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Application of combined gas-fired infrared and air convection drying for quality and energy consumption of instant rice

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As an excellent source of nutrients, riceberry has gained more intention than white rice. However, information of instant rice obtained from riceberry is scarce. An alternative technique of instant rice preparation was therefore proposed in this work. The combined gas-fired infrared burner and air convection drying at different gas-fired infrared burner intensities was investigated. Gas -fired infrared burner intensities at 350 to 550oC were combined with a 40oC temperature and 1 m/s air velocity. The result shown that the drying rate increased with gas-fired infrared intensity, hence reducing the total drying time. The total color difference (ΔE) varied from 3.5 to 4.2. Increasing gas-fired infrared intensity decreased in hardness, chewiness and gumminess, but increased the rehydration of instant riceberry. The effective moisture diffusivity increased with the gas-fired infrared intensity varying from 1.37×10^{-11} to 3.64×10^{-10} m²/s. The specific energy consumption at 550oC was 2.90 kWh/kg of water removed resulting in a 76% energy saving when compared to 350oC. This study gives a method for preparation of instant rice; it would be a good choice to instant rice in the industry.

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