

Intensification of Enzymatic Synthesis of Esters in Ultrasound Assisted System

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Ultrasound application is a method of enhancing the performance of biocatalysts. Enzymes performance is strongly influenced by the nature of the reaction medium. Ultrasounds have the potential to significantly influence the activity of the enzymatic processes, provided that the energy input is not too high to inactivate the enzyme. Applying a low ultrasound power increases the growth of microbial cell cultures, while too much power can cause cell destruction and can therefore be considered as microbicide. However, the influence of ultrasound on enzyme activity and stability depends on the sonication parameters and the specific enzyme preparation. Although ultrasonography is mainly associated with cellular destruction, there is more and more evidence of the beneficial effects of controlled sonication on the conversion of enzyme-catalyzed reactions¹⁻³.

The main advantages of using ultrasounds to enhance biocatalyzed reactions are: increasing selectivity, using less dangerous solvents, lowering energy consumption for the desired transformation, using renewable and sustainable materials, reducing reaction time, better use of raw material and catalyst⁴.

In the present paper a systematic study on ultrasound-assisted enzymatic esterification for aroma esters preparation is described. Thus, by ultrasound assisted enzymatic esterification, two esters (*i*-amyl acetate and *i*-amyl butyrate) were obtained. The method is efficient, mild, and environmentally benign. Significant improvements were obtained in comparison to conventional method. The results show a favorable perspective of the ultrasound technique to improve the process efficiency and reduce the reaction time. The commercial aroma esters synthesis will be potentially realized due to this ultrasound-promoted esters synthesis method.

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