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Analysis of Particulate Matter Concentration, EC, OC Emission and Elemental Composition for Biodiesel-Fuelled Diesel Engine

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Abstract : Comparative investigations were performed on the particles matter emitted from a DI diesel engine utilizing palm biodiesel. In this experiment, palm biodiesel PB10 (90% diesel and 10% palm biodiesel), PB20 (80% diesel, 20% palm biodiesel) and diesel fuel samples exhaust were investigated at different working condition (25% and 50% load at 1500 rpm constant speed). Observation of this experiment it clearly seen that at low load condition particle matter concentration of palm biodiesel exhaust were de-creased than that of diesel fuel. At no load and 25% load condition PB10 biodiesel blend exhibited 2.2 times lower PM concentration than that of diesel fuel. On the other hand, elemental carbon (EC) and organic emission for PB10 showed decreases trend as varies 4.2% to 6.6% and 32 to 39% respectively, while elemental carbon percentage increased by 0.85 to 10% respectively. Similarly, metal composition of PB10 biodiesel blend increased by 4.8 to 26.5% respectively. SEM images for B10 and B20 demonstrated granular structure particulates with greater grain sizes compared with diesel fuel. Finally, the experimental outcomes showed that the blend composition and degree of unsaturation of the methyl ester present in biodiesel influence on the particulate matter formation.

Keywords : particulate matter, elemental carbon, organic carbon, biodiesel
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