

Oil extraction from mango kernels using a mechanical screw press

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Problem and Objective

- Mango (*Mangifera indica* L.) is one of the most important tropical fruits.
- Mango kernels, as one of the main by-products of mango processing, have an oil content of up to 16%.
- The main objective of this study was to evaluate the mechanical oil extraction of mango kernels using a commercial screw press.

Material and Methods

- 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.

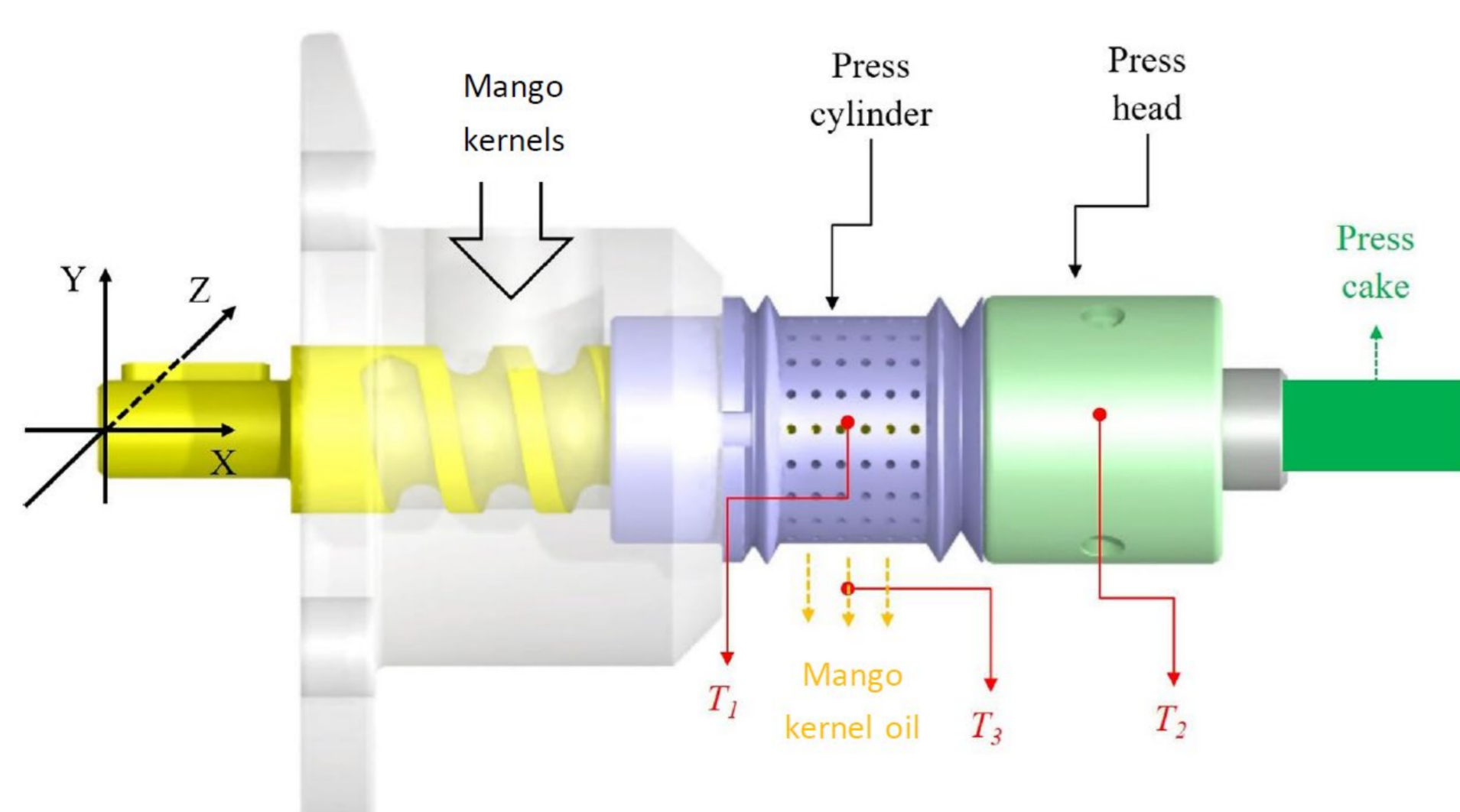


Fig. 1 Mechanical screw press CA59G with temperature measurement sensors T1, T2 and T3.

- Oil recovery, oil extraction efficiency and throughput were determined according to Karaj and Müller (2011) study.
- In addition, the oil quality parameters, such as water content, acid number, iodine and peroxide values, were measured according to standard methods.

Results

- 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 % of sedimented oil was obtained.
- The characterization properties of sedimented oil is presented in table 1.

Table 1 Oil characterization of the mango kernel oil.

Properties	Value
Peroxide value (mEq O ₂ kg ⁻¹)	0.26 ± 0.00
Acid value (mg KOH g ⁻¹)	3.64 ± 0.11
Iodine value (g of iodine (100g) ⁻¹)	57.26 ± 0.07
Water content (%)	0.04 ± 0.00

Conclusions

- The results showed that by applying a proper pretreatment, the mango kernel oil can be feasibly extracted from mango kernels using a mechanical screw press.
- To optimize 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.