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Biodiesel Fuel Production from Animal Fat and Investigation of the Effect of its Blends with Diesel Fuel of Performance of a Diesel Engine

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Bio-diesel is an alternative to petroleum-based fuels derived from vegetable oils, animal fats, and used cooking oils. The first aim of this work was to produce biodiesel from waste animal fats (an inedible and inexpensive byproduct from slaughterhouse) by transesterification reaction and to examine the conformity of some properties of the produced fuel with EN 14214 standards. The measured properties included, water content and density that both were in the acceptable range according to the European standard. Then, combustion performance of five blends of the produced biodiesel and diesel fuel (0, 15, 30, 45 and 60% biodiesel) in a MF-399 tractor engine was evaluated using a PTO dynamometer. Test results showed that power and torque of the engine slightly decreased and its specific fuel consumption increased by using biodiesel and diesel blends. This is in agreement with findings of former researchers and could be attributed to the lower heating value of biodiesel compared to pure diesel fuel. Results revealed that at the PTO speed of 950 rpm (1900 rpm engine speed) all fuel blends had their highest performance with B45D55 blend having the highest torque and power values and B30D70 having the lowest specific fuel consumption among the other blends. Overall, MF-399 tractor engine showed the best efficiency with using B45D55 blend.

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