Use of enzymes to enhance oil recovery during aqueous extraction of Moringa oleifera seed oil

ABSTRACT

Moringa oleifera seed oil was extracted using four different types of enzymes to obtain the most efficient extraction parameters. The enzymes used were Neutrase 0.8L (neutral protease), Termamyl 120L, type L (a-amylase), Pectinex Ultra SP-L (pectinase) and Celluclast 1.5L FG (cellulase). These were used either separately or in combination. Individually, Neutrase was found to be the most effective, followed by Termamyl, Celluclast and Pectinex. A combination of the four enzymes was found to be more effective than used separately, with 74% oil recovery. Percent oil recovery for individual enzymes under optimal conditions and with pH adjusted to the individual enzyme's optimum pH were 71.9, 64.8, 62.6 and 56.5 for Neutrase, Termamyl, Celluclast and Pectinex, respectively. Neutrase, Pectinex and the combination of all the four enzymes at 2% (v/w) were found to perform best at 45C, while Termamyl and Celluclast were best at 60C. The physical and chemical properties of the extracted oils such as iodine value (IV) (66.0–67.2 g iodine/100 g oil), free fatty acid (FFA) content (1.13–1.25 as % oleic acid), complete melting points (MPs) (18.6–19.1C) and viscosities (83.1–85.0 cP) except the color were not significantly affected (P 0.05) by the type of enzyme used in