Title	Rough rice kernel damage and milled rice free fatty acid quality as affected by harvest conditions
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Abstract

Milled rice free fatty acid (FFA) and surface oil determine the rice acceptability to the brewing industry. Controlling milled rice FFA by harvesting practices could be important in maintaining brewing quality as some rough rice is damaged during harvesting by hull removal and brand disruption. Increasing FFA levels could subsequently develop off-flavors and compromise milled rice brewing quality. Our objectives were to understand the effects of combine harvester cylinder speeds on harvest-damaged rough rice and subsequent FFA development on milled rice. Rough rice (Cocodrie) was harvested with a combine harvester using typical cylinder speeds of 550, 850 and 1000 rpm. The degree of harvest-damaged rice was recorded for each combine harvester cylinder speed. Rough rice was stored at 22 °C for 6 months; 1) without removing damaged kernel; 2) with damaged rice removed; and 3) damaged rice. Samples from each cylinder speed were obtained every month from all three populations and subjected to accelerated storage conditions at 37 °C and 70% relative humidity, and analyzed for surface oil and FFA. Rough rice damage was significantly increased by higher cylinder speeds. There was little difference in the FFA levels of the milled rice samples that were studied immediately after drying, but accelerated storage studies showed that milled rice prepared from damaged kernels produce almost twice the FFA levels of milled rice prepared from undamaged rough rice, although the appearance of the milled rice samples prepared from damaged and undamaged rough rice were similar. The FFA formation increased during storage in all samples. Increasing harvester cylinder speeds increased FFA development and could be a significant factor in determining the brewing acceptability of otherwise sound rice. The impact of harvesting speed on FFA formation prior to processing would be of serious economic interest.