Biodiesel from wild castor oil

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The seeds of the wild castor oil plant, Ricinus communis, can be converted into biodiesel according to a new study in the *International Journal of Oil, Gas and Coal Technology*. The Mexican research team shows how the requisite transesterification reaction of oil from the seeds using methanol in the presence of sodium hydroxide as a catalyst can

produce a fuel product that meets the standards set out by the American Society for Testing and Materials and the European Organization Standardization. A ratio of oil to methanol of 1 to 9 is the most efficient.

The team explains how in the search for sustainable alternatives to fossil fuels, techniques for biodiesel production using a transesterification reaction of a biological product have been used for many years. The process involves transforming esters in the plant-derived oil into another fuel-type ester and glycerol as a byproduct. The different densities of ester and glycerol means they can be readily separated by gravity and the glycerol removed. The alcohol reagent can then be removed from this biodiesel by distillation and recycled for use in the next batch.

Manuel Flota-Bañuelos and Liliana San-Pedro of the Autonomous University of Yucatan, and Carlos A. Victoria-Graniel of the National Technological Institute of Mexico (Tizimín Campus), Yucatán, Mexico, point out that for the greatest benefit, biodiesel should be derived from sources that are abundant, renewable, and local to the production plant. "The different feedstocks used in biodiesel production vary by location, either by their weather or by their availability, the most common are the oils and fats that are most abundant in each region," the team explains.

The team adds that the most common raw materials are oils and fats of natural origin as they are rich in a mixture of lipids including glycerides (acylglycerols), formed by esters between fatty acids and glycerol. Commonly sunflower oil and soybean oil are the most well-known biodiesel sources. However, oils from other seeds, and even fish oils, are used increasingly. For greater environmental benefit, it might be best to use inedible seeds that can grow on poor-quality soil, so that biodiesel production does not compete with the cultivation of food crops.

Castor oil plants have been grown for many years to give us oil for lamps and lubricants. The oils are even used as a chemical feedstock for the

production of polymers, surfactants, and other substances. As such, much is already known about the cultivation and conversion of castor oil. The team suggests, based on their reaction study that wild castor oil plants could represent an important part of our conversion to biodiesel without compromising food crop production.

More information: Manuel Flota Bañuelos et al, Obtaining biodiesel from seeds of *Ricinus communis*: methodological proposal, *International Journal of Oil, Gas and Coal Technology* (2022). DOI: 10.1504/IJOGCT.2022.121264

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