

INFLUENCE OF PULSED ELECTRIC FIELD TO ENHANCE BIODIESEL PRODUCTION EFFICIENCY

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A batch process to enhance the production of biodiesel using the application of pulsed electric field (PEF) with intensities of $\sim 5 - 15$ kV/cm is described. In this work, the biodiesel refining process was carried out by transesterifying used vegetable oil through the reaction of triglyceride and 95% methanol, catalyzed by potassium hydroxide (KOH) at 40-60 °C. The transesterification process was enhanced with the pulse train of electric field generated by the laboratory-assembled pulse forming line (PFL)¹ impinging on the custom-built cuvette filled with the oil. The maximum production efficiency of biodiesel was observed by the separation of methylester and glycerine when the treatment parameters include the pulse intensity of 10 kV/cm and the treatment periods of 5 and 10 min. Figure shown below compares biodiesels with the PEF treatments of 5 and 10 mins and the control (separation without PEF effect). In addition, the biodiesel purity was also analyzed by thin layer chromatography, yield percentage, viscosity, density, and flash point tests.



1. M. Behrend, A. Kuthi, X. Gu, P. T. Vernier, L. Marcu, C. M. Craft, and M. A. Gundersen, "Pulse generators for pulsed electric field exposure of biological cells and tissues," IEEE Trans. Dielect. Elect. Insulation, vol. 10, pp. 820-825, Oct. 2003.

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