APPLICATION OF NANOCOMPOSITES TO GRAPE WASTES PROCESSING FOR IMPROVE BIODIESEL PRODUCTION

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Introduction. Biodiesel production has received a special attention in the recent years due to its advantages in the conservation of the fossil fuels and production is becoming more and more important. Different methods for production are tested. Biodiesel can be obtained from different vegetable oils or animal fats and can be a natural substitute for petroleum-based fuels, with the similar or sometimes even higher properties. In plus, it is renewable, biodegradable and nontoxic. For socioeconomic reasons, edible oils used for biodiesel production should be replaced with other sources with lower costs like is the oil obtained from grape wastes, since over 20% of grape becomes waste during the production of wine.

Material and methods. The oil obtaining from seeds and grape residues was prepared according to the method previously published by our group [1]. Fe_3O_4/MnO_2 (FOM 1-4) nanocomposites were synthetized using a modified experimental procedure presented by Shu and Wang in 2009 [2].

Results. Fe_3O_4/MnO_2 nanocomposites prepared in this study were obtained both by chemically route and also using oregano extract, but the highest surface area and the best magnetic properties were obtained for FOM1. The selected Fe_3O_4/MnO_2 nanocomposites were further tested for microwave assisted transesterification of grapes residues and seeds oil. For all tests using FOM1 as catalyst, the resulted FAME's mixture mostly consists of C18:2, obtaining promising preliminary results. The highest quantity of linoleic acid was obtained by microwave treatment for 15 min at 800 W.

Conclusions. The Fe_3O_4/MnO_2 nanocomposites with the highest specific surface area from all prepared nanocomposites were tested for microwave-assisted transesterification studies. These nanocomposites, used as catalyst, determine an increasing reaction rate of the transesterification process thus being a promising route for biodiesel production.

Keywords: *Iron oxide Manganese oxide Nanocomposite Oregano extract Catalyst Biodiesel*

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