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Kinetics of microwave-assisted extraction of virgin coconut oil from solid coconut waste
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Abstract
Solid coconut waste (SCW) is a by-product of coconut milk production which still contains virgin coconut oil (VCO). This waste usually is thrown away or left in fields. This study aims to optimize the effects of Microwave power (80–400 W), irradiation time (1–4 minutes), and solvent to feed ratio (SF) (10–30 ml/g) on the extraction of VCO from SCW using microwave-assisted extraction. The optimized conditions were microwave power: 160 W, Irradiation time: 2.5 minutes, and SF: 30 ml/g (15.93% yield). After the extraction, the characteristics of the oil such as matters volatile at 105 °C (0.193%), Free Fatty Acid (FFA) (1.38%), peroxide value (undetectable), insoluble impurities (0.0015%), saponification value (258 mg/g), iodine value (7.60), specific gravity at 30 °C (0.918), and total plate count (0 CFU/ml) were determined. The second-order kinetic model described the extraction the best (R2adj = 0.9994). This method proves to be more efficient than the conventional virgin coconut oil extraction method. © 2022 Taylor & Francis Group, LLC.

Author Keywords
Coconut; coconut waste; microwave-assisted extraction; optimization; second-order kinetic; virgin coconut oil

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