

Title Feasibility of simultaneous rough rice drying and disinfestations by infrared radiation heating and rice milling quality

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Abstract

The objective of this study was to investigate the drying characteristics, milling quality, and effectiveness of disinfestation of rough rice under conditions of infrared (IR) radiation heating. Freshly harvested medium grain rice (M202) samples with low (20.6%) and high (25.0%) moisture contents (MCs) were used for this study. Single-layer rough rice samples [non-infested and infested with the adults and eggs of lesser grain borers (*Rhizopertha dominica*) and angoumois grain moths (*Sitotroga cerealella*)] were heated for various durations using a catalytic IR emitter. The effects of the tempering treatment and natural and forced air cooling methods on moisture removal, milling quality and disinfestation were determined. A high heating rate and corresponding high moisture removal were achieved by using IR heating. After heating, tempering increased moisture removal during cooling and improved the milling quality of the rice samples. When 20.6% MC rice was heated by IR for 60 s, the results were a rice temperature of 61.2 °C, 1.7% MC removal during the heating period, and an additional 1.4% MC removal after tempering and natural cooling. In addition, the rice had 1.9% points higher head rice yield than a control sample dried with room air. The heating and tempering treatment also completely killed the tested insects. We concluded that simultaneous drying and disinfestation with high rice milling quality can be achieved by using a catalytic IR emitter to heat rough rice to 60 °C, followed by tempering and slow cooling.