

# **Characterization of Particulate Emissions from**

## **Diesel Engines**

**By**

**K.V.L. Bharathi**

This study was set out to characterize particulate emissions from diesel engines in terms of Heavy metals, Benzene Soluble Organic Fraction, Elemental and Organic Carbon and Polycyclic Aromatic Hydrocarbons (PAHs). The Heavy metal content in particulates was correlated with that of metal content in diesel and lubricating oil. For this study, the exhaust from Mahindra DI engine was analyzed for the above parameters at three different engine loading conditions namely idle, 40%, 70% and 100%. It was found that as the load is increased from idle to 100% the heavy metal content in particulates gradually decreased. It was found heavy metal content was maximum at idle condition revealing that this would be due to inadequate combustion of diesel and lubricating oil. It is evident that the major source of heavy metals in particulates are from diesel and lubricating oil, while some metals are due to wear of engine components. Benzene Soluble Organic Fraction, which is a marker for carcinogenicity, also showed decrease in levels with increase in load. It was found that at idle condition 67% of organic fraction was soluble in Benzene with a minimum of 25 % at 100 % load. Elemental Carbon levels increased with increase in load showing a maximum of 48 % EC at 70% load with a minimum of 25 % at idle condition. The trend of Organic Carbon was quite opposite, it showed 35 % OC at idle condition and decreased gradually with increase in load. In case of PAHs, the Concentration of Chrysene, Benzo (k) Fluoranthene, Benzo (a) Pyrene, Dibenzo(a,h) Anthracene and Benzo(g,h,i) Perylene were found to increase with increase in load from idle to 40% load and decreased further upon reaching 70 % load.