

**T**he palm biodiesel technology has been developed in MPOB since 1980s. In recent years, biodiesel has gained a significant role as a blending component for diesel fuel. Various countries including Malaysia have implemented the blending of biodiesel into diesel fuel in various ratios. Malaysia has implemented the B5 (blend of 5% biodiesel with 95% diesel fuel) programme since June 2011 to the subsidised sector in the Central Region of Peninsular Malaysia. The quality of biodiesel, diesel fuel and its blends must comply with certain parameters as stipulated in the standard specifications before and after blending for quality assurance. With the setting up of a quality control laboratory for fuel analyses in MPOB, we are able to perform various analytical testing for biodiesel, diesel fuel and its blends in accordance with international standard methods such as the ASTM, EN and ISO.

## TS NO. 112

### DETERMINATION OF SULPHATED ASH CONTENT OF BIODIESEL AND DIESEL FUEL

Ash-forming materials especially the unremoved catalyst used in biodiesel production can cause engine deposits and contribute to wear and tear at the fuel injector, fuel pump, piston and ring. Thus, there is a need to limit the sulphated ash content in the biodiesel sample. Currently, a maximum of 0.02 mass % is stipulated in the biodiesel specification. In this test, the sample is ignited and burned until only ash and carbon remain. After cooling, the residue is treated with sulphuric acid and heated at 775 °C in a furnace until oxidation of carbon is completed. The ash is then cooled, treated with sulphuric acid and heated to constant weight at 775°C. The weight of the ash that remained represents the sulphated ash content.



Figure 1. Furnace and evaporating dish.

## TS NO. 113

### DETERMINATION OF TOTAL CONTAMINATION OF BIODIESEL

This test is to determine the content of undissolved substances in the fuel. The maximum limit of total contamination for biodiesel is 24 mg kg<sup>-1</sup>. In this test, the sample is filtered at 40°C through a membrane filter having a pore size of 0.8 µm at a pressure of 2-5 kPa, and the residue retained on the filter is washed with n-heptane. The increase in the weight of the filter represents the total contamination in a biodiesel sample.

## TS NO. 114

### DETERMINATION OF ELECTRICAL CONDUCTIVITY OF DIESEL FUEL

This test is mainly to verify the ability of a fuel to dissipate charge that has been generated during operation such as pumping and filtration. If the



Figure 2. Membrane filter system.



Figure 3. Electrical conductivity meter.

**TABLE 1. COST OF ANALYSIS AND AMOUNT OF SAMPLE REQUIRED\***

| TS No. | RM/sample | Amount of sample required |
|--------|-----------|---------------------------|
| 112    | 100       | 80 g                      |
| 113    | 100       | 250 g                     |
| 114    | 200       | 150 ml                    |

Note: \*as at June 2012; subject to change.

conductivity is sufficiently high, charges dissipate fast enough to prevent accumulation and this will reduce the hazard in storing the fuel in a fuel tank. The minimum limit of electrical conductivity of a diesel fuel specified in the Malaysian Standard Specification for Diesel Fuel is 50 pS/m. In this test, the liquid sample is placed in a measuring vessel to a level sufficient to cover the electrodes of the conductivity meter. A voltage is applied across the electrodes and the resulting current is expressed as the electrical conductivity value.

## REFERENCES

ASTM D 874-07 *Standard Test Method for Sulfated Ash from Lubricating Oils and Additives*. American Society for Testing and Materials.

ASTM D2624-02 *Standard Test Method for Electrical Conductivity of Aviation and Distillate Fuels*. American Society for Testing and Materials.

EN 12662:1998 *Liquid Petroleum Products – Determination of Contamination in Middle Distillates*.

ISO 3987:1994 *Petroleum Products – Lubricating Oils and Additives – Determination of Sulfated Ash*. International Organization for Standardization.

MS123:2005 *Malaysian Standard Specification for Diesel Fuel. Part 1: Euro 2M (third Revision)*. Department of Standard Malaysia.

MS 2008:2008 *Automotive Fuels: Palm Methyl Esters (PME) for Diesel Engines: Requirements and Test Methods*. Department of Standard Malaysia.

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