

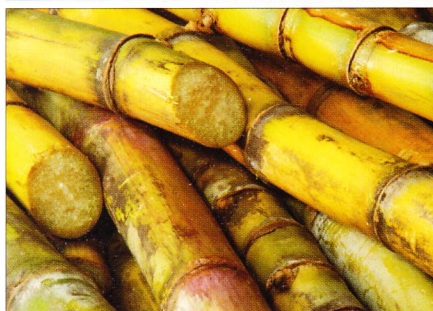
Soybean



Jatropha



Sunflower



Sugar Cane



Maize

Biodiesel shortens engine oil drain intervals

At the time of writing, crude had just broken through 120USD/barrel and everyone was scrambling for alternatives – biodiesel being one of them. Adding biodiesel to mineral diesel has an impact on lubrication intervals and this was well documented in a special paper tabled at the International Tribology 2011 Conference held in Pretoria. In the meantime biodiesel spec SANS 1935 has been enhanced with SANS 833 which, if followed correctly, will help the local industry to ensure the quality of the biodiesel, from manufacture to sale, while also reducing the associated complexity and costs. But regardless of biodiesel quality and specification, there are issues that remain with blended fuels coming into contact with engine lubrication during the combustion process writes **Dave Scott**.

Energy security and CO₂ emission regulations are driving governments to introduce legislation that mandates the minimum level of renewable fuels for transportation. In many countries this has led to the introduction of biodiesel fatty acid methyl esters (FAME) into diesel fuel. Based on projected growth over the next 5-10 years, the use of FAME in various feedstocks is set to increase.

The SA Government's current strategy envisions 2% of national

petrol and diesel usage coming from bio-fuels such as bio-ethanol and biodiesel by 2013, thereby creating an estimated 25 000 jobs.

As an increasing number of vehicles are exposed to FAME, the interaction between the fuel, engine components and engine oil are presenting challenges for the automotive, fuels and lubricant industries. Engine oil performance is affected by the use of FAME as they can accumulate in a vehicle's sump and impact engine oil durability.

There are many sources of biodiesel, each with different properties. The properties of biodiesel are also fundamentally different than those of mineral-derived diesel, specifically with reference to thermal and oxidative stability and much lower volatility. The effect on the engine oil is dependent on the type and quantity of the FAME contaminant.

There is an interaction between biodiesel and engine oil and the question is: To what extent does this impact lubricant performance levels and service intervals? Biodiesel can affect the engine oil durability in a

number of ways, specifically:

Fuel dilution

Due to the differences in volatility, the biodiesel tends to accumulate in the sump, diluting the engine oil.

Viscosity decrease

The viscosity of the engine oil is reduced with the high levels of unburnt fuel, shortening the useful service life of the lubricant.

Increased piston deposits

The nature of the biodiesel caused increased piston deposits. However, it is very dependent on the engine oil formulation. Testing should be conducted to ensure that the formulation is robust with biodiesel and biodiesel blends.

Increased lubricant oxidation

The presence of biodiesel in the engine oil increases the lubricant oxidation rate, which increases the engine oil viscosity. This, in turn, can potentially lead to sludging of the engine oil.

It is essential that the lubricant formulators ensure that engine oil durability is maintained. This will necessitate the use of high-quality engine oils. Vehicles will need to remain on the correct Original Equipment Manufacturers (OEM)-

SANS 1935

Bio-diesel quality is assessed against a SANS 1935:2004 (which entails the use of European Standard Methods and methods from the International Standard Organization ISO) specification consisting of 26 tests. The 26 tests are designed to control the chemical and physical properties of bio-diesel and to ensure that it is produced to a uniform standard, performs well in an engine, does not damage it, and does not produce harmful emissions.

approved or recommended engine oil throughout their lives to ensure that no problems are encountered. Failure to do so may result in premature engine or component failure.

Engine oil formulating is complex and biodiesel is introducing additional

challenges. Engine oils can be formulated to reduce the impact of biodiesel. However, high levels of fuel dilution may need to be addressed via reductions in oil drain intervals. This will potentially have a significant impact on service maintenance plans and customer operations and hence should be avoided if at all possible through engine design and lubricant

The use of biodiesel is increasing internationally due to environmental, energy security or job creation reasons. This is placing increased pressure on the engine, fuel and lubricant manufacturers to ensure that service intervals are maintained or extended while ensuring fit-for-purpose products.

The message is clear – if the fleet is topping up with biodiesel from a 'stokie' supplier, you are due for a big maintenance surprise! □

SANS 833

SANS 833 Biodiesel Production - Quality management – Producer requirements is an important step towards helping create a local biodiesel industry, as it helps producers and suppliers - particularly those producing small batches of biodiesel - to manage their quality requirements in a more cost effective way. If followed correctly, SANS 833 will help the local industry to ensure the quality of the biodiesel, from manufacture to sale, while also reducing the associated complexity and costs.

References & acknowledgement for extracts

Paper presented at SAIT International Conference 2011 - Webster M; Fitton, J; Lubrizol;
Effect Of Biodiesel On Engine Lubricant Durability
A copy of this paper can be obtained from the SA Institute of Tribology

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