

ITDI's biodiesel antifreeze to boost foreign sales

With the DOE 2017-2040 Philippine Energy Plan targeting to maintain a B2 biodiesel blending as shown in its long term (2020-2040) Biofuels Roadmap, local processors are hard put to find an antifreeze that would ensure their biodiesel getting a slice of the foreign market.

Cleotilde A. Bulan, head of the Industrial Chemicals Section at the Industrial Technology Development Institute (DOST-ITDI), stressed the need of local processors for a locally-produced antifreeze agent that would complement the Philippine biodiesel from coconut. Adding that the biodiesel industry sector needs "this" to ensure that the coconut methyl ester (CME) or cocobiodiesel can compete in the world market. GlobeNewsWire has reported that the global biodiesel market is currently standing at the size of USD23,290 million and is expected to reach USD25,880 million by the end of 2026 (CAGR of 1.5% during 2021-2026).

Bulan explains further that what an antifreeze does, also known as coolant, is to lower a liquid's freezing point, which is why it is added to radiators of vehicles. In foreign localities, an antifreeze allows cars to operate in a variety of temperatures, from frigidly cold to scorchingly hot.

By adding a mixture of chemicals and water, antifreeze helps ensure that the liquid in radiators does not freeze over during winter or boils up during summer, thus overheating the engine.

But, how does an antifreeze exactly work? How does it protect engines?

Bulan said that the key lies in the boiling and freezing points of coolants. Pure water has a boiling point of 212°F (100°C) and a freezing point of 32°F (0°C). However, by using a 50/50 mixture of water and ethylene glycol, the boiling point rises to 223°F (106°C) and the freezing point lowers to -35°F (-37°C).

By taking it a step further, using a 30/70 mixture of water and ethylene glycol, the boiling point rises to 235°F (113°C) and the freezing point lowers to -67°F (-55°C).

However, Bulan's team is working on a different antifreeze agent -- the synthesis of glycerol (a naturally occurring alcohol) acetals. Here, glycerol acts to prevent freezing damage, such as ice crystal formation.

Inspired by Technology, Driven by Innovation

Foreign research studies show that at lower glycerol concentrations like 10-20%, the frozen stock will be fairly solid at -80°C, while at higher concentrations (30-50%) it may remain partially liquid.

Currently, Bulan's team has applied for patent for the glycerol acetal and biodiesel samples. It is awaiting results from Intertek Testing Services (Singapore) Pte. Ltd. of the pour point analysis on samples of pure glycerol acetal, as well as biodiesel blends. The analysis will measure and confirm Bulan's target freezing point of the antifreeze agent. (amguevarra\ ITDI S&T Media Service)

###