

Effect of Aqueous Enzymatic Extraction Parameters on the *Moringa oleifera* Oil Yield and Formation of Emulsion

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Abstract : The study reports on the effect of aqueous enzymatic extraction (AEE) parameters on the *Moringa oleifera* (MO) oil yield and the formation of emulsion at the end of the process. A mixture of protease and cellulase enzymes was used at 3:1 (w/w) ratio. The highest oil yield of 19% (g oil/g sample) was recovered with the use of a mixture of pH 6, 1:4 material/moisture ratio, and incubation temperature, time, and shaking speed of 50 °C, 12.5 hr, and 300 stroke/min, respectively. The use of pH 6 and 8 resulted in grain emulsions, while solid-intact emulsion was observed at pH 4. Upon fixing certain parameters, higher oil yield was extracted with the use of lower material/moisture ratio and higher shaking speed. Longer incubation time of 24 hr resulted in significantly ($p < 0.05$) similar oil yield with that of 12.5 hr, and an incubation temperature of 50 °C resulted in significantly ($p < 0.05$) higher oil yield than that of 60 °C. In overall, each AEE parameter showed significant effects on both the MO oil yields and the emulsions formed. One of the major disadvantages of an AEE process is the formation of emulsions which require further de-emulsification step for higher oil recovery. Therefore, critical studies on the effect of each AEE parameter may assist in minimizing the amount of emulsions formed whilst extracting highest total MO oil yield possible.

Keywords : enzyme, emulsion, *Moringa oleifera*, oil yield

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