Enhancement of Agro-Industrial Copra Residue Oil Yield Using Microwave-Assisted Extraction

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Abstract
In this study, the main objective is to evaluate the suitability of microwave-assisted extraction (MAE) for the oil extraction from coconut copra residue, in comparison to conventional techniques; Soxhlet extraction (SXE) and ultrasonic-assisted extraction (UAE). The extractions were done by treatment at 60 °C (± 5) of a 10 g sample, with hexane as an extraction solvent, applicable to all techniques. The oil yield, fatty acid composition, and free fatty acid (FFA) concentration of copra residue oil (CRO) obtained from different extraction techniques and conditions were compared. Results indicated that SXE recovered the highest yield at 48 h and 400 ml hexane (81.39%), followed by UAE (30 min/300 ml) and MAE (15 min/100 ml), which 75.8 and 62.97% of total oil yield, respectively. Analysis of CRO fatty acid composition showed predominant of lauric (12.0, 47.41–47.67%), myristic (14.0, 18.53–18.56%), palmitic (16.0, 8.84–9.13%), and caprylic (8.0, 7.78–8.14%). On the other hand, FFA concentration was found to be lowest in extracted CRO using MAE (5 min/100 ml hexane), at 0.37%. In brief, different extraction techniques and conditions (SXE, UAE and MAE) influenced the CRO yield and FFA concentration but showed no significant differences in terms of fatty acid composition.

Keywords Copra residue oil · Fatty acid · Free fatty acid · Soxhlet extraction · Ultrasonic-assisted extraction · Microwave-assisted extraction

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