

## **Biodiesel Synthesis by Ultrasound Assisted Enzymatic Transesterification**

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This work presents the ultrasound assisted enzymatic transesterification of sunflower oil with ethanol using an immobilized lipase (Lipozyme 435). The heterogeneous enzyme-catalyzed process is considered a green process and presents some advantages as: compatibility with various substrates, fewer process steps, easier product separation, and no by-products formation (soaps). The main disadvantages are the reaction time that is longer than the classical homogeneous process, enzymes cost and conversion efficiency. The ultrasonic technique is a successful method for the intensification of transesterification in biodiesel production, increasing the conversion yield, and reducing the reaction time and energy consumption. Ultrasound-assisted reactions were performed using a MMM Clamp-on tubular reactor by batch process. The main parameters were optimized to maximize the fatty acid ethyl esters (FAEE) yield. Higher ultrasonic powers led to an increase of the amount of ester formed, but over a certain value the enzyme is deactivated. The best results were achieved by combining the activation of the enzyme with ultrasound for 20 minutes, followed by conventional transesterification until the completion of the reaction.

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### **Biography**

Dr. Adina Gavrilă (Associate professor) has completed her PhD in chemical engineering in collaboration with Aarhus University, Denmark and her postdoctoral studies at McMaster University, Canada. During these programs and during the research performed in Romania, she has gained experience in different domains: biomass transformation into valuable compounds, microwave-assisted extraction of bioactive compounds from vegetable materials, process intensification using ultrasounds, organic synthesis. These activities were quantified by publishing over 35 articles, by participating at over 45 national and international conferences and she has been involved as team a key person in 15 research projects.