

Comparison between tri-fuel (diesel-ethanol-biodiesel) emulsion with and without surfactant

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ABSTRACT

In this project, the overall activities were carried out to compare tri-fuel (diesel-ethanol-biodiesel) emulsions with and without surfactant (Tween 80 and Span 80) in term of stability and physiochemical properties (density, calorific value, surface tension and kinematic viscosity) characteristics. Potential benefit includes microexplosion phenomenon through mixing diesel fuel and alcohol has inspired researcher to find solution for immiscibility issue. Furthermore, biodiesel add-on apart from as oxygen source, the expectation will be to act as natural surfactant. The effectiveness of biodiesel in the absence of surfactant however is dubious while additional potential benefits compose with surfactant is unfamiliar. Hence, the objective of the study was to compare side by side, tri-fuel emulsion with and without surfactant in term of physicochemical properties. In this study, alternative fuel for CI engine called tri-fuel emulsions were prepared using Hielscher Ultrasonic Processor UP400S. The result of stability study revealed that tri-fuel emulsions with surfactant show promising stability reading compared to the tri-fuel emulsion without surfactant. Evidence was identified by having lower phase separation height and slower phase separation formation. Composition with 5% of ethanol content (D85E5B10) proves to be the best in term of physiochemical properties compared to other composition either with or without surfactant. However, the addition of surfactant in D85E5B10 shows more optimum properties.

KEYWORDS

Thermodynamic states and processes; Biofuels; Emulsions; Chemical elements; Alternative fuels; Ultrasonics; Diesel fuel; Viscosity

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