciences), past chair. Others are **Carol Locke**, Omega Natural Science; **Kent Cipollo**, Solae; **Cynthia Crouch**, DuPont; **Hans de Wit**, Marvesa; **Josipa Paska**, FINA; **Bjorn Rene**, Cognis; **Harald Ronneberg**, Denomega; **Olav Sandnes**, Marine Nutriceuticals; and **Federico Tripodi**, Monsanto.

Hjaltason, Locke, and Sandnes are members of AOCS.

Adam Ismail, GOED's executive director, noted that the expanded board provides the association with the ability to further increase membership and expand its reach worldwide as it works to educate media, consumers and omega-3 industry companies on the latest EPA/DHA research, benefits, and trends.

Goodall becomes CTO for OriginOil

Brian Goodall became chief technology officer for the algae-biofuels company OriginOil (Los Angeles, California, USA) in June. Before coming to OriginOil, he most recently served as vice president of downstream technology at Sapphire Energy, Inc., where he worked with Continental Airlines in developing the algae oil/jet fuel blend used in the first US commercial flight powered by biojet fuel (see *inform 20*:152, 2009).

Goodall has international experience in renewable fuels, petrochemicals and polymers, specialty and fine chemicals, catalysis, and oil sectors. He has been integrally involved in all aspects of the algae-to-fuel value chain, from algae harvesting and drying, to extraction, pre-refining, and conversion to fuels and chemicals.

He previously held senior positions with multinational companies such as Royal Dutch/Shell Group, B.F.Goodrich, and Rohm & Haas.

Ocean Nutrition appoints new president/CEO

Robert Orr of Ocean Nutrition Canada Ltd. (ONC) has relinquished his position as president and chief executive officer (CEO) of the company in favor of **Martin Jamieson**, a 30-year international food industry veteran. Jamieson is expected to focus particularly on international expansion efforts and the food sector. He will oversee day-to-day operations at the Dartmouth, Nova Scotia-based omega-3 dietary supplement and food ingredient, researcher and manufacturer.

Most recently Jamieson was executive vice president of Loblaw Brands at Loblaw Companies, Canada's leading food retailer. Prior to that, he was president of Robin Hood Multifoods and before that of Pillsbury Canada Ltd.

Orr, who co-founded ONC with **John Risley**, now becomes chairman. He will work with Jamieson and the board of directors in charting the firm's strategic direction and will focus on omega-3 category growth activities. ■

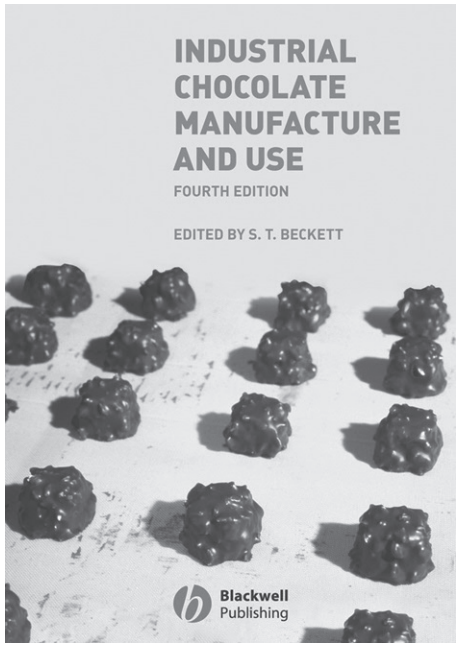
Book Review

Industrial Chocolate Manufacture and Use, 4th Edition
Stephen T. Becket (ed.), Wiley-Blackwell, 2009
688 pages, ISBN 978-1-405139-949-6, $304.99

William E. Artz

Industrial Chocolate Manufacture and Use is in its fourth edition; the first was published in 1988, and only one of the authors that contributed to the first edition contributed to the 2009 version.

This new version is a comprehensive treatment of the food technology and food engineering used for chocolate processing and production. The text provides a good description of the flavor chemistry of chocolate and the physical chemistry of chocolate triacylglycerol (TAG) crystallization, which includes the theoretical basis for the processing parameters best for making chocolate.



Each chapter is written by individuals well versed in their respective subject areas; seven pages in the beginning of the text describe the credentials and expertise of each chapter author. The book includes a substantial amount of compositional information on the major and minor components of chocolate, milkfat and milk powder components, and vegetable fats. There is a chapter on the nutrition of chocolate that emphasizes components such as the antioxidants, methylxanthines, and other bioactive components found in chocolate. Included in an early chapter is a discussion of the problems associated with chocolate bean production, important since the chocolate the world consumes is produced in relatively few countries. Except for Brazil, the chocolate-producing countries are all developing countries in Africa and Asia that enjoy less economic and political stability than the developed world. (Brazil consumes most of the chocolate it produces),

This book provides a well-written, food technology-oriented, comprehensive understanding of all aspects of chocolate production. If your company is involved in any aspect of chocolate production, if chocolate is an important component in your product, or if you are involved in research related to chocolate, this book is a necessary addition to your library.

Substantial information is provided on chocolate flavor development, from fermentation to roasting, including the conching processes. This includes the theoretical and chemical basis for process parameter selection and normal parameter ranges. Information on how the cocoa bean composition and processing parameters affect chocolate flavor composition, quality, and intensity is provided. The sugar–amino acid reaction products and their contribution to flavor are discussed in detail. The chemistry of Maillard browning, starting with Amadori rearrangement products, ending with a variety of cyclic, nitrogen-containing compounds, is discussed.

One of the most important parameters of chocolate quality is its textural characteristics, which are directly related to crystal form. Several chapters address this question, particularly the processing methods used to control crystal type. This section includes portions of a chapter on chocolate crumb, a chapter on particle size reduction, a chapter on chocolate flow properties, two chapters on chocolate tempering, chapters on molding, enrobing, and cold-forming technologies, as well as chapters on panning and rework.

There are numerous chapters that emphasize the engineering of chocolate production; including chapters on particle size reduction, bulk chocolate handling, nonconventional machines and processes, project management, instrumentation (for process control, as well as parameter measurement), and packaging. The equipment from many manufacturers is discussed, with cut-away diagrams provided. The discussions typically include comparisons among manufacturers, relating the advantages and disadvantages for the equipment.

There are also chapters on the ancillary components of chocolate, such as sweeteners, milk ingredients, and vegetable fats. There are chapters on important but diverse topics, such as marketing, intellectual property concerns, legal aspects, and food safety. Food safety includes the physical, chemical, microbiological (emphasizing *Salmonella*) hazards, as well as allergens. There is a good chapter on product recipes for those interested in experimenting with their product lines or product characteristics.

The book is well written, informative, and a great source for those interested in any aspect of chocolate technology. Each chapter is well referenced, with typically 20 to 40 references, although there are a few chapters (e.g., the chapter on flavor development) with more than 70 references.

We are looking for additional book reviewers, including reviewers from outside North America. If you are interested in reviewing one or more books, please send an email to the book review editor (William Artz) at wartz@illinois.edu and indicate your subject area of interest. An email request for the review with information about the text is sent to each reviewer, before any book is mailed out for review. Reviews are generally expected three to four months later. After review submission, the books belong to the reviewer. AOCS provides a general review guideline, available to each reviewer upon request.

William E. Artz is a faculty member at the University of Illinois at Urbana-Champaign Department of Food Science and Human Nutrition with 25+ years of experience in food science research.

Patents

Published Patents

Ophthalmic compositions comprising a branched, glycerol monoalkyl compound and a fatty acid monoester

Burke, S.E., *et al*., Bausch & Lomb Inc., US7670997, March 2, 2010

An aqueous ophthalmic composition comprising a branched, glycerol monoalkyl compound and a fatty acid monoester. The fatty acid monoester comprises an aliphatic fatty acid portion having six to fourteen carbon atoms and an aliphatic hydroxyl portion. The composition will also have an osmolality in a range from 200 mOsmol/kg to 400 mOsmol/kg. The invention is also directed to a method of inhibiting the formation of foam in an aqueous ophthalmic composition that includes a surfactant as well as to a method of enhancing the biocidal efficacy of an aqueous ophthalmic composition containing a fatty acid monoester.

Ink unit including ink and ink-wetted member

Morimoto, K., Fujifilm Corp., US7673963, March 9, 2010

An ink unit having: an ink utilized for an inkjet recorder; and a wetted member that contacts with the ink, wherein the ink includes a pigment dispersedly held in a medium, and the pigment contains particles having a size of 200 nm or larger in 2 volume percent or less, and wherein a principal component of the ink-wetted member is (i) a compound of specific hydrotalcite; (ii) a fatty acid and/or a fatty acid derivative; (iii) a phenolic antioxidant having an isocyanurate skeleton; or (iv) a polyolefin including an alkyl-substituted benzylidene sorbitol.

Method for preparing a cosmetic composition and cosmetic composition prepared by this method

Belmar, M.T., *et al*., Conopco, Inc., US7674472, March 9, 2010

A base composition comprising a fatty acid and an organic base to form at least partially a fatty acid organic soap is suitable for preparing a skin care composition by addition of relatively cold water.

Stable pigment dispersions

Louwet, F., *et al*., Agfa Graphics NV, US7674843, March 9, 2010

A pigment dispersion includes a pigment with at least one carboxylic acid group and a block copolymer including aromatic monomers having at least one carboxylic acid group or a salt thereof and aromatic monomers having at least one sulfonic acid group or a salt thereof. The pigment dispersions can be used for manufacturing inkjet inks and for the coating of colored layers.

Materials for processing non-aqueous mixtures and methods for their preparation

Kloos, S.D., *et al*., GE Osmonics, Inc., US7678277, March 16, 2010

The invention provides porous matrices that comprise one or more anionic surfactants that can be used in non-aqueous environments.

Rubber composition

Ohshima, N., Bridgestone Corp., US7678855, March 16, 2010

A rubber composition having a high hysteresis loss is provided without impairment of other physical properties such as fracture characteristics. The rubber composition includes 100 parts by weight of a rubber component, 0.1 to 100 parts by weight of graphitized carbon material, and a lipid the amount of which is 0.02 to 0.2 times the amount of the graphitized carbon material. Preferably, the graphitized carbon material is carbon fiber grown from a vapor phase or graphitized carbon black, and the lipid is a fatty acid. Preferably the rubber composition according to the present invention has a loss tangent tan δ in the range of 0.05 to 0.5 at a temperature of 60°C after vulcanization.

Process for decreasing the amount of cholesterol in a marine oil using a volatile working fluid

Sondbo, S., and O. Thorstad, Pronova Biopharma Norge AS, US7678930, March 16, 2010

The invention relates to a process for decreasing the amount of cholesterol in a mixture comprising a marine oil, the marine oil containing the cholesterol, which process comprises the steps of adding a volatile working fluid to the mixture, where the volatile working fluid comprises at least one of a fatty acid ester, a fatty acid amide and a hydrocarbon, and subjecting the mixture with the added volatile working fluid to at least one stripping processing step, in which an amount of cholesterol present in the marine oil in free form is separated from the mixture together with the volatile working fluid. The present invention also relates to a volatile cholesterol decreasing working fluid and a health supplement and a pharmaceutical, based on a marine oil, prepared according to the process mentioned above. ■

Patent information is compiled by Scott Bloomer, a registered US patent agent with Archer Daniels Midland Co., Decatur, Illinois, USA. Contact him at scott_bloomer@admworld.com.

Extracts & Distillates

Separation of *cis/trans* geometrical fatty acid isomers by silver-exchanged zeolite Y

Lykakis, I.N., *et al., Tetrahedron 66*:2203–2209, 2010.

The separation of *cis* and *trans* isomers is relevant for biological and nutritional applications. Silver-exchanged zeolite Y was prepared and applied for the treatment of mixtures of *cis* and *trans* geometrical isomers of mono- and polyunsaturated fatty acid methyl esters (FAME). *cis*-FAME were adsorbed into zeolite with a high degree of selectivity (*cis*/*trans* ratio in the range of 1.9–3.2). The effectiveness was clue to the synergism of the π-complexation between the silver ion and the double bonds and the different FAME structures trapped into the zeolite cages Some indication of the complex stabilities came from theoretical studies using unsaturated lipids. A prototype cartridge was also designed for application in the fractionation of *cis*/*trans* FAME mixtures.

Lipid biochemists salute the genome

Wallis, J.G., and J. Browse, *Plant J. 61:*1092–1106, 2010.

The biochemistry of plant metabolic pathways has been studied for many generations. Nevertheless, numerous new enzymes and metabolic products have been discovered in the last 5–10 years. More importantly, many intriguing questions remain in all areas of metabolism. In this review, we consider these issues with respect to several pathways of lipid metabolism and the contributions made by the *Arabidopsis* genome sequence and the tools that it has spawned. These tools have allowed identification of enzymes and transporters required for the mobilization of seed storage lipids, as well as transporters that facilitate movement of lipids from the endoplasmic reticulum to the chloroplast in green leaf cells. Genomic tools were important in recognition of novel components of the cutin and suberin polymers that form water-impermeable barriers in plants. The waxes that also contribute to these barriers are exported from cells of the epidermis by transporters that are now being identified. Biochemical and genetic knowledge from yeast and animals has permitted successful homology-based searches of the *Arabidopsis* genome for genes encoding enzymes involved in the elongation of fatty acids and the synthesis of sphingolipids. Knowledge of the genome has identified novel enzymes for the biosynthesis of the seed storage lipid, triacylglycerol, and provided a refined understanding of how the pathways of fatty acid and triacylglycerol synthesis are integrated into overall carbon metabolism in developing seeds.

Dual parallel mass spectrometry for lipid and vitamin D analysis

Byrdwell, W.C., *J. Chromatogr. A 1217*:3992–4003, 2010.

There are numerous options for mass spectrometric analysis of lipids, including different types of ionization, and a wide variety of experiments using different scan modes that can be conducted. Atmospheric pressure chemical ionization (APCI) and electrospray ionization (ESI) provide complementary types of information that are both desirable. However, the duty cycle of the mass spectrometer places limits on the number of experiments that can be performed, and instruments usually employ only one type of ionization at a time. This work describes the approaches we have used that employ two mass spectrometers in parallel or in a column-switching configuration that allow multiple ionization modes and types of experiments to be conducted simultaneously during a single chromatographic run. These data demonstrate how use of two systems can reduce or eliminate the need for repeat injections and repetitive experiments. Approaches are described that employ two mass spectrometers connected in parallel as detectors for a single chromatographic system (LC1/MS2) or that employ two liquid chromatographs and two mass spectrometers in a column-switching arrangement (LC2/MS2). Examples of LC1/MS2 analyses of triacylglycerols (TAG), sphingolipids, and vitamin D are given, as well as an example of an LC2/MS2 experiment that is used to perform analysis of both polar and nonpolar lipids in a total lipid extract.

Rapid and simple micromethod for the simultaneous determination of 3-MCPD and 3-MCPD esters in different foodstuffs

Küsters, M., *et al*., *J. Agric. Food Chem. 58*:6570–6577, 2010.

This paper describes for the first time a micromethod for the simultaneous determination of 3-monochloropropane-1,2-diol (3-MCPD) and fatty acid esters of 3-MCPD (3-MCPD esters) in different foodstuffs. 3-MCPD and 3-MCPD esters were isolated from food products using a single extraction step separating hydrophilic and lipophilic compounds. An aliquot of the aqueous layer was analyzed for the content of 3-MCPD while a part of the organic layer was analyzed for 3-MCPD esters after cleavage with sodium methoxide. After a simple derivatization procedure with phenylboronic acid, the determination was achieved by isotope dilution GC-MS using isotope-labeled 3-MCPD and 3-MCPD ester as internal standards. The method was validated for various foodstuffs such as bakery products, meat and fish products, and soups as well as seasonings with limits of detection of 1–2 µg/kg (3-MCPD) and 6 µg/kg (3-MCPD esters), respectively. Recoveries ranged within 95 ± 9% and 96 ± 10% at spiking levels of 15 and 25 µg/kg in all matrices for 3-MCPD and 84 ± 9% and 85 ± 7% at spiking levels of 0.05 mg/kg and 2 mg/kg for 3-MCPD esters. The method avoids tedious and laborious sample preparation and was successfully applied to the rapid screening of samples conforming to the European Union performance criteria for methods of analysis for 3-MCPD.

Analysis of wax ester molecular species by high performance liquid chromatography/ atmospheric pressure chemical ionization mass spectrometry

Vrkoslav, V., *et al.*, *J. Chromatogr. A 1217*:4184–4194, 2010.

High chromatographic resolution of wax esters (WE) was achieved by nonaqueous reversed-phase liquid chromatography on a Nova-Pak C18 column by optimizing

the acetonitrile/ethyl acetate mobile phase gradient. The retention behavior of WE was studied in this chromatographic system. The WE eluted according to their equivalent carbon number (ECN) values; within the group of WE with identical ECN, the most unsaturated species tended to elute first. The isobaric WE with different positions of the ester moiety were separated from each other whenever the lengths of the chains were sufficiently different. The methyl-branched esters eluted at shorter retention times than the straight-chained analogs, and the resolution among methyl-branched WE depended on the position of the branching. The analytes were detected by atmospheric pressure chemical ionization mass spectrometry (APCI-MS) using data-dependent scanning. WE provided simple full-scan spectra with abundant protonated molecules and low-intensity fragments. Collision-induced dissociation (CID) promoted identification of the WE molecular species. The responses of WE were found to be dependent on the number of double bonds and on the alkyl-chain length; the limits of the detection ranged from 20 µmol/L to 200 nmol/L. High-pressure liquid chromatography/APCI-MS was applied for the analysis of the WE isolated from honeycomb beeswax, jojoba oil, and human hair. Good agreement between reported results and the literature data was achieved, with several novel polyunsaturated WE also being found.

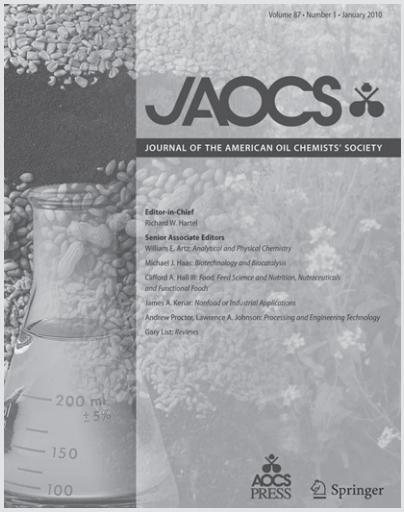
DHA may prevent age-related dementia

Cole, G.M., and S.A. Frautschy, *J. Nutr. 140*:869–874, 2010.

The risk for dementia, a major contributor to incapacitation and institutionalization, rises rapidly as we age, doubling every 5 years after age 65. Tens of millions of new Alzheimer's disease (AD) and other dementia cases are projected as elderly populations increase around the world, creating a projected dementia epidemic for which most nations are not prepared. Thus, there is an urgent need for prevention approaches that are safe, effective, and affordable. This review addresses the potential of one promising candidate, the n-3 fatty acid docosahexaenoic acid (DHA), which appears to slow pathogenesis of AD and possibly vascular dementia. DHA is pleiotropic, acting at multiple steps to reduce the production

CONTINUED ON PAGE 508

AOCS Journals

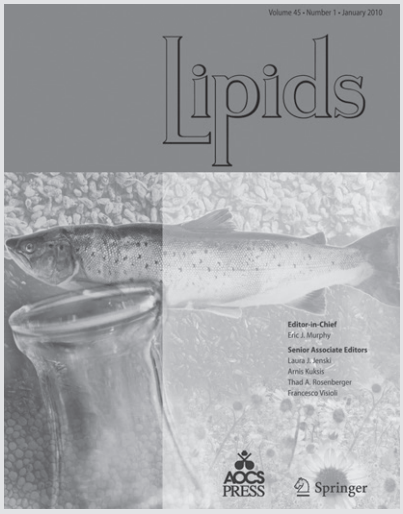


Journal of the American Oil Chemists' Society (July)

- Properties and stability of solid lipid particle dispersions based on canola stearin and poloxamer 188, Trujillo, C.C., and A.J. Wright
- Detection of hydrocarbons in irradiated chilled beef by HS-SPME–GC–MS and optimization of the method, Li, A., Y. Ha, F. Wang, and Y. Li
- Rapid determination of volatile compounds in *Gymnotheca involucrata* Pei. by MAE–HS-SPME followed by GC–MS, Yang, Z.-b., H.-l. Mao, W.-y. Kang, H.-t. Zou, C.-b. Sun, and Z.-y. Guo
- A novel method for monitoring the transesterification reaction of oil in biodiesel production by estimation of glycerol, Reddy, S.R., D. Titu, and A. Chadha
- Extraction and analysis of tomato seed oil, Eller, F.J., J.K. Moser, J.A. Kenar, and S.L. Taylor
- *Annona squamosa* and *Catunaregam nilotica* seeds, the effect of the extraction method on the oil composition, Mariod, A.A., S. Elkheir, Y.M. Ahmed, and B. Matthäus
- Interaction between polar components and the degree of unsaturation of fatty acids on the oxidative stability of emulsions, Decker, E.A., J. Alamed, and I.A. Castro
- Relationship between geographical origin and fatty acid composition of Turkish virgin olive oils for two harvest years, Diraman, H., H. Saygi, and Y. Hisil
- Changes in lipid class and fatty acid composition of cultures of *Pavlova lutheri*, in response to light intensity, Guedes, A.C., L.A. Meireles, H.M. Amaro, and F.X. Malcata
- Optimization of the conditions for removing cholesterol from cod liver oil by β-cyclodextrin crosslinked with adipic acid, Chang, Y.H., J.E. Lee, and H.-S. Kwak
- Entrapment of flaxseed oil within gelatin–gum Arabic capsules, Liu, S., N.H. Low, and M.T. Nickerson
- Preparation of biodiesel by transesterification of rapeseed oil with methanol using solid base catalyst calcined K_2CO_3/γ-Al_2O_3, Liu, X., X. Xiong, C. Liu, D. Liu, A. Wu, Q. Hu, and C. Liu
- The conversion of low grade tallow into biodiesel-grade methyl ester, Fröhlich, A., B. Rice, and G. Vicente
- Rapid oil extraction from potato chips, Kadamne, J., and A. Proctor
- Erratum to: A novel method for monitoring the transesterification reaction of oil in biodiesel production by estimation of glycerol, Reddy, S.R., D. Titu, and A. Chadha

Lipids (July)

- Acyl-CoA binding protein gene ablation induces pre-implantation embryonic lethality in mice, Landrock, D., B.P. Atshaves, A.L. McIntosh, K.K. Landrock, F. Schroeder, and A.B. Kier
- Dissimilar properties of vaccenic versus elaidic acid in β-oxidation activities and gene regulation in rat liver cells, Du, Z.-Y., P. Degrace, J. Gresti, O. Loreau, and P. Clouet
- Lipidomic analysis of porcine olfactory epithelial membranes and cilia, Lobasso, S., P. Lopalco, R. Angelini, M. Baronio, F.P. Fanizzi, F. Babudri, and A. Corcelli
- Reversible inhibitory effects of saturated and unsaturated alkyl esters on the carboxylesterases activity in rat



intestine, Li, P., C.-l. Zhu, X.-x. Zhang, L. Gan, H.-z. Yu, and Y. Gan

- Anti-scratching behavioral effects of *N*-stearoyl-phytosphingosine and 4-hydroxysphinganine in mice, Ryu, K.-R., B. Lee, I.-A. Lee, S. Oh, and D.-H. Kim
- Electronegative low-density lipoprotein is associated with dense low-density lipoprotein in subjects with different levels of cardiovascular risk, de Queiroz Mello, A.P., I.T. da Silva, A.S. Oliveira, V.S. Nunes, D.S.P. Abdalla, M. Gidlund, and N.R.T. Damasceno
- Oxidative modification and poor protective activity of HDL on LDL oxidation in thalassemia, Unchern, S., N. Laohareungpanya, Y. Sanvarinda, K. Pattanapanyasat, P. Tanratana, U. Chantharaksri, and N. Sibmooh
- Biochemical studies on sphingolipid of *Artemia franciscana* (I) isolation and characterization of sphingomyelin, Kojima, H., T. Inoue, M. Sugita, S. Itonori, and M. Ito
- Enhanced bioavailability of eicosapentaenoic acid from fish oil after encapsulation within plant spore exines as microcapsules, Wakil, A., G. Mackenzie, A. Diego-Taboada, J.G. Bell, and S.L. Atkin
- Methods of emulsifying linoleic acid in biohydrogenation studies *in vitro* may bias the resulting fatty acid profiles, Khiaosa-ard, R., F. Leiber, and C.R. Soliva

Journal of Surfactants and Detergents (Issue 3)

- Novel alkyl ether sulfonates for high salinity reservoir: Effect of concentration on transient ultralow interfacial tension at the oil–water interface, Aoudia, M., Z. Al-Harthi, R.S. Al-Maamari, C. Lee, and P. Berger
- Enhanced wettability alteration by surfactants with multiple hydrophilic moieties, Salehi, M., S.J. Johnson, and J.-T. Liang
- Some imidazoline derivatives as corrosion inhibitors, Aiad, I.A., A.A. Hafiz, M.Y. El-Awady, and A.O. Habib
- Biocidal activities of cationic surface active starch and its transition metal complexes against different bacterial strains, Zaky, M.F.
- Surfactant-like properties of alkaline extracts from wastewater biosolids, Becerra, F.Y.G., D.G. Allen, and E.J. Acosta
- Effect of sonication on the thermotropic behavior of DODAB vesicles studied by fluorescence probe solubilization, Feitosa, E., C.R. Benatti, and M.J. Tiera
- The clouding of an anionic surfactant in acid solution: Mechanistic and analytical implications, Charboneau, J., and R. von Wandruszka
- Effect of sodium salicylate on the properties of gemini surfactant solutions, Ye, Z., L. Han, H. Chen, L. Shi, and P. Luo
- Formation and growth of micelles in dilute aqueous CTAB solutions in the presence of $NaNO_3$ and $NaClO_3$, Kuperkar, K., L. Abezgauz, K. Prasad, and P. Bahadur
- Ethoxy carboxylate extended surfactant: Micellar, adsorption and adsolubilization properties, Arpornpong, N., A. Charoensaeng, D.A. Sabatini, and S. Khaodhiar
- Microemulsion-based vegetable oil detergency using an extended surfactant, Phan, T.T., A. Witthayapanyanon, J.H. Harwell, and D.A. Sabatini
- Microemulsions with mixed nonionic surfactants and flavor oil, Fanun, M.
- Surface and self-aggregation properties of bis-benzimidazolones derivatives of D-glucose, Lakhrissi, B., L. Lakhrissi, M. Massoui, E.M. Essassi, F. Comelles, J. Esquena, C. Solans, and C. Rodríguez-Abreu
- Preparation of a new oligomeric surfactant: *N,N,N′,N″,N″*-pentamethyl diethyleneamine—*N,N″*-di-[tetradecylammonium bromide] and the study of its thermodynamic properties, Alehyen, S., F. Bensajjay, M. El Achouri, L. Pérez, A. Pinazo, and M.R. Infante
- Synthesis of high purity mono-alkyl phosphate using cyclic polyphosphoric acid, Ye, Q., and S. Yan
- Synthesis and properties of novel alkyl sulfonate gemini surfactants, Li, X., Z. Hu, H. Zhu, S. Zhao, and D. Cao
- A kinetics and mechanism investigation of the nucleophilic substitution reaction of α-chlorododecyl carboxylate with trimethylamine, Wang, Z.-y., S.-f. Zhang, Y. Fang, H.-Y. Yang, and L.-y. Qi

*inform*ation

Did you know that *inform* provides news updates on the AOCS homepage at www.aocs.org? As well as alerts on Twitter at www.twitter.com/theAOCS and Facebook at www.facebook.com/AOCSFan?

of the β-amyloid peptide, widely believed to initiate AD. DHA moderates some of the kinases that hyperphosphorylate the τ-protein, a component of the neurofibrillary tangle. DHA may help suppress insulin/neurotrophic factor signaling deficits, neuroinflammation, and oxidative damage that contribute to synaptic loss and neuronal dysfunction in dementia. Finally, DHA increases brain levels of neuroprotective brain-derived neurotrophic factor and reduces the n-6 fatty acid arachidonate and its prostaglandin metabolites that have been implicated in promoting AD. Clinical trials suggest that DHA or fish oil alone can slow early stages of progression, but these effects may be apolipoprotein E genotype-specific, and larger trials with very early stages are required to prove efficacy. We advocate early intervention in a prodromal period with nutrigenomically defined subjects with an appropriately designed nutritional supplement, including DHA and antioxidants.

Fast and simple nuclear magnetic resonance method to measure conjugated linoleic acid in beef

Maria, R.M., *et al*., *J. Agric. Food Chem. 58*:6562–6564, 2010.

Conjugated linoleic acids (CLA) are a group of linoleic acid isomers that are naturally found in food products originating from ruminants (meat and dairy). These acids have received special attention in recent years due to their potential human health benefits. Research efforts have been proposed to increase the CLA content in beef to improve public health. However, because more than 30 million beef cattle are used each year by the American food industry, it will be necessary to ensure their content in a large number of samples. Therefore, it is important to have an inexpensive and rapid analytical method to measure CLA content in food products. Because gas chromatography (GC), a current popular method for measuring CLA, is slow, this paper describes a nuclear magnetic resonance (^{1}H NMR) spectroscopy method that is potentially >10 times faster than the GC method. Analyses show a correlation coefficient of 0.97, indicating the capacity of NMR to quantify the CLA content in beef samples. Furthermore, the method proposed herein is simple and does not require sophisticated sample preparation.

Effect of fat content on flavor delivery during consumption: An *in vivo* model

Linforth, R., *et al*., *J. Agric. Food Chem. 58*:6905–6911, 2010.

Data from studies of the effect of fat on *in vivo* flavor release were modeled to generate a predictive model (R^2 = 0.71). The data included a range of values from the literature and 200 new data points giving a total data set of 345 values; of these, 310 values were used as a data set for model development, and the remaining 35 values were used as a test set for model validation. The model could be used to estimate the differences in flavor delivery for samples with two different fat contents. The hydrophobicity of the flavor compounds was represented in the model by including log *P*. The model may provide a tool to aid in flavor reformulation between samples with different fat contents. Sensory analysis showed that an orange flavor present in a high-fat food could be reformulated for a low-fat food, giving a more similar flavor experience than in the absence of any formulation changes

Dietary sphingolipids ameliorate disorders of lipid metabolism in Zucker fatty rats

Yunoki, K., *et al*., *J. Agric. Food Chem. 58*:7030–7035, 2010.

Dietary sphingolipids (SL) inhibit colon carcinogenesis, reduce serum cholesterol, and improve skin barrier function and are considered to be "functional lipids." For comparative determination of the effects of SL with different chemical compositions on lipid metabolism and its related hepatic gene expression, Zucker fatty rats were fed pure sphingomyelin (SM) of animal origin and glucosylceramide (GC) of plant origin. After 45 days, the SM and GC diets led to significant reductions in hepatic lipid and plasma non-high density lipoprotein cholesterol. Both SM and GC diets decreased plasma insulin levels, whereas only the GC diet increased the plasma adiponectin level. Hepatic gene expression analysis revealed increased expression of adiponectin receptor 2 (Adipor2), peroxisome proliferator-activated receptor alpha (PPARα), and pyruvate dehydrogenase kinase 4 (Pdk4). However, expression of stearoyl CoA desaturase (Scd1) was significantly decreased. These results suggest that dietary SL, even of different origins and chemical compositions, may prevent fatty liver and hypercholesterolemia through improvement of adiponectin signaling and consequent increases in insulin sensitivity.

Technical efficiency analysis for oilseed sunflower farms: A case study in Erzurum, Turkey

Külekçi, M., *J. Sci. Food Agric. 90*:1508–1512, 2010.

The main purpose of this study was to examine the technical efficiency of farms producing sunflower in Erzurum, Turkey, and to identify factors that might be causing inefficiency. Stochastic frontier analysis was used to measure technical efficiency. One hundred seventeen randomly selected farms were interviewed for farm-level data in the 2004–2005 production period. Results revealed that the mean technical efficiency for the sunflower farms, estimated by the stochastic production frontier, is 64%. At full technical efficiency, on average, the farmers could reduce their inputs by around 56% without reducing their sunflower production, simply by improving technical efficiency. In the inefficiency model the parameter estimates showed that older farmers, higher level of farmer's education, more experienced farmers, larger farm size, and higher information score resulted in lower technical inefficiency, while bigger family size and more credit use resulted in higher technical inefficiency. This study proposes strategies such as providing better extension services and farmer training programs, including more educated people in sunflower farming, and also expanding the sunflower-growing area through provision of adequate facilities in order to increase technical efficiency.

Intestinal absorption of dietary maize glucosylceramide in lymphatic duct cannulated rats

Sugawara, T., *et al*., *J. Lipid Res. 51*:1761–1769, 2010.

Sphingolipids are ubiquitous in all eukaryotic organisms. Various physiological functions of dietary sphingolipids, such as preventing colon cancer and improving the skin barrier function, have been recently reported. One of the common sphingolipids used as a foodstuff is glucosylceramide from plant sources, which is composed

of sphingoid bases distinct from those of mammals. However, the fate of dietary sphingolipids derived from plants is still not understood. In this study, we investigated the absorption of maize glucosylceramide in the rat intestine using a lipid absorption assay of lymph from the thoracic duct. The free and complex forms of *trans*-4,*cis*-8-sphingadienine, the predominant sphingoid base of maize glucosylceramide, were found in the lymph after administration of maize glucosylceramide. This plant type of sphingoid base was detected in the ceramide fraction and N-palmitoyl-4,8-sphingadienine (C16:0-d18:2) and N-tricosanoyl-4,8-sphingadienine (C23:0-d18:2) were identified by liquid chromatography–tandem mass spectroscopy. The cumulative recovery of 4*t*,8*c*-sphingadienine in the lymph was very low. These results indicate that dietary glucosylceramide originating from higher plants is slightly absorbed in the intestine and is incorporated into ceramide structures in the intestinal cells. However, it appears that the intact form of sphingoid bases is not reutilized well in the tissues

Fatty fish, marine ω-3 fatty acids and incidence of heart failure

Levitan, E.B., *et al*., *Eur. J. Clin. Nutr. 64*:587–594, 2010.

Marine ω-3 fatty acids have beneficial effects on cardiovascular risk factors. Consumption of fatty fish and marine ω-3 has been associated with lower rates of cardiovascular diseases. We examined the association of fatty fish and marine ω-3 with heart failure (HF) in a population of middle-aged and older women. Participants in the Swedish Mammography Cohort aged 48–83 years completed 96-item food-frequency questionnaires. Women without any history of HF, myocardial infarction, or diabetes at baseline (n = 36,234) were followed from 1 January 1998 until 31 December 2006 for HF hospitalization or mortality through Swedish inpatient and cause-of-death registers; 651 women experienced HF events. Cox proportional hazards models accounting for age and other confounders were used to calculate incidence rate ratios (RR) and 95% confidence intervals (CI). Compared with women who did not eat fatty fish, RR were 0.86 (95% CI: 0.67, 1.10) for <1 serving per week, 0.80 (95% CI: 0.63, 1.01) for 1 serving per week, 0.70 (95% CI: 0.53, 0.94) for 2 servings per week and 0.91 (95% CI: 0.59, 1.40) for ≥3 servings per week (P_{trend} = 0.049). RR across quintiles of marine ω-3 fatty acids were 1 (reference), 0.85 (95% CI: 0.67, 1.07), 0.79 (95% CI: 0.61, 1.02), 0.83 (95% CI 0.65, 1.06) and 0.75 (95% CI: 0.58, 0.96) (P_{trend} = 0.04). Moderate consumption of fatty fish (1–2 servings per week) and marine ω-3 fatty acids were associated with a lower rate of first HF hospitalization or death in this population.

The comparative efficacy of plant sterols and stanols on serum lipids: a systematic review and meta-analysis

Talati, R., *et al*., *J. Am. Diet. Assoc. 110*:719–726, 2010.

Plant sterols and stanols are plant steroids with a similar chemical structure and cellular function to human cholesterol, and are recommended as dietary modifiers of serum lipids. Plant sterols have a higher degree of absorption than plant stanols, suggesting differential efficacy between the two. A meta-analysis of randomized controlled trials was performed to summarize direct comparisons between the effect of plant sterols vs. plant stanols on serum lipid levels in healthy patients and patients with hypercholesterolemia. A systematic literature search of MEDLINE, EMBASE, Cochrane CENTRAL, and the Natural Medicines Comprehensive Database was conducted from January 1950 through January 2009. Trials were included in the analysis if they were randomized controlled trials evaluating the effect of plant sterols vs. plant stanols in healthy patients or patients with hypercholesterolemia who reported efficacy data on total, low-density lipoprotein (LDL), and high-density lipoprotein (HDL) cholesterols or triglycerides. The weighted mean difference (WMD) of the change from baseline (in mg/dL) with 95% confidence interval (CI) was calculated as the difference between the means in the plant sterol and plant stanol groups using a random-effects model. Fourteen studies (n = 531 patients) met the inclusion criteria. Upon meta-analysis, the results showed that there is no statistically or clinically significant difference between plant sterols and plant stanols in their abilities to modify total cholesterol (WMD –1.11 mg/dL [–0.0286 mmol/L], 95% CI –4.12 to 1.90, P = 0.47), LDL cholesterol (WMD –0.35 mg/dL [–0.0091 mmol/L], 95% CI –2.98 to 2.28, P = 0.79), HDL cholesterol (WMD –0.28 mg/dL [–0.00073 mmol/L], 95% CI –1.18 to 0.62, P = 0.54), or triglycerides (WMD –1.80 mg/dL [–0.0203 mmol/L], 95% CI –6.80 to 3.21, P = 0.48). Plant sterols and plant stanols do not have statistically or clinically relevant differing effects on total cholesterol, LDL cholesterol, HDL cholesterol, or triglyceride levels. The selection of plant sterols vs. plant stanols should then be based on potential differences in safety parameters, and further study is required to elucidate such differences.

Low dietary fish-oil threshold for myocardial membrane n-3 PUFA enrichment independent of n-6 PUFA intake in rats

Slee, E.L., *et al*., *J. Lipid Res. 51*:1841–1848, 2010.

Long-chain n-3 polyunsaturated fatty acid (PUFA) docosahexaenoic acid (DHA) is important for heart and brain function. Investigations of biologically plausible mechanisms using animal models associate cardioprotection with DHA incorporation into myocardial membranes that are largely derived from supra-physiological fish-oil (FO) intake. We measured the incorporation of DHA into myocardial membranes of rats from low dietary FO intake within human dietary range and quantitatively assessed the influence of dietary n-6 PUFA. With rats fed diets containing 0.16%–5% FO, equal to 0.12%–8.7% energy (%en) as eicosapentaenoic acid (EPA) and DHA (EPA+DHA), and either 1.5%en or 7.5%en n-6 PUFA (linoleic acid) for four weeks, dietary n-6/n-3 PUFA ratios ranged from 74 to 0.3. Myocardial DHA concentration increased in a log-linear fashion with a dietary threshold of 0.019%en as EPA+DHA and half-maximal dietary [EPA+DHA] equal to 0.29%en (95% confidence interval, 0.23–0.35). Dietary linoleic acid intake did not influence myocardial DHA. Myocardial membranes are sensitive to absolute dietary intake of long-chain n-3 PUFA at low %en in the rat, equivalent to a human intake of one meal of fatty fish per week or less. The dietary ratio of n-6/n-3 PUFA has no influence on long-chain n-3 PUFA cellular incorporation from dietary fish oil.

Selected factors affecting crude oil analysis of distillers dried grains with solubles (DDGS) as compared with milled corn

Liu, K., *Cereal Chem. 87*:243–249, 2010.

With increasing production of distillers dried grains with solubles (DDGS), both fuel ethanol and animal feed industries are demanding standardized protocols for characterizing quality. AOCS Approved Procedure (Am 5-04) was used for measuring crude oil content in milled corn and resulting DDGS. Selected factors, including sample type (milled corn, DDGS), sample origin (ethanol plant 1, 2, 3), sample particle size (original matrix, <0.71 mm, <0.50 mm mesh opening; the last two materials were obtained by grinding and sieving), solvent type (petroleum ether, hexane), extraction time (30, 60 min), and postextraction drying time (30, 60 min) were investigated by a complete factorial design. For milled corn, only sample origin and extraction time had significant effects ($P < 0.05$) on crude oil values measured; but for DDGS, besides those two factors, sample particle size, solvent type, and drying time also had significant effects. Among them, the particle size of DDGS had the most effect. On average, measured oil content in DDGS ranged from 11.11% (original matrix) to 12.12% (<0.71 mm) and to 12.55% (<0.50 mm). For measuring the crude oil content of DDGS, particle size reduction, 60 min of extraction, and 60 min of drying are recommended. Regardless of the underlining factors, the method was very repeatable (standard errors <0.05). The observed particle size effect on crude oil analysis of DDGS suggests the need for similar confirmations using other analytical methods.

Genetic evidence for the involvement of lipid metabolism in Alzheimer's disease

Jones, L., *et al*., *Biochim. Biophys. Acta 1801*:754–761, 2010.

Alzheimer's disease (AD) is the most common cause of dementia in the elderly and presents a great burden to sufferers and to society. The genetics of rare Mendelian forms of AD have been central to our understanding of AD pathogenesis for the past 20 years and now the genetics of the common form of the disease in the elderly is beginning to be unraveled by genome-wide association studies. Four new genes for common AD have been revealed in the past year: *CLU*, *CR1*, *PICALM,* and *BIN1*. Their possible involvement in lipid metabolism and how that relates to AD are discussed here.

Using isoprostanes as biomarkers of oxidative stress: some rarely considered issues

Halliwell, B., and C.Y.J. Lee, *Antioxid. Redox Signal. 13*:145–156, 2010.

The measurement of F2-isoprostanes by methods utilizing mass spectrometry is widely regarded as the best currently available biomarker of lipid peroxidation. F2-isoprostanes and their metabolites can be measured accurately in plasma, urine, and other body fluids using mass spectrometric techniques, and detailed protocols have been published in several papers. However, many clinical studies and intervention studies with diets or supplements have employed single "spot'' measurements of F2-isoprostanes on either plasma/serum or urine to estimate "oxidative stress.'' This review examines the validity of the common assumption that plasma and urinary F2-isoprostane measurements are equivalent. It identifies scenarios where they may not be and where "spot'' measurements can be misleading, with examples from the literature. We also discuss the controversial issue of whether and how F2-isoprostane levels in plasma should be standardized against lipids, and, if so, which lipids to use.

The location and behavior of alpha-tocopherol in membranes

Atkinson, J., *et al*., *Mol. Nutr. Food Res. 54*:641–651, 2010.

Vitamin E (alpha-tocopherol) has long been recognized as the major antioxidant in biological membranes, and yet many structurally related questions persist of how the vitamin functions. For example, the very low levels of alpha-tocopherol reported for whole cell extracts question how this molecule can successfully protect the comparatively enormous quantities of polyunsaturated fatty acid (PUFA)-containing phospholipids found in membranes that are highly susceptible to oxidative attack. The contemporary realization that membranes laterally segregate into regions of distinct lipid composition (domains), we propose, provides the answer. We hypothesize alpha-tocopherol partitions into domains that are enriched in polyunsaturated phospholipids, amplifying the concentration of the vitamin in the place where it is most needed. These highly disordered domains depleted in cholesterol are analogous, but organizationally antithetical, to the well-studied lipid rafts. We review here the ideas that led to our hypothesis. Experimental evidence in support of the formation of PUFA-rich domains in model membranes is presented, focusing upon docosahexaenoic acid, which is the most unsaturated fatty acid commonly found. Physical methodologies are then described to elucidate the nature of the interaction of alpha-tocopherol with PUFA and to establish that the vitamin and PUFA-containing phospholipids co-localize in non-raft domains.

Rapid quantitation of fish oil fatty acids and their ethyl esters by FT-NIR models

Azizian, H., *et al*., *Eur. J. Lipid Sci. Technol. 112*:452–462, 2010.

Consumption of fish oil and dietary supplements containing eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) has steadily increased because of their reported health benefits. A rapid procedure based on Fourier transform–near-infrared spectroscopy (FT-NIR) models was developed for analysis of fish oils and their ethyl ester derivatives to replace the time-consuming gas chromatography (GC) method. Inclusion of fish oil or ethyl esters containing varied concentrations of oleic acid (OA), EPA, and DHA into the FT-NIR classification models made possible their classification and quantification. Accurate GC analysis is essential in developing reliable quantitative models since FT-NIR is matrix dependent. Development of FT-NIR models based on 30 m PEG capillary GC column results, as recommended by the official GC method for analysis of marine oils, proved problematic, since these columns did not resolve many geometric isomers compared to 100 m highly polar cyanopropyl polysiloxane columns. Depending on the content of geometric isomers in fish oils and ethyl esters, the levels of long-chain n-3 PUFA would be overestimated if the model used were based on the results from a 30 m column. The FT-NIR method was found to be applicable

to all fish oil and ethyl ester samples, except when fatty acids were outside the range examined, or contaminants were present. The FT-NIR method was applicable to analysis of in-plant intermediates provided contaminants were absent, or identified so they could be incorporated into the model. The FT-NIR method was suitable to evaluate the shelf life of n-3 PUFA concentrates.

Plant stanols dose-dependently decrease LDL-cholesterol concentrations, but not cholesterol-standardized fat-soluble antioxidant concentrations, at intakes up to 9 g/d

Mensink, R.P., *et al*., *Am. J. Clin. Nutr. 92*:24–33, 2010.

It is unclear whether plant stanols lower serum low density lipoprotein (LDL)-cholesterol concentrations and cholesterol-standardized fat-soluble antioxidant concentrations dose-dependently when consumption exceeds the recommended daily intakes of 2.0–3.0 g. The objective was to study the relation between plant stanols provided as plant stanol esters on changes in serum concentrations of LDL-cholesterol and fat-soluble antioxidants. Healthy subjects (n = 93) with slightly elevated serum total cholesterol concentrations (5.0–8.0 mmol/L) received, after a 3-wk run-in period, control products (n = 22) or products (margarine and soy-based yogurt) providing 3 g (n = 24), 6 g (n = 22), or 9 g (n = 25) plant stanols provided as fatty acid esters for 4 wk. Serum LDL-cholesterol decreased dose-dependently. Compared with control, decreases in the 3-g group were 0.32 mmol/L (7.4%; P = 0.005 after adjustment for multiple comparisons). An intake of 6 g plant stanols caused an additional decrease of 0.18 mmol/L (4.5%; P = 0.100 compared with the 3-g group). In the 9-g group, a further decrease of 0.22 mmol/L (5.4%) was observed (P = 0.048 compared with the 6-g group). Serum LDL-cholesterol concentrations were lowered by 17.4% in the 9-g group compared with the control group. No effects on cholesterol-standardized β-carotene concentrations were observed. Even the change of –0.01 µmol/mmol cholesterol (or –9.2%; P = 0.341) in the 3-g group compared with the control group was not statistically significant because of the large variation in response. Serum HDL-cholesterol and triacylglycerol concentrations, cholesterol-standardized α-tocopherol and lutein concentrations, and plasma markers reflecting liver and renal function were not affected. Daily consumption of plant stanols up to 9 g reduces serum LDL-cholesterol concentrations linearly up to 17.4%. For cholesterol-standardized fat-soluble antioxidant concentrations, such a relation could not be ascertained.

Effects of plant sterols and stanols beyond low-density lipoprotein cholesterol lowering

Derdemezis, C.S., *et al*., *J. Cardiovasc. Pharmacol. Therapeut. 15*:120–134, 2010.

Consumption of foods and supplements enriched with plant sterols/stanols (PS) may help reduce low-density lipoprotein cholesterol (LDL-C) levels. In this review, we consider the effects of PS beyond LDL-C lowering. Plant sterols/stanols exert beneficial effects on other lipid variables, such as apolipoprotein (apo) B/apoAI ratio and, in some studies, high-density lipoprotein cholesterol (HDL-C) and triglycerides (TG). PS may also affect inflammatory markers, coagulation parameters, as well as platelet and endothelial function. Evidence also exists about a beneficial effect on oxidative stress, but this does not seem to be of greater degree than that expected from the LDL-C lowering. Many of these effects have been demonstrated *in vitro* and in animal models. Some *in vitro* effects cannot be seen *in vivo* or in humans at usual doses. The epidemiological studies that evaluated the association of plasma PS concentration with cardiovascular disease (CVD) risk do not provide a definitive answer. Long-term randomized placebo-controlled studies are required to clarify the effects of supplementation with PS on CVD risk and progression of atherosclerosis.

Conjugated linoleic acid in adipose tissue and risk of myocardial infarction

Smit, L.A., *et al*., *Am. J. Clin. Nutr. 92*:34–40, 2010.

Despite the high saturated fat content of dairy products, no clear association between dairy product intake and risk of myocardial infarction (MI) has been observed. Dairy products are the main source of conjugated linoleic acid (CLA; 18:2n-7*t*), which is produced by the ruminal biohydrogenation of grasses eaten by cows. Pasture-grazing dairy cows have more CLA in their milk than do grain-fed cows. Some animal models have reported beneficial effects of CLA on atherosclerosis. The objective was to determine the association between the 9*c*,11*t*-CLA isomer in adipose tissue and risk of MI. The studied population consisted of 1,813 incident cases of a first nonfatal acute MI and 1,813 population-based controls matched for age, sex, and area of residence. All subjects lived in Costa Rica—a country that uses traditional pasture-grazing for dairy cows. Conditional logistic regression was used to estimate multivariate odds ratios and 95% confidence intervals (CI). Adipose tissue 9*c*,11*t*-CLA was associated with a lower risk of MI in basic and multivariate models. Compared with the lowest quintile, odds ratios and 95% CI were 0.80 (0.61, 1.04) for the second, 0.86 (0.64, 1.14) for the third, 0.62 (0.46, 0.84) for the fourth, and 0.51 (0.36, 0.71) for the fifth quintiles (P for trend <0.0001). Dairy intake was not associated with risk of MI, despite a strong risk associated with saturated fat intake.

Lipid nutrition and eye health

Bretillon, L., *et al*., *Lipid Technol. 22*:130–133, 2010.

According to demographic forecasts, the elderly population will represent a growing part of the developed societies in the near future. Eye diseases are the second most prevalent pathologies after the age of 65 years. Age-related macular degeneration (AMD) is the leading cause of irreversible vision loss in Western countries. The number of people suffering from ocular pathologies is expected to increase sharply in the near future, becoming a socio-economic burden. Recent data indicate that lipid nutrients may represent new tools in the prevention of eye diseases, and especially AMD. ■

Published something lately?

We would like to begin listing recent publications of our student members, including dissertations. Please send complete citations to *inform* Associate Editor Catherine Watkins (cwatkins@aocs.org).

CALENDAR (CONTINUED FROM PAGE 468)

http://nifes.no/forsiden/arrangement/index.php?page_id=&article_id=3401&lang_id=2.

November 9–10, 2010. Advanced Biofuels Markets, San Francisco, California, USA. Information: www2.greenpowerconferences.co.uk/EF/?sSubSystem=Prospectus&sEventCode=BF1011US&sSessionID=79d28109d72bb9b274000d659189c592-976017.

November 9–12, 2010. 5th Annual Biofuels 2010 Meeting, Okura Hotel, Amsterdam, Netherlands. Information: www.wraconferences.com/2/4/articles/149.php?.

November 10, 2010. Developing Soy Seminar 2010: Connecting Product Development and Supply, Amsterdam, Netherlands. Information: http://bridge2food.com/Developingsoy2010.asp.

November 10–11, 2010. Bioenergy International Asia Expo & Conference, The Maya Hotel, Kuala Lumpur, Malaysia. Information: www.biofuelsinternationalexpo.com/asia/conf_prog.html.

November 10–12, 2010. 45th Southeastern Regional Lipid Conference 2010, High Hampton Inn & Country Club, Cashiers, North Carolina, USA. Information: www.musc.edu/BCMB/serlc.

November 11, 2010. 15th Soy Symposium: Adapting to New Market Forces, L'Enfant Plaza Hotel, Washington, DC, USA. Information: www.soyfoods.org/2010-soy-symposium.

November 16–18, 2010. Health Ingredients Europe, Madrid, Spain. Information: http://hieurope.ingredientsnetwork.com.

November 16–18, 2010. Food Ingredients Europe, London, United Kingdom. Information: www.fi-events.com.

November 21–24, 2010. 8th Euro Fed Lipid Congress, Munich, Germany. Information: email: info@eurofedlipid.org; www.eurofedlipid.org/meetings/munich.

November 24–26, 2010. 4th International Conference, Fat and Oil Industry 2010, Palmira Palace Hotel, Yalta, Ukraine. Information: email: promo@apk-inform.com, ozip@apk-inform.com; www.agrimarket.info.

November 25–26, 2010. Protein Summit, Amsterdam, Netherlands. Information: www.bridge2food.com/Mailings/PS2010.html.

November 29–December 1, 2010. 7th Annual Canadian Renewable Fuels Summit, Hilton Lac-Leamy Hotel, Gatineau, Québec, Canada. Information: www.crfs2010.com.

December

December 3–5, 2010. 65th Annual OTAI Convention, International Symposium, and Expo on Oils, Fats & Oleochemicals; Food Security, Green Energy, and Environment, Hotel InterContinental Eros, New Delhi, India. Information: www.otai65agm.org.

December 10–11, 2010. Functional Foods for Heart Health: Continuum Between Science and Commercialization, Winnipeg, Canada. Information: www.bioactivesworld.com/winnipeg.html.

December 16–17, 2010. HPCI [Home and Personal Care Ingredients] Congress, Mumbai, India. Information: www.hpci-congress.com.

2011

January 30–February 4, 2011. Gordon Conference on Plant Lipids: Structure, Metabolism & Function, Hotel Galvez, Galveston, Texas, USA. Information: www.grc.org/programs.aspx?year=2011&program=plantlipid.

February 6–9, 2011. National Biodiesel Board Conference & Expo, Phoenix Convention Center and Venues, Phoenix, Arizona, USA. Information: www.biodiesel.org.

February 20–22, 2011. 16th National Ethanol Conference, JW Marriott Desert Ridge, Phoenix, Arizona, USA. Information: www.ethanolrfa.org or www.nationalethanolconference.com.

February 26–March 1, 2011. GEAPS [Grain Elevator and Processing Society] Exchange, Portland, Oregon, USA. Information: www.geaps.com/exchange/index.cfm.

February 27–March 4, 2011. Gordon Conference on Signal Transduction within the Nucleus, Four Points Sheraton, Ventura, California, USA. Information: www.grc.org/programs.aspx?year=2011&program=sigtrans.

March 13–18, 2011. Pittcon 2011, Georgia World Congress, Atlanta, Georgia, USA. Information: www.pittcon.org/about.

March 14–15, 2011. Biowise 2011: Biofuels from Lab to Finance, The Crowne Plaza Hotel, Kuala Lumpur, Malaysia. Information: www.greenworldconferences.com.

March 22–24, 2011. World Biofuels Markets, Beurs–World Trade Center, Rotterdam, Netherlands. Information: http://greenpower.msgfocus.com/q/1NeTXkWKWk1ab2/wv.

March 27–29, 2011. Congress on Steroid Research, Westin Chicago River North Hotel, Chicago, Illinois, USA. Information: www.steroidresearchcongress.com/index.asp. ■

AOCS Technical Services update

Catherine Watkins

For more than 100 years, AOCS has focused on providing technical support to industry, government, and academia. Each year at the AOCS Annual Meeting & Expo (AM&E), a number of technical committees meet and move that work forward. Following are notes from the committee meetings held May 16–19 at the AM&E in Phoenix, Arizona, USA.

TECHNICAL STEERING COMMITTEE (TSC)

Meeting chair: Len Sidisky, Supelco Inc., Bellefonte, Pennsylvania, USA

The TSC reviews the technical activities and services provided by AOCS, ensuring that they meet the needs of AOCS and its members. Therefore, the TSC oversees the work of all of the committees mentioned below.

Sidisky began the meeting—his first as chair—by complimenting the performance of AOCS Technical Services' staff. The committee then proceeded to hear reports about the work of the following committees.

LABORATORY PROFICIENCY PROGRAM (LPP) COMMITTEE

Chair: John Hancock, Federation of Oils, Seeds, and Fats Associations International (FOSFA), London, UK

The LPP had another good year, said Committee Chair John Hancock. The program added a biodiesel feedstock series in 2009; the total number of participants (800+) in all series increased by 4–5% from the previous year.

Work continues on updating the online data entry/results retrieval system for LPP. The aim is to upgrade the visual presentation, create more user-friendly functions, and upgrade the statistical program for analyzing the proficiency data to meet international standards (IUPAC).

UNIFORM METHODS COMMITTEE (UMC)

Chair: Mark Collison, Archer Daniels Midland Co. (ADM), Decatur, Illinois, USA

Because of the retirement of former chair Mike Kennedy of Cargill, the first order of business for the UMC was to elect a committee chair; Mark Collison of ADM was proposed for the three-year term. His appointment was later confirmed by the AOCS Governing Board.

Next, those subcommittee chairpersons who were present gave their reports.

Mycotoxins

Chair: James Falk, US Department of Agriculture (USDA), Washington, DC, USA

USDA has completed a collaborative study of two methods for testing aflatoxins in almonds (shelled and soft-shelled) aimed at modifying AOCS Official Method Ab 7-91. Falk announced that the California Almond Board funded the work on soft-shelled almonds. Work on a method for characterizing aflatoxins in pistachio nuts (in-shell) to add to the scope of AOCS Official Method Ab 7-91 has been tabled for now.

Chromatography

Co-chairs: Sneh Bhandari, Silliker, Chicago Heights, Illinois, USA; Steve Hansen, Cargill, Minneapolis, Minnesota, USA; and Tiffanie West, Bunge, Bradley, Illinois, USA

Current projects include:

- The collaborative study of alkaline-only and the acid-alkaline direct methylation procedures for Ce 1k-09 and Ce1i-07 was scheduled to begin in the third quarter of 2010. Those persons interested in participating should contact Gina Clapper at ginac@aocs.org.
- The review of packed column methods for butyric acid, triglycerides, and fatty amines continues. The next step is to compare AOCS Method Ce 5-86 to the ISO (International Organization for Standardization) method and determine how to move forward.

Rapid and Nondestructive Technologies
Chair: Alan Kook, NMR Consulting, Austin, Texas, USA

During the Sunday afternoon Methods Committee Roundtable meeting, George Porter of Metrohm discussed his company's rapid sodium determination process, which is of interest to AOCS in regard to sodium content of butter and margarine.

The UMC also discussed Alan Kook's AM&E presentation on solid fat content (Kook did not attend the UMC meeting himself). In brief: Using the NMR (nuclear magenetic resonance) magnet to heat a sample allows the analyst to take a large number of readings as the sample warms rather than one at each temperature defined by separate baths. Further information is anticipated at next year's meeting.

USB/AOCS SOYBEAN QUALITY TRAITS (SQT) PROGRAM COMMITTEE

Project Manager: Amy Johnson, AOCS, Urbana, Illinois, USA

The SQT Program is funded by the United Soybean Board (USB) and provides the infrastructure for the generation of reliable analytical results at all levels of the soybean industry by establishing industry-wide acceptance of analytical methods and protocols and their implementation under internationally accepted quality management standards.

The meeting began with a review of SQT projects, including the Analytical Standards Program (ASP), the NIR applicability study, and methods development. ASP is a proficiency testing program with three series: whole soybean wet chemistry, whole soybean near-infrared (NIR) spectroscopy, and soybean meal NIR. Currently, there are 70 participants.

A survey of ASP participant needs conducted prior to the AM&E indicated that participants would like a soybean meal wet chemistry series to be offered; Johnson noted that this will be done once the new SQT website is complete.

During 2007, 2008, and 2009, commercially available whole soybean samples were collected at harvest for the NIR applicability study from Monsanto Co., Pioneer Hi-Bred International, Inc., Iowa State University, and the North Carolina Department of Agriculture & Consumer Services. After wet chemistry analysis, samples were made available to participants, primarily NIR equipment manufacturers, universities, and testing laboratories, for scanning purposes. NIR results were statistically compared to wet chemistry, as well as across all NIR platforms. The results from 2009 are still being analyzed because of the extremely late US harvest. However, the protocol used for the studies can be applied to all quality traits in the development pipeline, Johnson said.

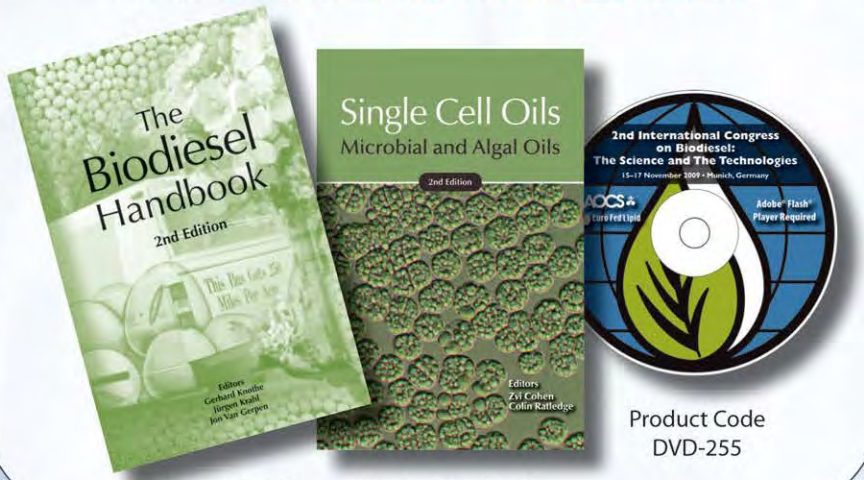
In other SQT news, the program acquired soybean samples for its Soybean Sample Library from the 2009 GIPSA/FGIS (USDA's Grain Inspection, Packers and Stockyard Administration/Federal Grain Inspection Service) FarmGate program.

The SQT Program has also been working on the development of performance criteria for an amino acid method, a phytate method, and a sugar method in soybeans, as well as test miniaturization.

Catherine Watkins is associate editor of inform *and can be reached at cwatkins@aocs.org.*

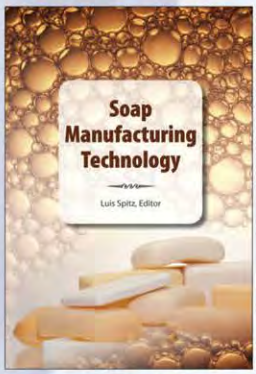
Take a closer look at

our RECENT RELEASES

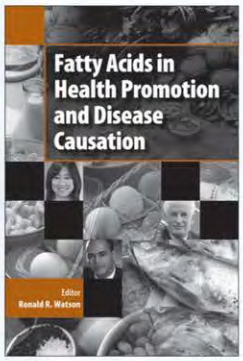


Product Code 234 Product Code 249 Product Code DVD-255

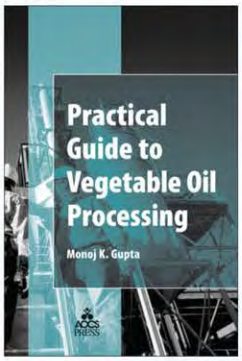
our BESTSELLERS



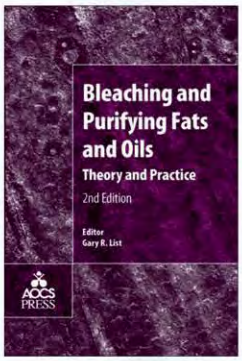
Product Code 238



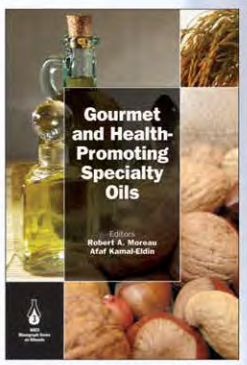
Product Code 237



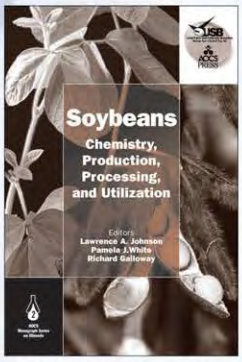
Product Code 212



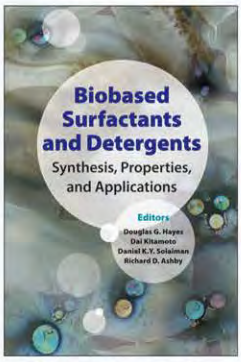
Product Code 220



Product Code 241

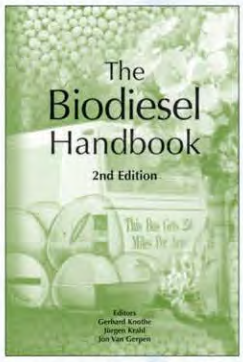


Product Code 223

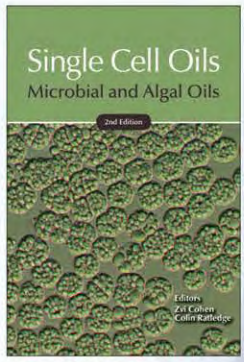


Product Code 235

Product Code DVD-255



Product Code 234



Product Code 249

Visit www.aocs.org/store

Official Methods and Recommended Practices of the AOCS

6th Edition now available!

www.aocs.org/Methods

The *Official Methods and Recommended Practices of the AOCS* has long been regarded as the standard publication for analytical methods critical to processing, trading, utilizing, and evaluating fats, oils, and lipid products.

Did you know that this critical resource is available in print and electronic formats? These options allow your organization to select methods only applicable in your laboratory.

Online Individual Methods

The advantages of online delivery include the ability to select methods related to specific analytical areas, the ability to search by definition and scope, as well as the low individual methods cost. Visit www.aocs.org/Methods for more information.

Electronic Access

If your company or university has several laboratories that need access to *AOCS Methods*, there is no need to purchase several copies. Electronic access is now available to meet your needs. A web-based library of *AOCS Methods* is available for individual use or for multi-user/multi-site access. Governments and Universities receive special rates. Electronic access is automatically updated when there are additions or revisions to any of the methods.

Contact AOCS Technical Services to learn more and find out what package best suits your organization.

Member Price: $520 • List Price: $595

For more information on *AOCS Methods* please visit www.aocs.org/Methods.

Phone: +1 217-693-4803
Fax: +1 217-351-8091
Email: technical@aocs.org

TECHNICAL SERVICES AOCS

Mass spectrometry and prions: The need to simplify and remove oil from the system

Christopher J. Silva

This article has been adapted from the talk given by Christopher J. Silva during the Agricultural Microscopy Division Luncheon at the 101st AOCS Annual Meeting & Expo in Phoenix, Arizona, USA.

Transmissible spongiform encephalopathies (TSE) are a set of rare fatal neurological diseases. TSE are characterized by a long latency period, followed by a relatively rapid onset of neurological symptoms that inevitably ends in the death of the host. The hallmark of these diseases is the formation of microscopic holes in the brain (spongiform encephalopathy), which occurs without eliciting an immune response. TSE afflict a number of mammals: sheep (scrapie); goats (scrapie); and deer, elk, and moose (chronic wasting disease: CWD). The human forms of TSE include Creutzfeldt-Jakob disease (CJD), Gerstmann-Sträussler-Scheinker (GSS) disease, kuru, fatal familial insomnia (FFI), and variant Creutzfeldt-Jakob disease (vCJD). These are the only known diseases that can be both heritable and transmissible.

In 1982 Stanley Prusiner coined the term prion (***pro***teinaceous ***in***fectious particle) to describe this unprecedented contagion. A prion (PrP^{Sc}) is a multimeric protein capable of recruiting and converting the monomeric normal cellular prion protein (PrP^{C}), a natively expressed protein, into a prion, thereby propagating an infection. PrP^{Sc} is a remarkably stable entity; it survives standard autoclaving and formalin inactivation and persists in the environment for years. A prion is the least complicated of all pathogens, since it consists of a single protein.

In the late 1980s and early 1990s, a variety of structural analyses, including mass spectrometry, were performed on PrP^{Sc} and PrP^{C} to determine any structural differences. These varied analyses showed that PrP^{Sc} and PrP^{C} possess identical amino sequences and covalent post-translational modifications (Fig. 1). Both have a single intramolecular disulfide bond between the two cysteine residues

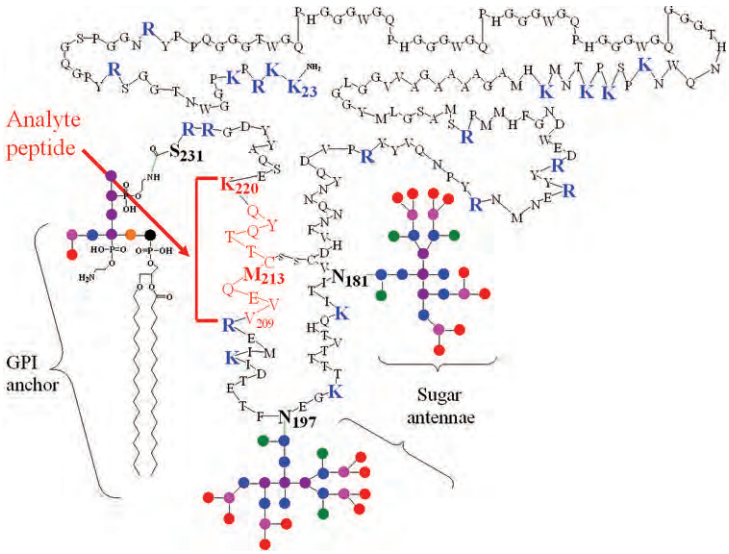


FIG. 1. *Schematic representation of hamster PrP^{C} (normal cellular prion protein). The first 22 amino acids of the peptide are cleaved upon its direction into the endoplasmic reticulum. The peptide starts with lysine (K) at position 23 and ends with serine (S) at position 231. The sugar antennae are attached to asparagine (N) 181 and 197. The GPI (glycosylphosphatidylinositol) anchor is attached to serine at position 231. Methionine at position 213 has been proposed to be involved in prion formation. The analyte peptide starts with valine (V) 209 and ends with lysine 220.*

present in the protein. Both contain a single glycosylphosphatidylinositol (GPI) anchor that covalently links the protein to a lipid. PrP^{Sc} and PrP^{C} are glycosylated at the same asparagine residues by N-linked sugar antennae. The variation in the composition of the sugar antennae is similarly varied in PrP^{C} and PrP^{Sc}. Since PrP^{C} and PrP^{Sc} have identical covalent structures, their structural differences must be noncovalent.

Although PrP^{C} and PrP^{Sc} only differ in terms of their noncovalent structures, these noncovalent differences impart significantly different properties. PrP^{Sc} can propagate itself while PrP^{C} cannot. PrP^{Sc} is more resistant to proteinase K digestion than is PrP^{C}. PrP^{C} is soluble in nondenaturing detergents such as sarkosyl. In contrast, PrP^{Sc} is insoluble. Since a prion is a multimer, it has different sedimentation properties than PrP^{C} and can be purified from PrP^{C} by ultracentrifugation. Denaturing PrP^{Sc} with guanidine hydrochloride disrupts its characteristic noncovalent interactions. If PrP^{Sc} is denatured by guanidine hydrochloride, then its characteristic noncovalent interactions are disrupted. As a result of these disruptions, it is

converted into denatured PrP^C and is no longer infectious.

Recent advances in instrumentation, computer hardware, and software now allow for more sensitive detection and identification of molecules. The structural studies described previously required multiple milligrams of purified material. Contemporary chromatography systems have flow rates in the nanoliters per minute range. The columns are 70 microns in diameter, allowing for chromatography on a scale appropriate for detection of molecules in the attomole (10^{-18} mole) range. The development of more advanced tandem mass spectrometers allows for the multiple reaction monitoring (MRM) approach to mass spectrometric analysis (Fig. 2A). Such instruments can detect molecules in the attomole range. Our research unit has exploited these advances and applied them to the detection of prions.

The structural complexity of PrP^{Sc} makes it difficult to quantitate. It is infectious and multimeric, so it must be inactivated and converted back into PrP^C prior to mass spectrometric analysis. There are at least 30 glycoform variants at each of the two sites of glycosylation of PrP^C, as well as variants in the sugar composition of the GPI anchor. The lipid portion of the GPI anchor also complicates the chromatography and ionization of the molecule. Such structural variety precludes simple quantification of PrP^{Sc} based on a characteristic molecular weight. Although PrP^{Sc} is structurally heterogeneous, it is composed of a single peptide. Quantification needs to be based solely on the peptide portion of PrP^{Sc}.

We exploit the physical properties of prions to effect their quantitation. We use ultracentrifugation in nondenaturing detergents to separate PrP^{Sc} from PrP^C. Once separation has been effected, the sample can be further purified by partial digestion with proteinase K. Proteinase K will digest any traces of PrP^C and any other protein that contaminates the ultracentrifugation pellet, leaving a truncated form PrP^{Sc} (PrP27-30). The highly purified pellet is inactivated by the protein denaturant guanidine hydrochloride to yield denatured PrP27-30 monomers. Methanol precipitation yields a protein pellet that is free of guanidine hydrochloride.

information

FURTHER READING:

- Onisko, B., E.G. Fernández, M.L. Freire, A. Schwarz, M. Baier, F. Camiña, J.R. García, S. Rodríguez-Segade Villamarín, and J.R. Requena, Probing PrP^{Sc} structure using chemical cross-linking and mass spectrometry: Evidence of the proximity of Gly90 amino termini in the PrP 27-30 aggregate, *Biochemistry 44*:10100–10109 (2005).
- Onisko, B., I. Dynin, J.R. Requena, C.J. Silva, M. Erickson, and J.M. Carter, Mass spectrometric detection of attomole amounts of the prion protein by nanoLC/MS/MS, *J. Am. Soc. Mass Spectrom. 18*:1070–1079 (2007).
- Silva, C.J., B.C. Onisko, I. Dynin, M.L. Erickson, W.H. Vensel, J.R. Requena, E.M. Antaki,, and J.M. Carter, Assessing the role of oxidized methionine at position 213 in the formation of prions in hamsters, *Biochemistry 49*:1854–1861 (2010).

The resulting pellet is dissolved in buffer and subjected to trypsin digestion. Trypsin selectively cleaves peptide bonds following either lysine (K) or arginine (R), but exhibits variable efficiency if the amino acid adjacent to the lysine or arginine is a proline (P) (Fig. 1). The peptide fragments resulting from trypsin digestion behave as small molecules. They ionize to different extents and fragment in characteristic ways. Based on these empirical considerations, we selected a peptide that ionized well, was cleaved quantitatively by trypsin, and was not covalently attached to the GPI anchor or the sites of glycosylation. The peptide we selected was VVEQMCTTQYQK (residues 209–220)

We employ a nano-liquid chromatography system to keep the scale of the chromatography similar to that of our detection system. The flow rate we use is 250 nL/min, and our detection limits are approximately 40 attomole (4 x 10^{-17} mole; ~24 M molecules). We used a stable isotope-labeled version of the analyte peptide as an internal standard (^{13}C and ^{15}N; N-terminal valine). The internal standard has

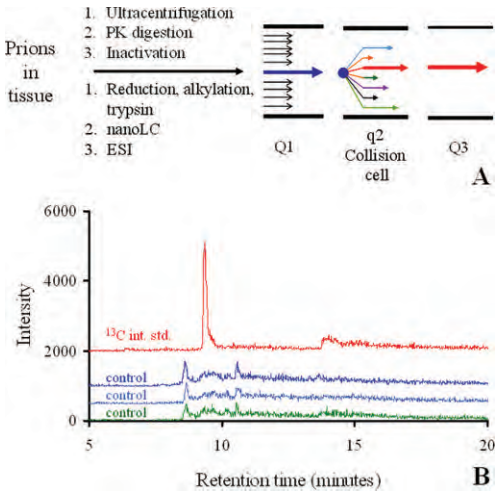


FIG. 2. A. *Schematic representation of the multiple reaction monitoring (MRM) method.* **B.** *NanoLC-ESI-MS-MS chromatograms of the ^{13}C-,^{15}N-labeled internal standard and three uninfected control animals. The scales are offset for the sake of clarity. Abbreviations: PK, proteinase K; nanoLC, nano-liquid chromatography; ESI, electrospray ionization; Q1, q2, and Q3, quadrupoles 1, 2, and 3; MS-MS, tandem mass spectrometry; for other abbreviations see Figure 1.*

a chromatographic retention time that is identical to that of the analyte peptide. This internal standard allows us to determine the chromatographic retention time of the analyte peptide and to quantify the analyte peptide based on the ratio of the areas of the unknown amount of analyte peptide and the known amount of the added internal standard.

We use the MRM method to analyze our peptide. This method requires a tandem instrument (triple quadrupole). The first quadrupole is set to permit ions with a characteristic mass-to-charge (*m*/*z*) ratio to pass into the second quadrupole, where these ions are fragmented by collision with nitrogen gas. The resulting ions enter the third quadrupole, which is set to permit only ions with a second characteristic *m*/*z* ratio to strike the detector (Fig. 2A).

There is always the possibility that some compound may interfere with this analysis, so we subjected healthy brain tissues to the same analysis. This analysis showed that there was no interfering molecule that would confound our results

(Fig. 2B). We performed a time course experiment to follow the increase of prions in hamsters intracranially challenged with a strain of hamster-adapted scrapie (263K). These results show a log linear increase over time (Fig. 3A, 3B). With this method, prions are detectable well before symptoms occur or there is evidence of the pathology that is characteristic of TSE. We can even detect prions one day post-inoculation; after one week the signal is more intense, and in subsequent weeks it becomes still more so.

The MRM method allows us to further probe the structure of prions. Methionine is a nonpolar amino acid, which upon oxidation becomes the very polar methionine sulfoxide. Oxidation of methionine at position 213 has been implicated in the formation and propagation of prions. We used the MRM method to quantify the amount of methionine sulfoxide (position 213) present in the prions from our time course study. The small amount of oxidation present (~10%) in the early samples decreased over time, but overall, the amount of oxidation was similar to that found in PrP^{C}. These results are inconsistent with the active recruitment and conversion of the sulfoxide-containing PrP^{C} into PrP^{Sc}. The observed oxidation is more consistent with partial oxidation of femtomole (10^{-15} mole) amounts of methionine-containing proteins and peptides that can occur in samples that are exposed to molecular oxygen.

Prions are multimers whose structure is difficult to analyze by traditional structural analysis. By using bifunctional reagents one can determine the distance between intramolecular and intermolecular amino acids in the PrP^{Sc} multimer. This analysis has led researchers to reject various models based on these constraints. This type

CONTINUED ON PAGE 528

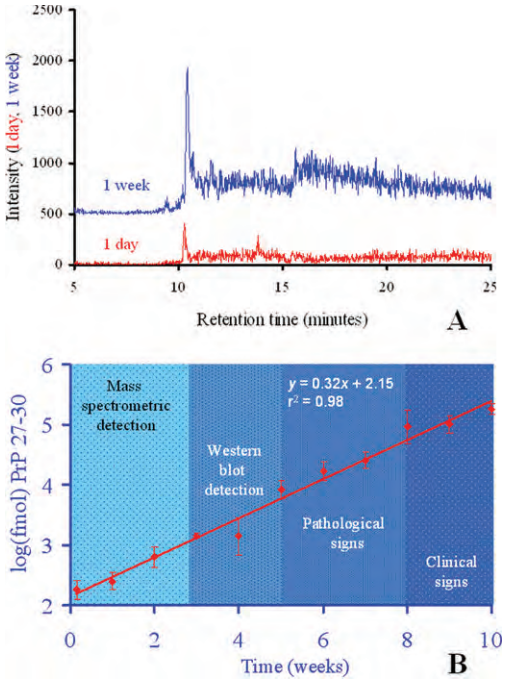


FIG. 3. A. *NanoLC-ESI-MS-MS chromatogram showing the MRM signal intensity of the analyte peptide 1 day and 1 week post-inoculation.* **B.** *Log_{10} plot of the time course of the disease from one day post-inoculation until all animals became sick. Four animals per time point. For abbreviations see Figures 1 and 2.*

Biofuels blend measurements with portable mid-infrared analyzers

Sandra Rintoul

Globally, governments are putting more emphasis on sustainable energy sources and are creating energy policies that promote the production and use of biofuels. With the Renewable Fuels Standard-2 (RFS-2), the United States set biofuels blending volumes to 12.95 billion gallons (49.0 billion liters) for 2010, increasing to 36 billion gallons (136 billion liters) by 2022. With similar mandates or guidelines coming from other countries, the need to easily and accurately measure biofuels blends becomes more important.

BLENDING METHODS

The splash blend method is often used for blending biodiesel. With this method, the petrodiesel fuel and B100 (i.e., 100% biodiesel) are pumped separately into a delivery truck or storage tank, and it is assumed the blend will have been adequately mixed in the tank by the time the truck arrives at the delivery site. However, a demonstration test was recently conducted with the Wilks InfraCal Biodiesel Blend Analyzer (shown in Fig. 1) five minutes after filling the truck for B20. A sample taken from the top measured 11.9% biodiesel, while another from the bottom was 24.1% (c.f. *inform 19*:787–789, 2008). If the first delivery of fuel from a splash blend-loaded truck is only a few miles away on a smooth road, the chance for delivering an accurate blend/mix is far from guaranteed. And subsequent deliveries will also have an incorrect blend.

In-line (injection) blending offers better blend consistency than splash blending and is typically used for ethanol blending at pipeline racks and terminals. It is also becoming more common for biodiesel blending. The biofuel is mixed as it is metered into the pipe with the diesel or gasoline. Additional mixing occurs as the fuels enter the receiving tank or truck. For biodiesel, density and viscosity changes require adjustments to the meters for an accurate blend. Although manufacturers of in-line blending systems claim indisputable accuracy, a quick check for the correct blend gives actual data to validate this claimed assumption.

INFRARED ANALYSIS OF BIOFUELS

The approved methods for biodiesel measurement, EN 14078 and the ASTM Method D7371, both specify mid-infrared spectroscopy for the measurement of the biodiesel blend ratio. Infrared analysis works well for FAME (fatty acid methyl esters) because the biodiesel ester has a characteristic infrared absorption due to the carbonyl bond at 5.7 micrometers or 1745 cm^{-1}. In other words, as the concentration of biodiesel goes up, the infrared absorbance at that wavelength increases. The infrared absorbance can be directly calibrated to read out in percent biodiesel. The same is true for ethanol, as it has an infrared absorbance band unique to gasoline at 9.6 micrometers (1042 cm^{-1}). Again, the increase of infrared absorbance correlates with the increase in concentration of ethanol in gasoline.

ADVANTAGES OF FILTER-BASED INFRARED ANALYZERS

An infrared analyzer can be set up with a filter mounted on a detector that is specific to the analysis, in this case either 1745 cm^{-1} for biodiesel or 1042 cm^{-1} for ethanol. The advantages of a filter-based infrared analyzer are many: convenient size, lower cost, ruggedness, decreased power usage. Regulatory agencies often travel to a fuel station and check to ensure what is specified on the pump is correct. For their application, a six inch square box that will fit in their truck, operate off of a 12-volt car battery, function in a wide range of temperature and humidity, and is quite rugged with no moving parts would be ideal. These features are also important to blenders and terminal operators as they would like the advantage of checking a truck, railcar, or tank on-site after it is loaded rather than hold up a delivery while a sample is taken to a laboratory for testing.

Another critical feature is ease of use. In the analyzer pictured in Figure 1, a fuel sample is placed directly on the exposed sample window, and in less than a minute the percent ethanol or biodiesel is displayed. The sample is cleaned with a wipe, and the analyzer is ready for the next measurement.

FIG. 1. *Portable biodiesel blend analyzer.*

TECHNICAL SERVICES AOCS

Biodiesel Expert Panel Meeting

AOCS Technical Services sponsored a meeting of biodiesel experts on Sunday, May 16, at the AOCS Annual Meeting & Expo in Phoenix, Arizona, USA. The purpose was to discuss the development of analytical methods for biodiesel. Participants introduced themselves and then proceeded with the agenda.

The update on the International Organization for Standardization (ISO)/Technical Committee (TC) Subcommittees (SC) involved with biofuels pointed out that progress on method development has been moving very slowly. This pertains particularly to ISO/TC 28/SC-7 and ISO/TC 334/SC 11 Joint Working Group Activities. Some of the methods in question are the determination of ester content by gas chromatography of mono-, di-, and triglycerides and the development of different methods for oxidative stability and phosphorus content.

Steve Howell, Mark-IV Consulting (Kearney, Missouri, USA) and National Biodiesel Board Technical Director (NBB; Jefferson City, Missouri), gave an update on activities of the NBB. The top technical priorities of NBB for 2010 are the following:

1. The impact of minor components
2. 2007/2010 Engine and after-treatment
3. Biodiesel quality enforcement
4. Boiler and heating oil research
5. Life cycle analysis/greenhouse gases
6. Biodiesel stability
7. Biodiesel transport in pipelines
8. Feedstock development
9. New, faster, and better test methods
10. Lubricating oil effects with biodiesel

Among other comments regarding this list, Howell pointed out that the National Oilheat Research Alliance (Alexandria, Virginia, USA) has a goal of achieving use of B100 (i.e., 100% biodiesel) for oil heating in the United States by 2050; this would represent 7 billion gallons (26.5 billions liters) annually. He also pointed out that different considerations come into play regarding biodiesel for heating vs. powering engines. For example, the fuel is burned in an open flame, not compressed within an engine.

Other comments were related to optimized biodiesel, which would involve development of a specific fatty acid profile; the use of pipelines to transport biodiesel, which could result in a significant savings vs. truck transport ($0.05–$0.25 per gallon); the implementation of the National Renewable Fuel Standard-2, the requirements for which went into effect July 1, 2010; and the development of methods for detecting metals in fats and oils.

Lisa Clement (Cargill Inc., Wayzata, Minnesota, USA) prepared a handout for this meeting on 21 analytical methodologies for sterol glucosides (SG) in biodiesel. The question arose whether there is a need for a method specifically for SG or for a more general method on filter-clogging components.

Other projects brought before the group included the robustness of the acid number test method (as represented by ASTM D664) for biodiesel, the cold soak filtration test method, and methodologies for monoglycerides. ■

Table 1. *Infrared measurements of different biodiesel feedstocks*

Feedstock	Biodiesel (%)	Feedstock	Biodiesel (%)
Coconut	26.3	Palm	20.5
Soybean	20.2	Animal fat	20.5
Yellow grease	20.1	Rapeseed	20.4

MAKING SURE NO BIODIESEL IS PRESENT

ASTM Method D975 currently allows up to 5% biodiesel in diesel without the requirement for biodiesel content labeling, which is a problem for some diesel users such as nuclear power plants. Fuel can be stored for as long as 10 years to power their standby diesel generators in case of an electrical power shut down. Emergency diesel generators (EDG) supply electrical power to safely shut down the nuclear reactor in the event of a loss of normal off-site power, and they supply power to critical items such as cooling pumps for decay heat removal. Biodiesel is a natural food source for microbial growth; and while biocides should prevent the growth of bacteria, fungi, and mold, nuclear power plants cannot risk that microbial growth could clog filters and shut down the EDG. In cold weather areas, there is also concern that the cold-flow properties of biodiesel-blended fuel may cause it to gel in cold temperatures and again clog filters. Therefore, it has become necessary for many standby generator operators to determine whether their fuel delivery contains biodiesel.

Pipeline operators also need to know that the product they deliver to their customer is as specified. If they receive diesel to be shipped on their pipeline and biodiesel is in the fuel, they have the risk of residual biodiesel being present in a fuel delivery to a customer that requires no biodiesel, such as jet fuel users or nuclear power plants. For low level analysis, more than one infrared wavelength is useful to be able to compensate for the variations found in different diesel fuels. The biodiesel detection measurement can also be done with a filter-based analyzer, this time with a spectrometer that uses a linear variable filter that covers a spectral range of 5.4–10.8 µm (1850–925 cm^{-1}) coupled with a 128 pixel detector array. The variable filter array (VFA) spectrometer is also compact and portable with a low power requirement and no moving parts. It is capable of detecting the presence of biodiesel below 500 ppm.

COMPARISON OF DIFFERENT BIODIESEL FEEDSTOCKS

A concern with any biodiesel blend analysis is whether feedstock differences affect the blend ratio measurement. Table 1 shows the analysis of a nominal 20% biodiesel blend from different feedstocks referenced to a soy biodiesel blend calibration. Most feedstock types do not require a separate analyzer calibration. Of the feedstocks tested, only the coco methyl esters require a separate calibration in order to accurately determine the blend ratio.

COMPARISON TO ANALYTICAL METHODS

The most common question is: How do filter-based infrared analyzers compare to other reference methods? In Table 2 the data for

CONTINUED ON PAGE 528

Springer
the language of science

springer.com

Springer's numerous benefits for subscribers to AOCS journals

When subscribing to **JAOCS**, **JSD** or **Lipids** you receive numerous benefits from Springer: Free access to the journals online, free access to 5 related journals and a 25% discount on books. Read on to find out more!

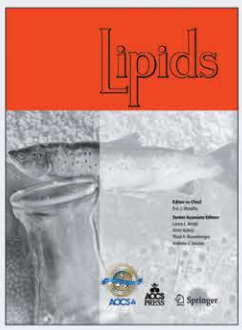
AOCS
Your Global Fats and Oils Connection

Free Access to related Springer Journals with your AOCS Subscription

► Each journal has 5 related Springer journals that come free with your subscription – but you must be an AOCS member to receive them. If you aren't already a subscriber see which journals you're missing out on and join AOCS at **springer.com/aocs**

Receive a 25% Discount on all Springer Books in English

► All members of the AOCS receive a 25% discount on all English-language books from Springer. Log on to **aocs.org** and follow the directions to get your own Springer book



Tables of Contents Alerts

► Visit the webpage for your favorite AOCS or Springer journal – even if you don't have a subscription! – sign up for their ToC Alert and whenever a new issue is published you will immediately receive an email detailing the latest Table of Contents. It's an easy way to keep up with journals you're interested in. Sign up at **springer.com**

► Springer also has Book Alerts in all our subject areas. Sign up for these and you'll immediately know what Springer is publishing and when. Find out more at **springer.com/alert**

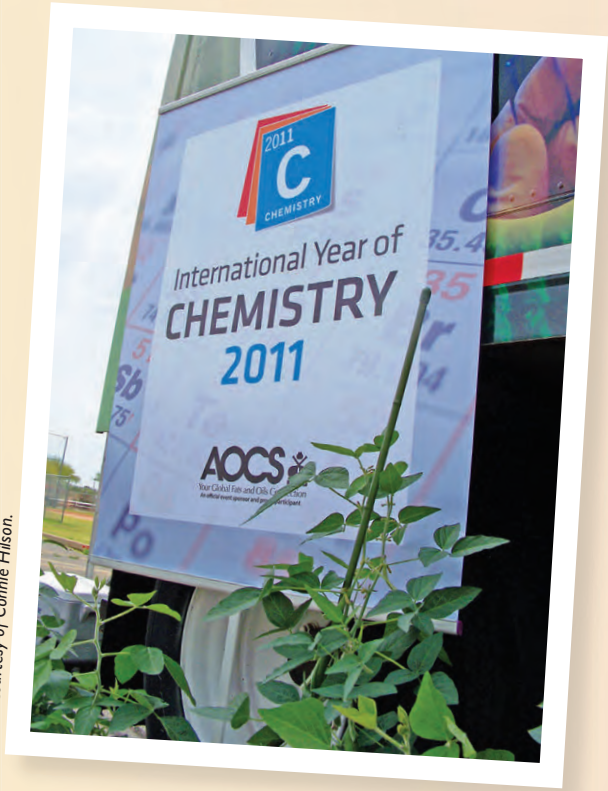
Free Online Journal Access

► Springer often trials many of our Chemistry journals, including **JAOCS**, **JSD** and **Lipids**, but the only way to be in on the secret is to join our Alerting services. This way whenever we send out an email with Free Online Journal Access you're automatically informed. Just another way we like to say thank you for subscribing to the journals and being an AOCS member. It's easy, just visit **springer.com/alert**

Contact Doreen Berning at AOCS to become a member and order your subscription. AOCS, P.O. Box 17190, Urbana, IL 61803-7190 USA
► **Phone:** + 1-217-693-4813 ► **Fax:** +1-217-693-4857 ► **Email:** membership@aocs.org ► **Web:** www.aocs.org

014541x

IYC 2011: Showing that oil chemistry is fun



Photos courtesy of Connie Hilson.

Monsanto, AOCS partner for International Year of Chemistry event

Around 150 students from Central High School in Phoenix, Arizona, USA, met a CAML on May 13, 2010. In the process, they discovered that the chemistry of fats and oils is "cool."

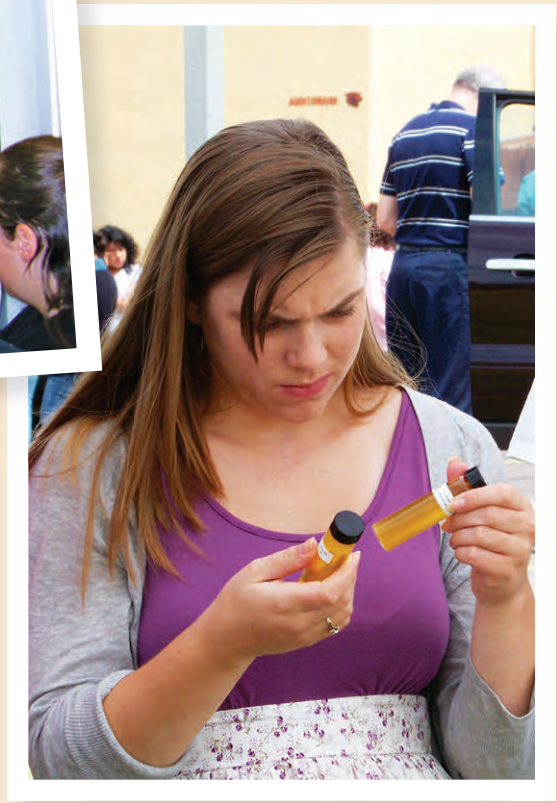
This particular CAML is no relation to the supply animals that constituted the US Army Camel Corps of the 1860s. Instead, it is an acronym for "Crop Analytics Mobile Laboratory." Developed by seed giant Monsanto Co. of St. Louis, Missouri, USA, the CAML can perform complete fatty acid profiles on grain or oil in less than 10 minutes, ensuring identity preservation of the company's specialty soybeans at grain elevators.

The event at Central High School was officially recognized by the organizers of the International Year of Chemistry (IYC 2011): UNESCO (United Nations Education, Scientific and Cultural Organization) and IUPAC (International Union of Pure and Applied Chemistry). To be eligible as an official IYC 2011 program, events must address at least one of the year's objectives, which include encouraging the interest of young people in chemistry. Certain events scheduled in 2010, such as the Central High School program, have been sanctioned because they serve as advance promotion for the yearlong celebration in 2011.

Discovering how oil chemistry applies to real life was an eye opener for a number of students. One—an aspiring dancer—only took chemistry because it was required. By the end of her CAML tour, she was vocal about how excited she was to

A group of Central High School students enter Monsanto Co.'s Crop Analytics Mobile Laboratory (CAML) for a hands-on demonstration of its state-of-the-art laboratory equipment.

Monsanto's Morgan Petty and Cindy Ludwig (both in green shirts) explain how the gas chromatography system and near-infrared spectrometer in the mobile laboratory help the company ensure that its specialty soybeans have not been contaminated with commodity varieties.



A student studies the differences between samples of mechanically pressed and solvent-extracted oil.

have discovered that science is "cool" and how it relates to everyday living.

Many of the students were horrified when asked to handle cottonseed hulls, complete with linters. Thinking the fuzzy hulls were bugs, they demurred. After learning what the hulls were, they responded, "Oh, we have cotton right down the road." (In fact, Arizona produced more than 400,000 bales of cotton in 2008, according to the National Cotton Council of America.)

Thanks to samples provided by POS Pilot Plant Corp., students also learned about oilseed processing—from seed to cooking oil—from Gina Clapper and Amy Johnson of AOCS Technical Services. Monsanto's Morgan Petty and Cindy Ludwig provided the hands-on demonstrations of the near-infrared spectrometer and other equipment inside the CAML. Petty and Ludwig also brought a number of potted oilseed plants from the Monsanto greenhouse, including canola and some exotic soybean varieties. By midday, the canola plants were decidedly unhappy in the hot, dry Arizona weather. That fact alone was a learning experience for the students, who had never before thought about plant varieties and growing regions.

Was the IYC 2011 promotional event a success? According to one Phoenix Central High School science teacher, "This was the best presentation I've seen in 26 years of teaching."

For more information about IYC 2011, see www.chemistry2011.org.

AOCS' Gina Clapper (right, with back to camera) explains how oilseeds are processed to become cooking oil.

2010 Report for the *Journal of the American Oil Chemists' Society*

Richard W. Hartel

The *Journal of the American Oil Chemists' Society (JAOCS)* has a long history of serving as the scientific outlet of the American Oil Chemists' Society. As editor-in-chief of *JAOCS* (since 2006), it is my pleasure to summarize journal activities in 2009 in this brief report.

STATISTICS/QUALITY

Although there are numerous indicators of journal quality, the Impact Factor (IF) has gained importance over the past decade as a measure of a journal's importance. Happily, the IF for *JAOCS* went up 32% between 2007 and 2008, from 1.137 to 1.504, and we recently received great news—the IF for 2009 is 1.803!

Another indicator of quality is the number of online downloads of *JAOCS* articles. In 2009, we had an amazing number of hits—around 827,000. While part of this could perhaps be related to the online availability of *JAOCS* manuscript archives dating back to the first issue, we're optimistic that this exceptionally high level of download activity correlates with a general increase in usage of *JAOCS* manuscripts. Thanks to Springer Publishing for all their marketing efforts—they are clearly working to get *JAOCS* broader coverage in the marketplace.

Submissions were up again too; we had 493 manuscript submissions in 2009, up from 399 in 2008. So far, 2010 looks to continue with this increasing trend. Although we rejected about 55% of those submitted, the increase in submissions means we have more accepted manuscripts in the pipeline. Because of that, we are now budgeting 120 pages per issue in 2010, up from 92 pages per issue in 2009.

The increase in manuscripts has come with a cost though. Our processing time, the time from the date the manuscript is submitted to our first decision point, has gone up. Some of our editors are asked to handle more papers than they comfortably can, meaning that some manuscripts take longer to process than they should. We will continue to look for ways to become more efficient in reviewing and processing manuscripts so that we can reduce the time from submission to publication.

Finally, with so many papers being submitted and processed, it is almost inevitable that some errors slip through the peer review process. Fortunately, we have some very observant editors who work diligently to minimize these mishaps, but even then, our critical readers have found a few instances of unacceptable work that slipped through our peer review process. We thank all those who have pointed out these slips in the system, and we work harder than ever to try to prevent these slips in the future.

JOURNAL OPERATIONS/PERSONNEL

There are numerous people whose work makes the journal possible. Specifically, the senior associate editors and associate editors all voluntarily contribute their time to *JAOCS*. Each and every one of them deserves a lot of credit for the hard work it takes to ensure that each manuscript gets a fair and timely review.

Senior Associate Editors (SAE). *JAOCS* has seven SAE, with expertise in the different categorical areas of the journal.

- **William Artz**, University of Illinois (Urbana-Champaign, USA). Artz handles the Analytical and Physical Chemistry section of the journal.
- **Michael Haas**, USDA/ARS/ERRC (Wyndmoor, Pennsylvania, USA). Haas is responsible for manuscripts in the areas of Biotechnology and Biocatalysis.
- **Clifford Hall III**, North Dakota State University (Fargo, USA). Hall handles manuscripts in two areas—Food, Feed Science and Nutrition and Nutraceuticals and Functional Foods.
- **James Kenar**, NCAUR/ARS/USDA (Peoria, Illinois, USA). Kenar handles Non-Food or Industrial Applications.
- **Gary List**, retired, NCAUR/ARS/USDA. List is responsible for review articles. He is always looking for good topics and authors to write review articles.
- **Lawrence Johnson**, Iowa State University (Ames, Iowa, USA). Johnson is responsible for manuscripts in the area of Processing and Engineering Technology.
- **Andrew Proctor**, University of Arkansas (Fayetteville, USA). Proctor has responsibilities in two different categories—Processing and Engineering Technology and Food, Feed Science and Nutrition.

Associate Editors (AE). To handle the large number of manuscripts submitted each year, we call on over 40 AE. Their expertise spans the wide range of topics for articles published in *JAOCS*. Each AE gets anywhere from a few to over 20 manuscripts to handle each year, depending on submissions in their area. Each year we evaluate our needs in each area and add new AE as required to make sure we have enough qualified experts to cover the wide range of manuscripts submitted.

This past year, we have added several new AE. They are:

- **Suzana Ferreira-Dias,** Lisboa, Portugal;

- **Nissim Garti**, Hebrew University, Jerusalem, Israel;
- **Gerhard Knothe**, NCAUR/ARS/USDA, Peoria, Illinois;
- **Jiann-Tsyh (Ken) Lin**, USDA/ARS/Western Lab, Albany, California;
- **Silvana Martini**, Utah State University, Logan, USA; and
- **Yomi Watanabe**, Osaka Municipal Technical Research Institute (OMTRI), Japan.

Welcome to the *JAOCS* editorial staff, and thanks for your efforts on the journal's behalf.

We periodically have people retire from the ranks of AE. This past year, AE who have retired from active service include:

- **Scott Bloomer**, Archer Daniels Midland Co., Decatur, Illinois, USA;
- **Tom Foglia**, USDA/ARS/ERRC, Wyndmoor, Pennsylvania; and
- **Yuji Shimada**, OMTRI, Japan.

The editorial staff gratefully acknowledges the outstanding contributions of these AE in past years. Their voluntary contributions in service to *JAOCS* are greatly appreciated; their time and energy devoted to manuscript review help maintain the quality of *JAOCS*. Scott Bloomer and Tom Foglia continue to serve the journal through their contributions to the Editorial Advisory Board.

Reviewers. Thanks to all the wonderful reviewers who give of their time to provide critical reviews of *JAOCS* manuscripts. Expert reviewers are the heart of the peer review process. However, one of the most difficult tasks faced by an AE is to identify highly qualified scientists who are willing to provide an in-depth, timely, critical review of each manuscript. *JAOCS* requires two independent reviews for each manuscript and AE often spend an inordinate amount of time identifying reviewers to make sure each manuscript gets the best technical review possible. We are especially grateful to those reviewers who accept the responsibility to provide a critical review and submit constructive, critical comments in a timely (3–4 weeks) manner.

Editing Advisors. We are fortunate to have a group of editors to call on when a manuscript has the necessary technical merit, but, for whatever reason, is not written very well. These editors are then called on to improve the manuscript. Thanks to John Cherry, Frank Flider, Earl Hammond, and Gary List for taking on these responsibilities.

AOCS Staff. At *JAOCS*, we are fortunate to have outstanding AOCS staff members to help ensure proper manuscript flow. In particular, the entire editorial group wishes to acknowledge the assistance of Pam Landman.

In many ways, 2009 was an outstanding year for *JAOCS*. We published more papers, with higher overall quality than ever before, thanks in large part to the efforts of the entire editorial staff. We are grateful to all who have provided reviews and other assistance to *JAOCS*. Finally, the recent collaboration with Springer Publishing has led to a significant improvement in manuscript flow, especially with the introduction of Manuscript Central. Thanks to all the people at Springer who have helped make *JAOCS* so successful in 2009.

Rich Hartel is at the University of Wisconsin-Madison, where he teaches numerous classes on food processing and conducts research on phase transitions in foods. Contact him at rwhartel@wisc.edu.

SD&PC (CONTINUED FROM PAGE 500)

From 2013 on, the European Commission will require manufacturers to declare the use of nanomaterials in cosmetic products.

The BfR opinion on nano-silver is available in a PDF document online (in German only) at http://tinyurl.com/23lgbk3.

ICMAD elects officers

ICMAD, the Independent Cosmetic Manufacturers and Distributors Association, has re-elected Pamela Jo Busiek of CBI Laboratories (Fort Worth, Texas, USA) as president of the association.

Other officers elected during the group's board meeting in June 2010 include:

- Vice presidents—Carl Geffken of Carl Geffken Consultants, Guilford, Connecticut, USA, and Pamela Viglielmo of The Gramercy House, Southport, Connecticut, USA;
- Treasurer—Craig Weiss of Consumer Product Testing Co., Fairfield, New Jersey, USA; and
- Secretary—Sharon Blinkoff of Venable LLP, New York, New York, USA.

In addition, Stan Katz of Cosmetic Index, Northport, New York, and Marva Kalish of Marketing Plus Consultants, Douglaston, New York, were re-appointed chair and vice chair, respectively.

ICMAD is a trade association based in Palatine, Illinois, USA. ■

MASS SPECTROMETRY AND PRIONS (CONTINUED FROM PAGE 520)

of analysis is typically reserved for proteins that bind other proteins. Since prions don't crystallize, it remains an effective means of checking models with experimental reality.

These analytical approaches are not restricted to prions. There are many proteins that are glycosylated and therefore difficult to analyze. The presence of the GPI anchor with its covalently attached lipid tail further complicates analysis, since it is often difficult to ionize such proteins. Modern mass spectrometry allows us to bypass the constraints imposed by the presence of diverse post-translational modifications and pesky lipids.

Christopher J. Silva is a research chemist with the Foodborne Contaminants Research Unit of the US Department of Agriculture's Agricultural Research Service. Reach him via email at Christopher.Silva@ARS.USDA.GOV.

BIOFUELS ANALYZERS (CONTINUED FROM PAGE 522)

these analyzers are compared to those from ASTM D7371 and EN 14078, which are the US and European methods for biodiesel blend analysis. Table 3 shows a comparison of results from an infrared ethanol blend analyzer to those from tests done by oxygenate flame ionization detection (O-FID). Both sets of data show good correlation between analytical methods.

CONCLUSION

With governments around the world striving for independence from imported fuels, the desire to reduce greenhouse gas emissions, and the recent impact of a major fossil fuel spill, biofuels are becoming a more popular fuel source. As higher percentages of biofuels enter the supply chain, knowing the biodiesel/diesel or ethanol/gasoline blend becomes more important for regulators, distributors, blenders, pipeline operators, and end-users. Having a quick analytical method for blend ratio measurements, which portable infrared analyzers provide, can be a valuable asset for the biofuels industry.

Table 3: *Infrared filter based analyzers compared to O-FID*[a]

Ethanol O-FID (vol%)	InfraCal ethanol blend analyzer	Ethanol O-FID (vol%)	InfraCal ethanol blend analyzer
9.87	9.9	9.97	10.1
9.89	9.8	9.7	9.5
9.84	9.8	10.48	10.5

[a]O-FID, oxygenate flame ionization detection.

Sandra Rintoul is president of Wilks Enterprise, Inc. (Norwalk, Connecticut, USA) and has worked with filter-based mid-infrared analyzers for over 25 years. Her experience ranges from assembly, service, technical support, applications support, and product development to business management and marketing. Contact her via email at srintoul@wilksir.com.

Table 2. *Infrared filter-based analyzers compared to EN and ASTM blend measurement methods*[a]

Sample ID	EN 14078 FTIR	ASTM D7371 FTIR	Single wavelength biodiesel analyzer	Variable filter array infrared spectrometer
105-003	0.2	0	0.2	0.22
1.0 STD	1.1	1.15	1.3	1.4
5.02 STD	5	4.99	5	5.12
30.0 STD	30.2	30.07	30	30.11
50.0 STD	50	50.06	50.4	50.6

[a]STD, biodiesel; FTIR, Fourier-transform infrared.

GOING STRONG

Day, after day, after day—Roskamp flaking mills run, and run, and run.

You get long-term performance from the rolls and bearings. The highest capacity. The most consistent flakes. With the greatest efficiency and ease of operation, Roskamp flaking mills are backed by the best support in the industry—available anywhere in the world.

Let Roskamp roll it all out for you. Call 800-366-2563 or visit us on the Web to get the right machine for your job.

Flaking Mill

CPM ROSKAMP CHAMPION

Your Partner in Productivity

800-366-2563 | 319-232-8444 | WWW.CPM.NET | WATERLOO, IOWA

Experts in | **MISSION CRITICAL** | Soap and Detergents Flow Solutions

"Any time I need to install pumps or troubleshoot flow issues, I take no chances. I call in the experts – Blackmer."

Mike Doll
Plant Manager
Peter Cremer North America, LP

Blackmer pump technologies are designed to deliver the best flow solutions for improved:

- Operational efficiencies
- Product loss prevention
- Environmental protection
- Through-put and uptime
- Energy savings
- Reliability

A Smart Energy™ Solution by Blackmer

Blackmer Sliding Vane Pumps are Energy-Efficient by Design

Better Get Blackmer

(616) 241-1611
www.blackmer.com

Blackmer Member of PSG™ Pump Solutions Group, A Dover Company

Blackmer® A Dover™ Company

1809 Century Avenue SW, Grand Rapids, MI 49503-1530

Process | Energy | Military & Marine

SLIDING VANE PUMPS | CENTRIFUGAL PUMPS | PERISTALTIC (HOSE) PUMPS | RECIPROCATING GAS COMPRESSORS