Small-Scale Oil Press for Sustainable Biodiesel Production

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Abstract

The purpose of this project was to design a small-scale oil press suitable for oil crops such as soy, peanut, sunflower and Jatropha *Curcas*, to advance sustainable, locally ranged biodiesel production. The focus of the project entailed developing a simple design out of common, widely available materials, with minimal required assembly and the most efficient oil extraction yields. The press can be used for different oil crops according to their oil content and particle size

Background Information

Biodiesel is a cleaner burning, renewable alternative for a petro diesel fuel. Sustainable biodiesel operations on a local level involve growing the oil crops, extracting oil on site and then converting it to biodiesel by the process of transesterification. Implementing a small oil press could be a significant step towards making an existing biodiesel operation more sustainable. The design involves a mechanical “bench press system” which allows the maker to extract oil on a batch by batch basis. Oil is commonly extracted using temperature, pressure or solvents. The mechanized way, using pressure, was chosen for this project due to the factors of safety, economical viability and employment of mechanized ways since prehistoric times. From stone grinding to animal operated mortar and pestle system, oil extraction is an olden process that dates back to 300 B.C. and is referred to in ancient Sanskrit literature as *Ghani.*[1]

Results

The press involves a hydraulic bottle jack, to act as a piston. The jack is attached to a sturdy welded metal frame. The piston comes down into a closed-bottom plastic cylinder where the seeds are crushed and oil is expelled with pressure. The perforated sides allow for the seed cake to escape and be collected into a seed cake collection lip. The cylinder contains a sealed bottom with a small (1mm) deep smooth grove leading to an opening at the bottom of the cylinder, required for the oil to run off into the oil collection cup (see Figure 1).

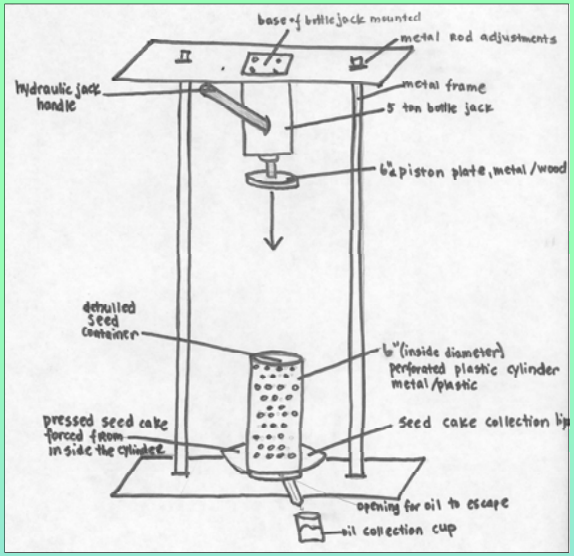

Figure 1 Design of oil press prototype

Crop	Oil content (% oil per seed) [2]	Annual Yield (gal oil /acre) [3]
Soya	20	48
Peanut	50	113
Sunflower	35	102
Jatropha *Curcas*	37	202

Table 1 Approximate oil yields of crops intended for pressing

Conclusion

In conclusion, this mechanical oil press could be utilized by any biodiesel production and be used as part of any operation from on-farm to garage-scale. Different perforation sizes and patterns can be used to accommodate different oil crops according to their oil content and particle size. The seeds require no pretreatment for pressing. The cake, still nutrient rich, can be used for compost or animal feed.

References

[1]Achaya, K.T., Indian Journal of History of Science 27(1), 1992, page 9. *Indian Oil Press (Ghani).*

[2]Robbellen G., Downey K., Ashri A. Oil Crops of the World. 1989

[3]journeytoforever.org/biodiesel_yield.html

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