

Title Comparison of drying characteristics and quality of rough rice dried with infrared and heated air
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Abstract

The objective of this study was to study and compare the drying process characteristics and quality of rice dried with a laboratory catalytic infrared (CIR) dryer, a laboratory simulated forced air convection (FAC) column dryer, and a commercial column dryer. Medium grain rice of variety M202 was used for the study. The rice samples were dried by using both the CIR and simulated FAC dryers with single and double passes, at two different temperatures of 36°C and 45°C to remove from 1.5% and 4% moisture at each drying pass. The milling quality, including head rice yield (HRV), total rice yield (TRY) and whiteness of the dried rice were evaluated. The CIR dryer showed much faster heating rate and more uniform heating to rice kernels than the simulated FAC column dryer. It took 28 and 11 minutes, respectively, to remove 2% moisture at 36°C and 45°C. On average, the head rice yields of the CIR, FAC and commercially dried rice were 62.4%, 61.1% and 58%, respectively. Corresponding total rice yields for the different drying methods were 70.2%, 69.5%, and 70%. It was found that for CIR drying, high drying temperature, 45°C, single pass with at least 3% moisture removal can be used to produce dried rice with milling quality equal to or higher than 36°C FAC drying with 1.5% moisture removal by each drying pass. The energy efficiency of CIR dryer was improved when the ratio of rice loading to emitter surface area. It is expected a large scale CIR dryer could have much higher energy efficiency than commercial column dryers.