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Farmers’ and academia’s views”

Oil extraction from mango kernels using a mechanical screw press

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Abstract

Mango (*Mangifera indica* L.) is one of the most important tropical fruits with an annual production of over 55 million tons. Mango kernels, as one of the main by-products of mango processing, have the potential to be used as a fat resource for human consumption, animal feed and cosmetics. The mango kernels have an oil content of up to 16%. In this study, mechanical oil extraction of mango kernels using a commercial screw press was evaluated. The mango fruits cv. Kent imported from Brazil were purchased at a local market in Stuttgart. Prior to the oil extraction, the mango kernels were separated from the fruits, cut into small pieces and dried at 40 °C until a moisture content of 9% was achieved. The experiment was conducted at a screw rotational speed of 20 rpm and a nozzle diameter of 5 mm. Oil recovery, oil extraction efficiency and throughput were determined. In addition, the oil quality parameters, such as water content, acid number, iodine and peroxide values, were measured. It was determined that oil recovery was 52.7%, oil extraction efficiency was 30.0% and throughput was 1.7 kg h⁻¹. After sedimentation of the crude oil, around 68.9% sedimented oil was obtained. The sedimented oil had a water content of 0.04 ± 0.00%, an acid value of 3.64 ± 0.11 mg KOH g⁻¹, an iodine value of 57.26 ± 0.07 g I₂ 100 g⁻¹ and a peroxide value of 0.26 ± 0.00 mEq O₂ kg⁻¹. The results showed that by applying a proper pre-treatment, the mango kernel oil can be feasibly extracted from mango kernels using a mechanical screw press. To optimise the oil extraction, different pretreatment methods, screw rotational speeds and nozzle diameters of a screw press and moisture content of press material must be investigated in future studies.

Keywords: Expeller, mango seeds, plant oil, press-cake, protein