

ABSTRACT

Extracting of olive oil from olive fruits is considered one of the very difficult operation and costly for multiplying the processing steps (crushing, mixing, separating the solid-liquid phases either using hydraulic press or centrifugation, and later separating the oil from liquid phase). So, the traditional methods used for extracting olive oil especially that using a stone mill for crushing the olive fruit tend to increase the total losses and oil deterioration which increasing oil oxidation and rancidity. However, in order to promote both farmers and investor to grow and improve olive production especially in the new reclaimed land, a suitable method for olive handling and processing should be introduced.

The present study was carried out to design and evaluate olive oil extraction machine capable to accomplish extracting operation in the proper time with the suitable capacity and maximum separation of oil from olive past. The prototype machine for extracting olive oil executed the three major operations of crushing, mixing, and extracting and it was designed according to the hale engineering parameters that correspond to the physical and mechanical properties of the most spreading varieties in Egypt. The designed machine was developed and fabricated at the workshop of Agric. Eng. Res. Institute (AEnRI) and it was tested and evaluated at the laboratory of Agric. Eng. Dept., Mansoura University.

The obtained results through-out several stages of laboratory experimental showed that , for the crushing and mixing units, the optimum operation conditions for hummer mill were 3000 rpm (35.51 m/sec) for the rotating speed, 4 mm for screen hole diameter, 2 mm for clearance between hummers and miller case, and 4 hummer for the number hummers. Meanwhile, the optimum operation conditions for the extracting unit were from 60-70 kg/cm² for the pressure over the olive paste, 1.75 cm for the thickness of paste on mat tray, and 40 minutes for the time of constant pressure on the paste.

In general the developed oil extracting machine showed a good working ability and high operational performance and it can be recommended for both farmers and investors with olive holding areas less than 10 feddans.

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