The Effect of Washings and Shelf Life on Biodiesel Efficiency

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The purpose of this project was to determine the most efficient biodiesel: made from corn, soybean, or canola oil. Experiments were conducted to determine which would be more efficient: one or two washings, short or long shelf life. Some sources encourage using unwashed biodiesel, because washing is a time consuming process. However, some alcohol and sodium hydroxide remain suspended throughout the biodiesel which can result in a fire or explosion and can corrode engine components. Subsequently, water in biodiesel can lead to biological growth as the fuel degrades. It is advantageous when making biodiesel to minimize washings, while still maximizing efficiency and maintaining purity of biodiesel. The biodiesel was first produced, blending small amounts of sodium hydroxide and methanol with 0.5 L of purified oil. The glycerin and biodiesel were separated using a separatory funnel. The first washings were subdivided for a second washing and further experimentation. Biodiesel aliquots were burned for 5 minutes heating a pre-determined mass of water (recording the temperature after). Trails were repeated in triplicates and t-test were performed (p-values < 0.05 were considered significant). Soybean oil had significantly higher energy with one washing, but burned with random flares. Biodiesel made from canola oil washed twice had significantly higher energy content than the other two biodiesels with two washings, but less than one washing of soybean oil. However, it had a more controlled flame. In summation, benefit of the first washing showed improved heating value and the second washing showed more stable combustion characteristics.

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