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Experimental Investigation of Single Cylinder C.I Engine Using Mustard and Neem Oil as a Biodiesel

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Abstract : To study the feasibility of using two edible plant oils mustard (Brassica nigra, Family: Cruciferae) and neem (Azadirachtaindica, Family: Meliaceae) as diesel substitute a comparative study on their combustion characteristics on a C.I. engine were made. Oils were esterified (butyl esters) before blending with pure diesel in the ratio of 10:90, 15:85, 20:80, and 25:75 by volume. Pure diesel was used as control. Studies have revealed that on blending vegetable oils with diesel a remarkable improvement in their physical and chemical properties was observed. Cetane number came to be very close to pure diesel. Engine (C.I.) was run at different loads (0, 4, 8, 12, 16, and 20 kg) at a constant speed (1500 rpm) separately on each blend and also on pure diesel. Results have indicated that engine run at 20% blend of oils showed a closer performance to pure diesel. However, mustard oil at 20% blend with diesel gave best performance as compared to neem oil blends in terms of low smoke intensity, emission of HC and NO_x. All the parameters tested viz., total fuel consumption, specific energy consumption; specific fuel consumption, brake thermal efficiency and cylindrical peak pressure were improved. These studies have revealed that both the oils at 20% blend with diesel can be used as a diesel substitute. Further, esterified mustard oil at 20% blend satisfies the important fuel properties as per ASTM specifications of biodiesel as it lead to an improvement in engine performance and emission characteristics without bringing any modifications in the engine.

Keywords : edible oils, mustard, neem, bio-diesel, transesterifications, combustion characteristics, engine performance.

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