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Economic analysis of optimized blend of composite oil methyl ester (COME)

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The present paper considers the importance of economic feasibility and financial viability of biodiesel production, use and its environmental impact in the context of Indian scenario. Optimization of production of biodiesel is carried out in an innovatively designed reactor wherein 40% reduction in production time is realized. The study of synergetic effect of mixing two non edible oils in various proportions derived from Jatropha and Pongamia, subjecting this composite oil to transesterification process to drive biodiesel is investigated. This biodiesel, blended with petrodiesel in various proportions is used to run a computerized Compression Ignition (CI) and Direct Injection (DI) engine at various Injection Pressures (IPs). The synergetic effect resulted in 53.9% increase in thermal efficiency and 54.83% overall reduction in emissions including oxides of nitrogen (NO_x). To validate the experimental results and optimization, Multi-Functional Criteria Technique (MFCT) is used. Further, value additions in terms of Indian Rupees (INR) due to increase in performance and decrease in emissions are investigated. Cost component of subsidy on petrodiesel is also taken into consideration in the calculation of cost of one litre of petrodiesel. From the analysis, it is found that one litre of optimized biodiesel blend (180MEM4B20) costs `44.35 ($0.71), whereas, petrodiesel cost is `53.00 ($0.85). Comparison of costs is with respect to units of power generated per litre of COME and petrodiesel. By the analysis it has been concluded that the amount saved with subsidy is `1.45 Lakh Crores ($232.15 Billions) per year and it is `1.60 Lakh Crores ($256.17 Billions) per year without subsidy.

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