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Entitled

*EMULSION STABILITY, RHEOLOGICAL PROPERTIES, AND COMBUSTION CHARACTERISTICS OF WATER-JOJOBA BIOFUEL EMULSION*

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Abstract

This thesis comprehensively investigates the stability, rheological properties, and engine performance implications of water in jojoba biodiesel (WJBD) emulsion. The research delves into multiple aspects, including the influence of diverse surfactants and water concentrations on emulsion stability. It also yields valuable insights into the development of stable water in jojoba biodiesel emulsions, specifically tailored for diesel engines. These insights contribute significantly to the body of knowledge of positioning emulsion fuels as viable alternative to traditional diesel fuels. The anticipated benefits include notable reductions in emissions. Importantly, this study underscores the critical importance of considering emulsion stability, both during storage and engine operation, as it holds substantial implications for their overall performance and commercial viability. These emulsions, formulated from jojoba biodiesel synthesized via transesterification of jojoba oil extract, their stability was tested via several tests, including Gravitational test, and microscopy test. Furthermore, the investigation extends to the rheological properties of WJBD emulsions, focusing on their flow behavior and viscoelastic properties across varying water concentrations, results displayed noteworthy stability and rheological characteristics. Stable emulsions were tested on running a single cylinder diesel engine to study their performance characteristics, exhaust emissions, noise, and vibration levels. Notably, the utilization of WJBD emulsions demonstrated a pronounced reduction in NOx emissions, offering compelling insights into the potential of this emulsion compared to jojoba biodiesel.