The Transesterification of Hickory Nuts into Biodiesel Fuel
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Introduction:
- Biodiesel fuels can be produced from a fat and an alcohol via transesterification
- Hickory nuts have a high fat content (~60% by weight)
- Can nuts from shagbark hickory (Carya ovata) be used to produce a biodiesel fuel using existing acid-catalyzed transesterification methods?

Methodology:
Extraction of HKO:
- Remove endosperm from nuts
- Grind endosperm into a powder
- Extract HKO using heptane
- Filter solids & remove heptane using rotary evaporation

Acid-catalyzed transesterification:
- Heat HKO & methanol with < 1% H_2SO_4 overnight
- Wash product mixture to remove impurities & by-products
- Dry HKOME product to remove residual H_2O
- Remove excess methanol via rotary evaporation
- Analyze HKOME product mixture using 1H-NMR spectroscopy

Results:
- Integration data from 1H-NMR spectra of product mixture was used to calculate % conversion
- HKOME product was formed with 97.4% conversion

Discussion:
- Acid-catalyzed transesterification methods were effective for the production of biodiesel fuel from hickory kernel oil
- NMR data show the HKOME product was formed in 97.4% conversion.

Conclusion:
- Hickory nuts can be used for producing biodiesel fuel

Future Work:
- Repeat experiments using base-catalyzed transesterification
- Determine the fatty acid composition of the HKOME product mixture
- Improve HKO extraction methods

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References: