

Non-Confidential Description - PSU No. 3627
“Process Development for Preparation and Tribochemical Evaluation
of Boron Containing Vegetable Oil Based Antiwear/Antifriction
Additive”

Keywords:

Lubricant additives, petroleum, environmentally friendly, boron

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Background

The United States lubricant additives market utilizes 1.8 billion pounds of deposit control additives, viscosity index improvers, antiwear and extreme pressure additives, antioxidants, corrosion inhibitors, defoamers, and pour point depressants per year, at a cost of over \$1.7 billion. Within this market, prices will continue to increase as higher-value, higher-performing additives are used to meet original equipment manufacturer (OEM) and consumer safety and performance requirements. In addition, the increasing use of non-petroleum basestocks will require higher additive treat rates. Currently, the majority of these additives are petroleum based, providing an opportunity for a bio-based lubricant additive that is environmentally friendly, cost-effective, and of superior quality.

Invention Description

When applied to metal surfaces, heteroatom-containing compounds help to alleviate friction and decrease wear. The disclosed invention is a bio-based anti-friction/anti-wear additive that demonstrates significant improvement in friction and wear and tear protection compared to commercial additives of mineral oil origin. The invention describes a process that optimizes a synthetic route to convert any vegetable oil that contains some double bonds into a boron containing molecule that demonstrates improved friction and wear properties compared to petroleum-derived additives.

The easy availability of raw materials, non-toxic character of the bio-product, and the potential to deliver better properties when compared to available mineral oil based technology all prove this technology advantageous. Lubricant additives compounds are premium priced and highly application specific. This technology will deliver a bio-based compound that can deliver better functional properties compared to existing commercial additives at a much lower price.

This technology uses renewable resources (vegetable oil) and presents a green methodology that can be easily adopted for commercial scale-up.

Advantages/Applications

- Better properties compared to currently available mineral oil-based technology
- Easy availability of raw materials (vegetable oil) and a non-toxic bio-product
- Lower price than current solutions

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