

**Title** Far-infrared radiation assisted drying of longan fruit  
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### **Abstract**

Oversupply of fresh longan (*Dimocarpus longan* Lour.) from seasonal production in Thailand needs to be preserved in the form of dried product (exported value of over US\$70 million in 2009) to prevent it from being damaged by microorganism. Due to well known limitations of hot air (HA) drying, a new technique of using far-infrared radiation (FIR) in combination with hot air and heat pump (HP) dryers for longan is proposed in this study. Longan with initial moisture content of approximately 84–86% w.b. was dried to about 18% w.b. at the drying temperature of 55 °C in the case of combined FIR-heat pump drying and 65 °C in the case of combined FIR-hot air drying with 80% recycled air. In both cases, the electric power supplied to FIR rods was set at 250, 350 and 450 W. The experimental results are presented in terms of the drying kinetics, dried product qualities (color, shrinkage, percentage of rehydration, water activity, texture, and microstructure) and sensory characteristics of the dried product. The results show that FIR in combination with hot air and heat pump drying increases the drying rate of longan by reducing the drying time. FIR also helps to create more porous structure in dried longan, with porosity increasing with the power supplied to the FIR heaters. The formation of porous structure results in a product with lower shrinkage, improved rehydration, lower hardness and lower toughness than samples dried in the absence of FIR. In addition, the FIR dried longan had a stronger red color and appeared darker. Dried longans obtained by HP, HA, combined techniques and the product from the local market, were all rated similarly by a sensory panel for color, shape, flavor and taste. It is worth noting that the overall energy used for FIR-assisted drying processes decreased with the increase in the power supplied to the FIR heaters.