The Transesterification of Hickory Nuts into Biodiesel Fuel
Hannah K. Trauger, Madilynn G. Dewell, Jahida A. Mendoza, and Russell J. Franks*
Department of Chemistry & Biochemistry, Stephen F. Austin State University, Nacogdoches, TX

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$_2$SO$_4$ overnight
- Wash product mixture to remove impurities & by-products
- Dry HKOME product to remove residual H$_2$O
- Remove excess methanol via rotary evaporation

Analyze HKOME product mixture using $^1$H-NMR spectroscopy

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

Acknowledgements:
- SFASU Dept. of Chemistry & Biochemistry
- SFASU School of Honors
- SFASU Office of Research & Sponsored Programs
- Robert A. Welch Foundation (Grant #AN-0008)

References: