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Production of Biodiesel in Bangladesh from Inedible Renewable Pithraj Oil (Aphanamixis polystachya) and Experimental Investigation of Methyl Esters as Biodiesel on C.I. Engine

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Abstract

This paper investigates the production of biodiesel from inedible renewable pithraj (Aphanamixis polystachya) oil and its effect on engine performance and emissions. In the first part of this work, the pithraj oil was used to produce biodiesel by transesterification process followed by the determination of fuel properties like density, viscosity, higher heating value, P^H value, flash point, pour point and cetane index. A maximum of 96% by volume methyl ester (biodiesel) was obtained at a methanol concentration of 22 vol%, catalyst concentration of 0.45wt% and a temperature of 60°C. In the second part of this work, a four-stroke, single cylinder, direct injection (DI), naturally aspirated (NA) diesel engine was used to investigate the engine performance and emissions fuelled with neat diesel fuel biodiesel blends. The engine experimental results showed that exhaust emissions including carbon monoxide (CO), smoke and engine noise were reduced with all biodiesel blends, while the NOx emission was found to be higher compared to baseline diesel fuel. Engine thermal efficiency was lower and the brake specific fuel consumption was higher with biodiesel blends.