

Grain Quality Newsletter

News and Highlights from NC-213: Marketing and Delivery of Quality Grains and BioProcess Coproducts.

Volume 32:1

NC-213 The U.S. Quality Grains Research Consortium

International Congresses, Conferences, Symposiums, and Expos 2012

- February 10–12: "6th International Seminar on Wheat & Wheat Products—Moving Towards Food & Nutrition Security." New Delhi, India. Contact: E-mail: seminar@wpps.org, Web: wpps.org/iws/index.php
- February 19–22: "Gulfood 2012, Ingredients Middle East 2012 and Restaurant and Café 2012." Dubai International Convention and Exhibition Centre. Dubai, UAE. Contact: Web: www.gulfood.com
- March 3–7: "Europain & Intersuc 2010, International Bakery, Pastry, Ice Cream, Chocolate, Confectionary Exhibition." Paris-Nord Villepinte Exhibition Center. Paris, France. Contact: Web: www.europain.com
- April 12–15: "IBATECH 2012. 5th International Trade Fair for Bakery, Patisserie Machinery, Ice Cream, Chocolate and Technologies." Istanbul Fair Center, CNR Expo. Yesilköy, Istanbul, Turkey. Contact: E-mail: ozlem.ercan@messe-stuttgart.com.tr, info@messe-stuttgart.com.tr, Web: www.messe-stuttgart.com.tr
- May 7–9: "5th International Dietary Fibre Conference 2012, DF 2012." Roma, Italy. Contact: E-mail: anita.habershuber@icc.or.at, Web: www.icc.or.at/events/df09/index.php, www.icc.or.at/DF2012-Announcement.pdf
- May 7–11: "116th Annual IAOM, International Association of Operative Millers, Conference & Expo." The Davenport Hotel and Tower and the Spokane Convention Center. Spokane, WA, USA. Contact: E-mail: shannon.henson@iaom.info, info@iaom.info, Web: http://www.iaom.info
- May 20–22: "Whole Grains Summit 2012." Hilton Minneapolis. Minneapolis, MN, USA. Contact: E-mail: ottx064@umn.edu, for registration information—Nicole Freese, Tel: +1 (612) 624 3708, or Kristi Fischer, Tel: +1 (612) 625 4265, E-mail: cceconf5@umn.edu
- June 25–28: "Institute of Food Technologists Annual Meeting and Food Expo." Las Vegas, NV, USA. Contact: E-mail: info@ift.org, Web: www.ift.org
- July 22–25: "The International Association for Food Protection, 2012 Annual Meeting, IAFP 2012." Rhode Island Convention Center. Providence, Rhode Island, USA. Contact: E-mail: info@foodprotection.org, Web: www.foodprotection.org/events/iafp-annual-meeting/

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Send your contributions, comments, suggestions, and subscription requests to:



F. William Ravlin
Grain Quality Newsletter
The Ohio State University
OARDC
1680 Madison Avenue
Wooster, OH 44691-4096
e-mail: ravlin.1@osu.edu

NC-213 Annual Meeting—Technical Sessions Announced

This year's NC-213 Annual Meeting—Technical Sessions will be held March 6–7, 2012, at the Hilton Minneapolis. Meeting participants will hear 17 presentations from over 10 agricultural stations and USDA agencies. Members will also be given the opportunity to attend all or part of GEAPS Exchange 2012 at a reduced rate. (Please check-in at the GEAPS Exchange registration booth.) Part of the meeting activities will include a joint banquet with GEAPS along with the presentation of the Andersons Cereal and Oilseeds Award of Excellence and the recently established Andersons Cereals and Oilseeds Early-in-Career Award of Excellence. For complete program and registration details, contact Bill Koshar at koshar.3@osu.edu or visit the NC-213 website at <http://www.oardc.ohio-state.edu/nc213/>.

North Dakota State University Agriculture, Extension Faculty and Staff Honored

North Dakota State University honored Agriculture and Extension Service faculty and staff in an awards ceremony Dec. 15. NDSU faculty and staff received awards for excellence in research, Extension and support staff efforts.

Ken Grafton, vice president for Agriculture and University Extension, dean of the College of Agriculture, Food Systems, and Natural Resources and director of the North Dakota Agricultural Experiment Station, and Duane Hauck, director of the NDSU Extension Service, presented the awards during the 20th annual Agriculture and University Extension Faculty/Staff Awards program. Fifty-two people were nominated this year.



Senay Simsek receives the Larson/Yaggie Excellence in Research Award from Ken Grafton, vice president for Agriculture and University Extension (right). Bob Yaggie (left) is one of the award's sponsors.

Iowa State University's Agricultural and Biosystems Engineering Releases Publications

Dr. Charles R. Hurburgh, Jr., Professor in Iowa State University's ABE, is sharing his unit's articles that were recently published. For more details on these articles, feel free to contact Dr. Hurburgh at tatry@iastate.edu.

Framework for implementing traceability system in the bulk grain supply chain

Maitri Thakur and Charles R. Hurburgh
Journal of Food Engineering

Managing food traceability information using EPCIS framework

Maitri Thakur, Carl-Fredrik Sorensen, Finn Olav Bjornson, Eskil Foras, Charles R. Hurburgh
Journal of Food Engineering

Modeling traceability information in soybean value chains

Maitri Thakur and Kathryn A.-M. Donnelly
Journal of Food Engineering

Noise robustness comparison for near infrared prediction models

Sylvie A. Roussel, Benoit Igne, David B. Funk, Charles R. Hurburgh
Journal of Near Infrared Spectroscopy

Design of an online course in quality management systems for adult learners

Gretchen A. Mosher, Steven A. Freeman, Charles R. Hurburgh
Journal of Industrial Technology

National Institutes of Health Awards Iowa State Grant for Food Safety Training

October 27, 2011

AMES, Iowa—The National Institutes of Health has awarded a grant to Iowa State University to develop a program to train inspectors for the new Food Safety Modernization Act.

The Food and Drug Administration (FDA) will administer the \$1.5 million grant over its three-year term. Iowa State scientists will team with Kansas State University to develop and deliver the training programs through distance education and on-site sessions.

"Our task is to support the development of the FDA Integrated Food Safety System while creating a food safety quality management system that increases efficiency and competitiveness while making food safer," said Charles Hurburgh, professor of agricultural and biosystems engineering and the principal investigator of the grant. "Our area is the supply chain of bulk agricultural products before processing into traceable and identifiable consumer products."

The training will focus on food safety in bulk agricultural commodities, targeting FDA inspectors and industry practitioners that need to meet the standardized FDA inspection system. Hurburgh said bulk commodities, like corn and soybeans, are of special concern because they are difficult to trace.

The program will include a cost-benefit analysis component, Hurburgh said, because the application of a formalized food safety quality management system often creates operational efficiencies for companies. The training will be organized to fit the format of the ISO 22000 food safety management standard, being used by the FDA.

"We have found that a food safety quality management system creates more economic benefit than it costs by virtue of greater efficiencies," he said. "We have the opportunity to fulfill the law's compliance, ensure public protection and increase economic competitiveness all at once."

Bulk agricultural commodities have not been actively considered a part of the food production chain, and so are less familiar to food safety regulators, Hurburgh said. Yet many food safety issues in recent years originated at a point where the product was a bulk material.

"We have the chance to influence how overall food safety needs in this area are met in a way that helps Iowa agriculture as well as the consuming public," he said.

The NIH has awarded grants to develop standardized training for food safety inspectors to six other organizations: the University of Tennessee, the University of California-Davis, Auburn University, North Carolina State University, the National Environmental Health Association and the International Food Protection Training Institute.

Contacts: Charles Hurburgh, Agricultural and Biosystems Engineering, (515) 294-8629, tatry@iastate.edu
Ed Adcock, Agriculture and Life Sciences Communication Service, (515) 294-2314, edadcock@iastate.edu

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Characterization of Sorghum Grain and Evaluation of Sorghum Flour in a Chinese Egg Noodle System

Authors: L. Liu, T.J. Herald, D. Wang, J.D. Wilson, S. Bean, F. Aramouni

Submitted to: *Journal of Cereal*

Sorghum is a gluten-free grain that has the potential to be used as an alternative to wheat flour for the Celiac Sprue market. There are thousands of sorghum lines that have not been characterized for grain, flour or end product quality. The objective of the research was to gain an understanding among grain sorghum quality factors and Chinese egg noodles quality. Four sorghum hybrids were characterized and evaluated for kernel characteristics, proximate analysis, flour composition and end product in a Chinese egg noodle system. Through control of sorghum grain quality and flour quality characteristics it is possible to manufacture good quality Chinese egg noodles. Contact Thomas Herald, telephone 785-776-2703, e-mail Tom.Herald@ars.usda.gov

Ethanol Production Performance of Ozone Treated Tannin Grain Sorghum Flour

Authors: S. Yan, X. Wu, J. Faubion, S. Bean, L. Cai, Y-C Shi, X.S. Sun, D. Wang

Submitted to: *Cereal Chemistry*

In 2009, more than 30% of the U.S. grain sorghum crop was used for ethanol production. Virtually all of the current commercial sorghum lines in the U.S. are tannin-free, and as such, little research has been conducted on ethanol production from these sorghum types. Interest in tannin sorghum utilization has increased recently as health benefits associated with tannins have been discovered. Tannin grain sorghum lines also have some agronomic benefits relative to non-tannin sorghums. However, tannin sorghum and its use for ethanol production is not desirable largely because of the adverse effects of the tannins. We tested the effect of ozone on tannin sorghum lines to overcome these negative effects. Ozonation not only decreased measured tannin levels, but also affected properties of sorghum flour and starch. Fermentation efficiency is an important parameter in evaluating the performance of a material for ethanol production, and ethanol fermentation efficiency from ozone-treated sorghum increased over 10% compared to controls. This indicates that ozonation has great impact on ethanol yield and fermentation efficiency and is an effective way to increase ethanol yield and shorten the fermentation process without decreasing ethanol yield. Contact Scott Bean, telephone 785-776-2725, e-mail Scott.Bean@ars.usda.gov

Near-Infrared Imaging Spectroscopy as a Tool to Discriminate Two Cryptic *Tetramorium* Ant Species

Authors: J. Klarica, L. Bittner, J. Pallua, C. Pezzei, V. Huck-Pezzei, F.E. Dowell,

J. Schied, G.K. Bonn, C. Huck, B. Schlick-Steiner, F.M. Steiner

Submitted to: *Journal of Chemical Ecology*

Correctly identifying insect species is essential for many ecological studies. Some species are very similar but are particularly difficult to discriminate and thus understudied ecologically. The chemical structure differs between species, and we used imaging near-infrared spectroscopy (NIRS) to detect this difference in ants (*Tetramorium caespitum* and *T. impurum*). NIRS is a rapid and non-destructive technique. We conclude that discrimination of *T. caespitum* and *T. impurum* using imaging NIRS is possible, promising that imaging NIRS could become a time- and cost-efficient tool for the reliable discrimination of similar species.

Contact Floyd Dowell, telephone 785-776-2753, e-mail Floyd.Dowell@ars.usda.gov

The Effect of Preservation Methods on Predicting Mosquito Age by Near-Infrared Spectroscopy

Authors: F.E. Dowell, A.E.M. Noutcha, K. Michel

Submitted to: *American Society of Tropical Medicine and Hygiene*

Malaria affects about 300 million people per year, primarily in developing countries. Mosquitoes must be about 8 days old to transmit malaria, thus it is important to determine the age structure of mosquito populations in order to determine the effectiveness of disease-control programs. Current age-grading techniques require tedious dissections or RNA extraction. We developed a rapid technique using near-infrared spectroscopy to determine the age of fresh mosquitoes, but the requirement for fresh insects limits applications of this technique. Thus, in this study, we investigate

whether age can be predicted from preserved insects. Results from this study show that age can be predicted from mosquitoes preserved with desiccants, ethanol, Carnoy, RNAlater or refrigeration with confidence intervals less than 1.4 days. The best results were obtained from mosquitoes stored using desiccants, RNAlater or refrigeration. Contact Floyd Dowell, telephone 785-776-2753, e-mail Floyd.Dowell@ars.usda.gov

Evaluating Residual Activity of Methoprene and Novaluron as Surface Treatments to Control *Tribolium castaneum* and *Tribolium confusum*

Authors: F.H. Arthur, E.A. Fontenot

Submitted to: *Journal of Insect Science*

Insect growth regulators are insecticides that inhibit insect development but do not kill adults, and historically these insecticides are evaluated by incorporation into the diet of an insect, which may not reflect how they would be exposed in actual field situations. We tested different methods to assess susceptibility of the red flour beetle and the confused flour beetle, two common pests of stored products. Exposing larvae directly on plywood, floor tile, and concrete treated with methoprene showed that the red flour beetle was the more susceptible of the two species, as determined by whether or not the larvae were able to reach the adult stage. Control was poorest on concrete. We then exposed larvae on concrete treated with a new insecticide, novaluron, and the confused flour beetle was again more difficult to kill than the red flour beetle. In our final test, we exposed adult confused flour beetles with flour on concrete treated with both insecticides, gave the adults the opportunity to lay eggs, and determined production of offspring. Novaluron provided better control than methoprene. Results show that evaluating an insect growth regulator by allowing flour beetle larvae to be exposed on a treated surface or by letting adult flour beetles lay eggs on a treated surface and examining progeny production would be effective methods for assessing susceptibility of different insect species.

Contact Frank Arthur, telephone 785-776-2783, e-mail Frank.Arthur@ars.usda.gov

Impact of *Rhyzopertha dominica* (F.) on Quality Parameters of Milled Rice

Authors: F.H. Arthur, G.O. Ondier, T.J. Siebenmorgen

Submitted to: *Journal of Stored Products Research*

The lesser grain borer is a major pest of stored rough rice, but there are only a few recent studies that have assessed susceptibility of different rice cultivars to this insect. In this test, adult lesser grain borers were allowed to feed and breed for one week on Francis and Wells cultivars rough rice, two common commercial cultivars, harvested in two different crop years at moderate and low moisture contents. Progeny production was consistently greater in Francis than in Wells, which resulted in reduced rice milling yield and reduced head rice yield in Francis cultivar rice. Techniques were also described that could be used to further assess susceptibility of different rice cultivars to the lesser grain borer.

Contact Frank Arthur, telephone 785-776-2783, e-mail Frank.Arthur@ars.usda.gov

A Machine Vision System for High Speed Sorting of Small Spots on Grains

Authors: T.C. Pearson, D. Moore, J. Pearson

Submitted to: *Sensing and Instrumentation for Food Quality and Safety*

A new type of automatic electro-optical sorting system was developed to identify and remove grains with small spots, or blemishes, on them. There currently is no commercially available system that can separate grains having small blemishes on their surface. However, several food processors have requested development in this area as it would improve food quality and safety. The newly developed system was tested for removing popcorn with a defect called blue-eye, which is caused by a fungus and appears as a small blue blemish on the germ of the kernel. This system was able to remove 89% of the blue-eye damaged popcorn kernels while only rejecting approximately 6% of the undamaged kernels. Blue-eye infected popcorn results in off tastes so the system will find use with popcorn processors across the country. The system can also be used to separate grains with other types fungal damage or insect damage, resulting in higher quality and safer food products.

Contact Thomas Pearson, telephone 785-776-2729, e-mail Thomas.Pearson@ars.usda.gov

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