



RESEARCH Kernels

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- Solvent Retention Capacity (SRC) Test Results on Hard Winter Wheat Show Promise.** SRC is a quality evaluation tool originally developed to differentiate the end-use performance of soft wheats. In this test, a specific amount of ground whole wheat or flour sample is suspended in either a 5% lactic acid, 50% sucrose, or 5% sodium carbonate solution or water. Levels of sedimentation are measured. We applied this technique to 116 Hard Winter Wheat samples and correlated the results to single kernel characteristics such as hardness and weight; NIR spectra; mixograph performance; Sodium Dodecyl Sulfate (SDS) sedimentation values; and a number of bread baking quality parameters. Bread loaf volume was significantly correlated with the SRC value of flour in 5% lactic acid solutions, followed by solubility in 50% sucrose, with much lower correlations with 5% sodium carbonate or water results. The lactic acid results also were correlated with mixograph mixing tolerance and peak time-x values after peak mixing time, making this procedure a simple test to predict the breadmaking quality of Hard Winter Wheats. (Okkyung Kim Chung, telephone: 785-776-2703; email: okchung@gmprc.ksu.edu)
- New Starch Isolation Method Developed for Sorghum Using Sonication.** The study of cereal starches often requires the isolation of starch from the seed endosperm. Cereal starches have been isolated by hand-washing, wet milling, or enzymatic treatment methods. However, these procedures are often tedious and time consuming. We developed a new rapid and reproducible method for starch isolation using sonication.

Decorticated sorghum flour was sonicated in an alkaline buffer in the presence of a detergent and reducing agent. Several different reducing agents were tested along with sonication times of 2, 4, 6, 8, and 10 minutes. Protein content of the starch obtained was only 0.35 to 0.45% (dry basis) after a 2-minute sonication and decreased to 0.15 to 0.30% using longer times. The sonicated starch was comparable to starch obtained using the enzyme treatment methods in a fraction of the time. The color of the starch obtained showed a similar brightness score (L value) and a lower yellow score (b value) when compared with the product obtained using enzyme treatments. (Scott Bean, telephone: 785-776-2725; email: scott@gmprc.ksu.edu)

- Dispersal Capabilities of the Lesser Grain Borer Evaluated.** The lesser grain borer

(*Rhyzopertha dominica* (F)) is an important insect pest in wheat stored in bins on the farm. A mark-release-capture study was conducted in order to determine the flight distances of this pest in the field. Marked beetles reared in the laboratory were released in the center of a grid of 46 Lindgren traps placed in concentric circles. Beetles were recaptured at a mean distance of 400 meters (1312 feet) with many captured at the maximum grid distance of 1 kilometer (0.62 miles) within 16 days of release. This information must be considered in the development of management programs for this pest on the farm. (James Campbell, telephone: 785-776-2717; email: campbell@gmprc.ksu.edu)

- **Digital X-Rays Are a New Tool for Insect Detection.** Insects that develop inside the kernels of cereal grains are often difficult to detect because there are no visible signs of infestation until the insect completes its development and a mature adult emerges from the kernel. These insects are often referred to as “internal feeders” and include the rice weevil, lesser grain borer, and the Angoumois grain moth. A new technique, digital x-rays, has been found effective at detecting all life stages of these insects. In contrast to conventional x-rays, digital x-rays can be obtained in only a few seconds and can be manipulated using computer software to closely examine suspect kernels. This technique could allow for a more rapid detection of internal insect pests in stored grain. (Michael Toews, telephone: 785-776-2719; email: mtoews@gmprc.ksu.edu)
- **Level of Commingling of Grain Measured in Commercial Grain Elevator.** As grain moves through marketing channels, there is ample opportunity for commingling of different types of grain in various types of grain handling systems. With increased emphasis on food safety and identity preserved shipments, it is important to document the levels of potential commingling that can occur. We measured the commingling of two grains when soybeans were received after a shipment of corn in a commercial elevator. Commingling was above 1% only during the first one to two minutes (40 to 80 bushels of grain received) except for the gravity-type dump pit configuration where commingling remained in excess of 1% for the duration of the test (14 minutes or 290 bushels of received grain). The commingling for the leg and pit with drag conveyer was 0.30% and the commingling for the bucket elevator alone was 0.23%. A simulation model based on these data predicted that a facility equipped with a bucket elevator and receiving pit with a drag conveyer would produce a final commingling of approximately 0.28% after receiving a grain shipment of 10 tons. (Mark Casada, telephone: 785-776-2758; email: casada@gmprc.ksu.edu)
- **Supercritical Fluid Extraction Method Can Segregate Non-polar and Polar Lipids.** Supercritical fluid carbon dioxide is a useful system for extracting lipids (fats) from cereal grains. In the past, once these lipids were extracted, lengthy and often tedious procedures were needed to separate the extracted lipids into the non-polar and polar lipid components. We used Hard Red Winter Wheat flours to develop a sequential extraction procedure. The first extraction is carried out using only carbon dioxide and removes the non-polar lipid components. A second extraction is applied with carbon dioxide containing a small amount of ethyl alcohol as a modifier and removes the polar lipids. Comparison of the products showed that this new technique removed the same amounts of the lipid components in a much more efficient process. (Okkyung Kim

Chung, telephone: 785-776-2703; email: okchung@gmprc.ksu.edu)

U.S. Department of Agriculture, Agriculture Research Service, Grain Marketing and Production Research Center,
1515 College Avenue, Manhattan, KS 66502. Phone:800-627-0388.