FATTY ACID ETHYL ESTERS AS BIODIESEL FUEL: PRODUCT QUALITY AND EFFICIENCY OF VARIOUS PURIFICATION TECHNIQUES

Lyubov Patrylak [*], Serhiy Konovalov, Stepan Zubenko, Angela Yakovenko, David Davitadze, Olexandra Pertko

V.P. Kukhar Institute of Bioorganic Chemistry and Petrochemistry of National Academy of Sciences of Ukraine, 1, Academ. Kukharia str., Kyiv 02094, Ukraine
[*]e-mail: lkpg@ukr.net; +380 44 292-30-96; fax +380 44 573 25 52

Abstract. The efficiency of removing glycerol, soaps, and unconverted acylglycerols by repeated washing with water, alcohol removal by distillation, distillation of esters, and using of sorbents, as well as a combination of these techniques, was evaluated. The use of a number of commercially available sorbents (Magnesol, talc, and coal) and ion exchange resins (KU-2-8, Purolite CT275) was investigated. Glycerol and soap were found to be effectively removed with all tested materials except talc, while Magnesol and Purolite CT275 also effectively removed monoacylglycerols. However, none of the materials tested have been able to withdraw diacylglycerols. A three-stage purification of esters was proposed. The latter includes the alcohol removal by distillation, which contributes to the additional settling of pollutants, vacuum distillation and final using of sorbents (Purolite CT275). The utilization of the indicated stages allows obtaining a product that meets the quality indicators of EN 14214 and can be used as a component of biodiesel fuel.

Keywords: Fatty acid ethyl ester, biodiesel fuel, monoacylglycerol, diacylglycerol, glycerol.