# DETERMINATION OF KINEMATIC VISCOSITY OF DIFFERENT BIODIESEL FUELS AT LOW TEMPERATURES

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**Darbaz Abdulla Qadir : Determination of Kinematic Viscosity of Different Biodiesel Fuels at Low Temperatures.**

**Approval of Director of Graduate School of Applied Sciences**

**Prof. Dr. İlkay SALİHOĞLU**

**We certify this thesis is satisfactory for the award of the degree of Masters of Science in Mechanical Engineering**

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**DECLARATION**

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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## ABSTRACT

The use of biodiesel as an alternative fuel for diesel engine still has some challenges. One of the main challenges is being a significant amount of unsaturated fatty acid compounds because it is derived from vegetable oils and fats. Therefore, viscosity of biodiesel is affected by fatty acid composition, temperature, pressure, chain length and degree of saturation. The most serious problem that is faced to biodiesel is its utilization at low temperatures. There is a contrary relationship between viscosity and temperature. Viscosity increases by decreasing temperature. Additionally, the cloud point and pour point of biodiesel are higher than petrodiesel. Due to these reasons, there is a need to determine the biodiesel properties, especially at low temperatures such as viscosity and cold flow properties because; the major concern about biodiesel is its use at low temperatures. The kinematic viscosity and cloud point and pour point of five biodiesel fuel blends (100% UCOME, 75% UCOME + 25% UFOME, 50% UCOME + 50% UFOME, 25% UCOME + 75% UFOME and 100% UFOME) are measured from 20 $^0$C down to -10 $^0$C. The variations of these properties with temperature and blend composition are also observed.

**Keywords:** Biofuels, Biodiesel, Kinematic Viscosity, Cold Flow Properties, Cloud Point, Pour Point, Frying Oil, Canola Oil.

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