



## **Evaluation of malt spent rootlets biochar as catalyst for biodiesel production.**

Dimitra Pantiora

Greece (dimpantiora@gmail.com)

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Dimitra Pantiora<sup>1</sup>, Hrisi K. Karapanagioti<sup>1</sup>, Ioannis D. Manariotis<sup>2</sup>, Alexis Lycourghiotis<sup>1</sup>, Christos Kordulis<sup>1,3</sup>

(1) University of Patras, Department of Chemistry, GR 26500, Patras, Greece,

(2) University of Patras, Department of Civil Engineering, Patras, Greece,

(3) Institute of Chemical Engineering Science (FORTH/ ICE-HT), Stadiou Str., Platani, GR 26500, Patras, Greece

Biodiesel is an attractive renewable fuel, environmentally friendly, and can readily be synthesized from the triglycerides found in animal fats and vegetable oils. It can be used in existing engines. Biodiesel consists of fatty acid alkyl esters. Conversion of triglycerides to biodiesel fuel is commonly achieved through a series of transesterification reactions involving the reaction of an alkoxy group of an ester (i.e. mono-, di-, or triglyceride) with that of a small alcohol (usually methanol). This reaction is traditionally catalyzed by homogeneous catalysts, such as bases or mineral acids. Basic catalysts have been proved to be much more active than acidic ones. However, due to environmental (waste water) and economic concerns (catalyst separation and product and by-product cleaning), heterogeneous catalysts are much more desirable.

In the present study we have evaluated the use of biochar, produced from malt spent rootlets, as a potential basic catalyst, for transesterification of triglycerides using triacetin as a probe molecule.

The biochar used in this study was prepared by heating malt spent rootlets in an oxygen-limited environment. It is a carbon rich material, containing 66% C, 22% O, 0.45% Mg, 0.86% Si, 5.7% K, 1.5% Cl, 0.61% Ca, and 2.4% P. Aqueous suspension of this material equilibrates at pH= 10. This is probably due to high K content. Furthermore, it exhibits high specific surface area (SSA= 183 m<sup>2</sup>g<sup>-1</sup>). The above described characteristics make this material very promising catalyst for transesterification reactions. Indeed, the corresponding catalytic tests showed that 100% transesterification of triacetin can be achieved into 0.5 hour. This activity was maintained at least for 4 successive catalytic runs.