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## Low Value Natural Oils to Biolubricants and Biofuels

Adding value to low quality oils and biofuel byproducts is attractive to biofuel refineries that want to become more economically sustainable. ISTC researcher Dr. B.K. Sharma and his team have found ways to modify soybean oil to improve its inherent drawbacks (low oxidation stability and poor cold flow properties) and make it more suitable as a base oil for lubricant applications. They extended this approach further and used new modification methods to improve properties of low quality oils, which can be formulated into industrial biobased lubricants. Several projects and papers resulted from this line of research. One project is described and all the papers can be accessed from the Publications section in the right column.

## Corn Oil Enhancement

Industrial applications of vegetable oils outside of food usage have been limited due to their short shelf-life, which results from unsaturation (carbon-carbon double bonds) in the structure of most triglycerides. To explore expanded utilization of this renewable resource, Sharma and his team have eliminated the problem of short shelf-life by chemically modifying double bonds in an attempt to stabilize the oil. Analysis of this modified corn oil indicated that the resulting poly-hydroxylated acids were more stable than the unmodified, native corn oil. These modified oils are amenable for use in cosmetics, pharmaceuticals, and other industrial uses, especially as a lubricity enhancing additive in fuel applications.

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- **B.K. Sharma**

#### **Publications**

- **Synthesis and characterization of corn oil polyhydroxy fatty acids designed as additive agent for many applications**
- **Preparation of acetonides from soybean oil, methyl soyate, and fatty esters**
- **Synthesis and physical properties of isostearic acids and their esters**
- **Emulsification of chemically modified vegetable oils for lubricant use**
- **Synthesis and characterization of the intrinsic properties of milkweed polyhydroxy fatty acids**



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