Unraveling Milled Rice Appearance and Quality Traits of Importance to Key Export Markets

Issue
The U.S. rice industry owns the reputation as the world’s quality standard for long-grain rice. In recent years, however, the industry has been beset with unfavorable quality issues raised by both domestic and international customers, which has consequently weakened the U.S. market share. Some government reports have disclosed that many U.S. customers are turning to other countries in South America and Asia as alternative sources of high quality long-grain rice. There have been complaints about inferior grain appearance (chalkiness, opacity, luster, and color), non-uniformity of grain size and shape (length, width, and thickness), and inconsistent cooking characteristics of domestically grown rice. The reasons for the U.S. rice quality issues are presumed to be related to genetics, factors during crop production (e.g. high nighttime air temperatures), and postharvest processing (e.g. drying and milling technologies). It is necessary that the underlying causes of diminishing quality are properly identified; otherwise the U.S. rice industry may eventually lose its export market share to other countries.

Action
Food science researchers at the University of Arkansas have collected a total of 25 short- and medium-grain milled rice samples from all over the world for characterization. Seven samples were from Arkansas; 5 were from California; and 13 were from various countries, including Bangladesh, Bhutan, China, Italy, Mexico, Pakistan, and Taiwan. Overall, the California rice samples had the narrowest range of thermal (gelatinization) properties; the rice samples from other countries showed a wide range of gelatinization temperature, while Arkansas rice had higher and a wider range of gelatinization enthalpy. Similarly, the rice samples from other countries had a wider range of pasting characteristics compared to the locally-grown medium grain cultivars, and the California rice samples displayed a narrower range of pasting characteristics than those grown in Arkansas.

Impact
Producing rice that can satisfy both domestic and export market demands is the key to a successful and competitive Arkansas rice industry. This project is expected to develop benchmark information on the key factors that impact the quality traits of rice for key export markets. Such information will be useful to farmers in choosing specific cultivars to plant; to rice breeders in knowing the traits/markers to include in varietal improvement efforts; and to processors in making proper adjustments of existing processing operations so as to consistently produce high-quality milled rice.

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