Non-Confidential Description - PSU No. 2969
“Poly (hydroxyl thioether) Vegetable Oil Derivatives Useful as Lubricant Additives”

Field of the Invention
Biodegradable Lubricants and Oils

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Patent Status
A U.S. and PCT patent applications have been filed.

Background
Lubricant additive demand in the US is forecast to advance two percent per year to $1.7 billion in 2006, with volume reaching 1.9 billion pounds. Prices are continuing to increase as high-value better performing additives are developed to meet original equipment manufacturer (OEM), consumer safety, and performance requirements. There is an increased demand for environment friendly, biodegradable alternatives to petroleum based fuels and oils. Current so-called biodegradable fluids are not fully biodegradable due to the antiwear/antifriction additives used which are mineral-based. On a comparative basis, the biodegradability of seed oil is generally 90-98 percent, compared with 20-40 percent for petroleum-based oil.

Invention Description
The invention describes a novel process for the preparation of bio-based antiwear/antifriction additives for use in existing mineral oil and biodegradable lubricants. The process involves developing and optimizing the synthetic route to converting seed oils (e.g. corn, soybean, sunflower, etc.) into sulfur-containing molecules. The new molecule, which retains the basic backbone structure and chemical properties of seed oils, demonstrates significant improvement in friction and wear protection compared to existing commercial additives of mineral oil origin. The important functional properties of the molecule include but are not limited to: high flash point, high viscosity, high molecular weight, high polarity for adsorption on metal surfaces, and excellent boundary lubrication behavior. The most significant contributions of this disclosure are the molecule’s biodegradability and use of renewable resources (e.g. vegetables, soy beans), thus helping to protect the environment while at the same time contributing to the agro- economy.

Advantages
• Readily available raw materials
• Non-toxic and Biodegradable
• Cleaner, Renewable alternative to petroleum based additives
• Delivers improved antiwear/antifriction properties
• Low cost process development and manufacturing friendly technology