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*Making Biodiesel Greener*

Although biodiesel is much greener than petroleum-based fuels, as it is derived from the renewable source of vegetable oils, several of its features could be made more environmental. Two such characteristics are that the conventional method of making biodiesel wastes electrical energy, and that the oil most commonly used in biodiesel comes from soybeans, which occupy valuable food crop land. This experiment analyzes whether the type of oil and method of heat-assisted transesterification (the biodiesel reaction) affect the completeness of the reaction. Due to background research, it was hypothesized that transesterification would be successful, regardless of process or oil, but microwaved samples would be of slightly better quality, followed by electrically and finally solar-heated samples. Microwave radiation, conventional electrical heating (hot plate), and solar heating were used to transesterify samples of hemp and soybean oil. The well-established 27-3 methanol test was employed to determine the amount of untransesterified material (triglycerides) in each sample, an indication of the samples' quality. Contrary to the hypothesis, microwaved biodiesels contained the most triglycerides, followed by those transesterified through solar and finally electrical heating; also, soybean biodiesel was generally of better quality than hemp. However, since transesterification did work to a great degree in all samples, this experiment indicates that it seems to be feasible, with more refining of the processes, to augment biodiesel's environmental appeal with different oils and more energy-efficient methods. In turn, these improvements could increase use and its potential for positive impact, leading to more widespread use of green biodiesel.