Waste to Fuel: Biodiesel Production

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In Iraq, reliance on fossil fuels and improper waste disposal methods led to Iraq having an AQI of between 65-90, and studies in local universities stated that if nothing changes in the future, people living in Iraq will face respiratory diseases like lung cancer, acute lung infections, asthma, and others. Since my project involves using used cooking oil, and used plastic, it helps reduce waste, also, there are about 70 metric tons of used cooking oil produced every year, and with that, about 67-68 metric tons of biodiesel can be made. On the other hand, my project also helps reduce air pollution, because it has way less soot, carbon dioxide, hydrocarbons and other harmful emissions that normal fossil fuels have. Firstly, I used a homemade filter bottle to remove impurities form the oil. Then I heat the oil to about 60C, then I put it in the HDPE container. Then I mix 5g sodium hydroxide per liter of oil with 200ml of methanol per liter of oil to from sodium methoxide, this reaction is called a transesterification reaction, by the following reaction: NaOH+ CH3OH to NaOCH3 +H2O. The -OH reacts with the H of methanol to make H20, leaving the -OCH3 to react with the fatty acids in the oil, with glycerin forming as a by-product. My methods yielded a biodiesel that was successfully used in a pirmus stove, and had properties that indicate low harmful emissions.

Awards Won: