Announcing NC-213 Annual Meeting Set for February 2006

The NC-213 Annual Meeting/Technical Session is scheduled for February 28 and March 1, 2006, in Nashville, Tennessee. We will be enjoying a joint banquet with the Grain Elevator and Processing Society’s (GEAPS) 2006 conference. NC-213’s current Executive Committee is excited to offer a program that will include many informative presentations.

Here is the tentative program:

**Tuesday, February 28, 2006**

3:00–6:30 p.m.

NC-213 Business Meeting for all NC-213 Participants, Executive Board, and Industry Advisory Committee.

NC-213 Participants may also register at this time.

6:30–8:30 p.m.

GEAPS Reception/Banquet.

The President’s Banquet will be a plated meal. Part of the program will include The Andersons Research Award Recipient for 2006 presentation.

GEAPS is planning a post-banquet event. For a complete look at the program schedule, please refer to the GEAPS materials on the web at http://www.geaps.com/ for details.

**Wednesday, March 1, 2006**

7:00 a.m.–8:00 a.m.

NC-213 Executive Committee Meeting

(Closed to all except the Executive Board.)

8:30 a.m.–5:00 p.m.

Presentations by recipients of The Andersons Research Grant Programs.

Charlene Wolf-Hall, North Dakota State University

Survey of the Microbiological Quality of the Wheat Crop from the Northern Plains and Evaluation of Ozone for Reducing Microbial Loads and Mycotoxin Content in Wheat

Lloyd Bullerman, University of Nebraska-Lincoln

Biological Evaluation of Reduction of Fumonisin B1 Toxicity in Corn Grits by Extrusion Processing

“Suh” Bhadriraju, Kansas State University

Development and Implementation of a Thermal Death Kinetic Model for Management of Indianmeal Moth and Red Flour Beetle in Food Processing Environments

Richard Stroshine, Purdue University

Stability Measurement of Shelled Corn as a Means of Improving Stored Grain Management Practices and Preventing Loss

Objective A: This session will explore the practices and technologies to support quality management systems for production, distribution, processing, and utilization of quality grains and oilseeds. Papers will address, in part, the practices and technologies to support quality management systems. Pre-harvest production will also be covered.

Objective B: This session will explore basic knowledge, science-based standards, and technologies that promote crop quality, food security, and food safety in grain markets. Papers will address grain quality and food safety during production, storage, and processing for feed, food, or industrial use.

In addition, this session will include the evaluation and development of standards and technologies based on sound science. Research areas include identity preservation; pest control; microbiological indicators of safety and quality; physical, chemical, and biological means of ensuring grain safety and quality; and trace-back technologies.

Objective C: This session will explore the creation and dissemination of scientific knowledge that will enhance public confidence in market-driven management systems for grain. Papers will address methods of measuring ingredients, methods of evaluating biochemical components, and the identification of quality traits of ingredients.

5:00 p.m.

NC-213 Program ends.
Dr. Okkyung (Okky) Kim Chung to Retire After 31 Years

Dr. Okkyung (Okky) Kim Chung will retire September 30, 2005, with more than 31 years of service with the USDA-ARS-GMPRC, Grain Quality and Structure Research Unit (GQSRU) in Manhattan, Kansas. Dr. Chung has made significant contributions to basic and applied research in studies on the characterization and quantification of cereal lipids, interactions between lipids and other wheat flour components, functionality of native wheat flour lipids, and mechanisms of the improving effects of lipid-related materials (surfactants) in breadmaking. In addition, she has contributed to the improvement of U.S. hard winter wheat (HWW) cultivar releases by evaluating and providing intrinsic (milling and baking, more recently tortilla and noodle) quality of HWW progenies.

Dr. Chung has gained national and international stature as indicated by many honors and awards, nearly 200 invitations to various functions, and many offices and committee chairs held in several national and international professional societies. She is a full professor on courtesy appointment and is a member of the graduate faculty at KSU.

Her research accomplishment is evidenced by her publication of more than 200 papers, including two theses, 50 book chapters, encyclopedia, three editions of proceedings books, and more than 200 published abstracts. In addition, Dr. Chung has produced many Ph.D. and M.S. students as co-major professor.

Dr. Chung received her B.S. degree in pharmacy from Ewha Womans University in Seoul, Korea. She earned her M.S. degree in analytical chemistry and her Ph.D. degree in grain science and industry (cereal chemistry emphasis) from Kansas State University (KSU). She began her career in 1974 as a research chemist, continued in 1987 as a research leader of the GQSRU, director of the 68-year-old Hard Winter Wheat Quality Laboratory (HWWQL), and supervisory research chemist.

Dr. Chung has made significant contributions to basic and applied research in studies on the characterization and quantification of cereal lipids, interactions between lipids and other wheat flour components, functionality of native wheat flour lipids, and mechanisms of the improving effects of lipid-related materials (surfactants) in breadmaking.

Anderson Research Grant Program Funds 2 Team Competition Proposals

This year’s competition with the Anderson Research Grant Program—Team Competition resulted in two awarded proposals. Competing for funding were six proposals with the potential of up to three team proposals to be funded to receive up to $50,000 per year for two years (total $150,000).

The winning proposals are: Method to Establish Pack Factors for Grains in Upright Storage Structures submitted by Michael Montross and Sam McNeill, University of Kentucky; and Charles Woloshuk, Purdue University; and Bh. Subramanyam, Kansas State University.

This proposal’s project contact is Michael Montross with proposed project dates running October 1, 2005, through September 30, 2007.

Ozonation of Corn, Wheat, and Barley for the Control of Pests and Spoilage Agents, and the Removal of Off-odors in Commercial Grain Storage Structures submitted by Dirk Maier, Linda Mason, and Charles Woloshuk, Purdue University; and Bh. Subramanyam, Kansas State University.

This proposal’s project contact is Dirk Maier, and proposed project dates are September 1, 2005, through August 31, 2007.

This year’s competition drew the most proposals, a clear indicator that the Anderson Research Grant Program is a well-recognized funding opportunity. Congratulations to the winners!

NC-213 Engineers, Scientists, and Economists Share Their Research on Wheat Quality

Top Layer Treatment of Bins with Diatomaceous Earth May Not Give Complete Control

Stored wheat is often treated for insect control with inert dust, diatomaceous earth (DE), by mixing the dust into the top surface of the wheat mass. We placed 6-, 9-, and 12-inch layers of treated wheat on top of untreated wheat in vertical columns that represented grain storage bins. We then released live adult lesser grain borers on the surface of these grain masses. Adult mortality increased with the increasing depths of the DE-treated layer as expected.

However, we still found live lesser grain borer offspring in the untreated wheat. Adults apparently were able to penetrate through the DE-treated layers and lay eggs before they died. These results suggest that surface-layer treatments with DE may not give complete control of the lesser grain borer.

Treatment of Flour with Glucose Oxidase Changes Proteins

Chemical oxidants are routinely added to flour to modify dough properties (shorten mixing time, improve gas retention, lower energy requirements for dough mixing, etc.) and enhance bread-baking performance (increase loaf volume and improve crumb structure). The elimination of potassium bromate, and possibly other chemical oxidant additives, presents a challenge to the baking industry. Oxidoreduction enzymes such as glucose oxidase have been proposed as alternative improvers.

We generated wheat flour with and without the presence of glucose oxidase, and the different classes of proteins were extracted and analyzed. The most significant effects were observed to occur in the albumin (water soluble) and gliadin (alcohol soluble) protein groups.

A significant increase in protein concentration and molecular weight distribution was observed in the albumin fraction. Further analysis revealed that this was due to changes in the gliadin solubility. Gliadins are generally not soluble in water; however, the inclusion of glucose oxidase enzyme in the mixing renders the gliadins more water soluble. The mechanisms responsible for the solubility changes are currently under investigation.

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How Can We Measure the True Quality of Wheat?

Over the past several decades, many tools have been developed to differentiate wheat with good baking quality from wheat with poor baking quality. Two commonly used instruments are the farinograph and the mixograph. Both involve the mixing of dough-water systems in bowls that contain permanently mounted pins, and the instruments measure changes in the resistance to this mixing as the dough is formed.

The mixograph mixes the dough on a vertical axis, while the farinograph mixes the dough on a horizontal axis in a gentler process. Until recently, the minimum amount of flour required for the farinograph was 50 g while only 10 g were needed for the mixograph. We investigated the mixing quality of four hard winter wheat flour samples having protein levels of 6.9, 12.6, 12.7, and 14.8%. We also compared the farinograph results obtained using the new mini bowl (10 g of flour) and four different mixing speeds with results from the mixograph.

For the farinograph, water absorption increased (average of 6.2%) whereas the mix time, stability, and time to break all decreased as the speed of the farinograph increased. Farinograph results collected at the same speed (88 rpm) as mixograph results showed a slightly higher water absorption value but a mix time over twice as long (6.84 min) compared to that from the mixograph (3.30 min). We are continuing to investigate the farinograph using the mini bowl as a potential tool for evaluating the quality of breeders’ samples.

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