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**Investing in
bio-based materials
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A renewable future with biodiesel and glycerin

Recent concerns over traditional petroleum-based fuel, its effect on the environment and the rapid depletion of this non-renewable energy source, are leading many to revisit biodiesel as a worldwide fuel source. Biodiesel is popular in Europe, and now Canada and the United States are hopeful it can become an economical option in North America.

Biodiesel

Biodiesel is a non-toxic and biodegradable fuel that can be made from vegetable oils, waste cooking oil, rendered animal fats or tall oil (a by-product from pulp and paper processing). Biodiesel is produced from these feedstocks through a process called transesterification – the reaction of the oil with an alcohol (usually methanol, although ethanol can also be used) and a catalyst (such as sodium hydroxide). The resulting chemical reaction produces glycerin and a methyl ester – the chemical name for biodiesel.

Biodiesel integrates smoothly into the current delivery infrastructure and

engines. The flash point – the point at which the fuel will spontaneously combust – is higher for biodiesel, making it a safer option than conventional petroleum. Biodiesel is also biodegradable, meaning it will decompose naturally and leave less of an impact on the environment.

With the exception of nitrous oxides, exhaust emissions are far lower in biodiesel than its petroleum counterpart. With the current focus on the environment, and the increasing price of petro-diesel, biodiesel is becoming an attractive option.

Canadian market

The annual Canadian diesel fuel market is approximately 25 billion litres. Currently, the industry depends upon the availability of oilseed crops – such as soybeans and canola – to meet its needs in biodiesel production. In Eastern Canada production is also dependent upon the availability of rendered animal fats and waste cooking oils. These combined resources would allow for the production of approximately 2.5 billion litres of biodiesel fuel, or 10% of the total Canadian diesel fuel market.

Soybean oil is a common feedstock for biodiesel production – in fact it is the primary feedstock for biodiesel

production in the United States. In Ontario research and advancements in soybean genetics are producing high-oil soybeans which will make this option even more popular. Projects underway with the Ontario Soybean Growers aim to increase the oil content of beans, in hopes of reducing per unit cost of the oil.

Glycerin

Glycerin (also called glycerol) is an abundant by-product of biodiesel production. Current research focused on the purified form of glycerin is revealing value-added molecules that can be used in the production of consumer goods.

One area of development that is nearing the market is propylene glycol made from glycerin.

The growing demand for biodiesel is resulting in a glut of glycerin. For every tonne of biodiesel produced, 100 kilograms of glycerin are generated.

Traditionally glycerin was sold as a low-cost input for soap production or airplane deicing fluids, among other end uses. The surplus for glycerin is pushing biodiesel producers to re-examine current market for this by-product in hopes of garnering greater value from the waste stream.

The surplus is also being viewed by many large multinational chemical companies including Dow, Huntsman and Ashland Chemical in a joint venture with Cargill, as an opportunity to find profitable ways to meet market demands using renewable feedstocks.

The global demand for propylene glycol is estimated at 2.1-billion kilograms per year with over 500-million being consumed in the United States each year. Propylene glycol is a common ingredient in a variety of resins,

lubricants, cosmetics, paints, detergents and antifreeze.

Today, most propylene glycol is produced from propylene oxide, a petroleum-based intermediate. Research shows that global demand for propylene glycol is growing at 3 to 7 per cent.

For more information about renewable propylene glycol or biodiesel visit:

www.soyatech.com

www.greenfuels.org

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Canada



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