

## **ALL IS NOT "GOLDEN" WITH BIODIESEL:**

1. Biodiesel is produced by reacting vegetable oils or animal fats with an alcohol (usually methyl) in the presence of a catalyst, usually lye (sodium hydroxide). Biodiesel is said to be "carbon neutral" because the carbon in the greenhouse gases released to the atmosphere when it is burnt, is the same carbon the original oil plants removed from the atmosphere in order to grow. In addition, the energy used to produce it is less than 1/3 of the energy contained in the product manufactured. Compared that to petroleum fuels, which contain less energy than the energy used to produce it. It sounds good at first, but there is some "self-delusion" in these beliefs:
  - a) If the biodiesel production process utilizes methyl alcohol (methanol, or "wood" alcohol), it is most likely derived from methane (natural gas) which is a net contributor of greenhouse gases just like petroleum. The natural gas is not burned, per se, it becomes a part of the biodiesel molecule which IS burned.
  - b) If ethanol (ethyl, or "grain" alcohol) is the alcohol used, it is probably derived from corn which is a soil-depleting crop that makes extensive use of petro-chemical fertilizers, pesticides and herbicides.
  - c) Oil-seed crops may be low labor and fertilizer intensive crops that contribute little to the production of greenhouse gases and that leave a valuable animal feed leftover. However, even if the crop is relatively high yielding, such as the Oil Palm, it must be considered that millions of acres of land (ie: in Malaysia, Indonesia and South America) are being cleared and burnt over to provide space for oil palms. Over 140 animal species are expected to become extinct from this clearing. The burning is adding more greenhouse gas to the atmosphere than the biodiesel will save for many years. But other land is lying fallow because the former crops grown there (ie: sugar cane) are no longer economically feasible.
2. Growing oil-seed crops diminishes the amount of land available for the growth of crops for food. At the rate that we Americans use fuel, and at present oil yields per acre, the same land area that can produce food for one person for a year, can only produce enough fuel for that person for one week.
3. It is often touted that it is less expensive to produce biodiesel from waste vegetable oils and rendered fats than it is from new vegetable oil. That's true, but there is only enough WVO and animal fats available to replace 3-5% of the fuel we use for transportation only. That does not even consider the fuel we use for heating purposes or the petroleum used to produce plastics and everything else made from it.
4. Algae can be a good source of oils for bio-fuels because so much can be per acre of land. Unfortunately, a practical process for growing and producing algae oil, and converting it to biodiesel does not yet exist.
5. The catalyst is not used up in the reaction to create the biodiesel. It remains, as poisonous and caustic as it started out, as waste. Even worse, it is now dirty and dissolved in water and glycerin byproduct and cannot easily be recovered for reuse. Generally it is neutralized with acid and the least expensive acid is Muriatic (hydrochloric). However, when the catalyst and the acid cancel each other out, they leave dirty salt water in their place. Unfortunately, saltwater is considered a pollutant. It is not economically feasible to recover and purify the salt because "new" salt from other means is much less costly to produce.
6. The glycerin byproduct is only 80-85% pure and has a worth of less than 5 cents per pound. There is a limited market for it as a degreaser. It can be used to make bar soap, but this is not the crystal-clear glycerin soap you find in the store. The glycerin can be purified, but within a couple of years, there will be more glycerin from biodiesel production than the entire world demand for it (which is about 600,000,000 pounds). It will burn as a fuel, but produces poisonous acrolein in a low temperature furnace.
7. The common procedure is to wash biodiesel with water when it is first produced. It takes about 3 washes to clean the biodiesel enough to remove leftover catalyst and soaps that can "gunk up" an engine if not removed. Obviously, what is washed out of the biodiesel is now in the wash water. And there is a lot of it...approximately equal to the amount of biodiesel produced.
8. Small biodiesel producers utilize a batch process which requires excess alcohol and constant mixing for 1-3 hours to ensure a complete reaction. This is a waste of time and power. Once the reaction is complete, the product takes from 1-3 days to settle out into biodiesel and the byproduct. During that time, the equipment is essentially out of commission unless the raw product mixture is transferred into separate settling tanks.
9. Biodiesel is considered non-toxic. But the catalyst and acids involved are poisonous and caustic and the alcohols used are poisonous and/or present a hazardous fire and explosion risk.
10. B100 Biodiesel is not yet price competitive with pure petro-diesel and temperature conditioning additives add to the cost but are needed to prevent clouding and gelling during cold seasons.
11. Corn, as the root of ethanol, is a more valuable crop than soy beans. Soy prices will rise if farmers switch from growing soy beans to corn. Feedstock is as much as 80% of the cost of producing biodiesel.