

Green efficient tools for the catalytic synthesis of fatty acid esters

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Topic: The Elements and the Periodic Table for Sustainable Chemistry

Abstract:

One of the objectives of maximum interest of sustainable chemistry involving the elements of the Periodic Table is to achieve the highest possible efficiency for using the biomass resources, as well as the incorporation of a cycle for the reuse and sustainability of the chemical processes. Thus, an important example is the synthesis of biofuels from biomass resources to reach a full circular economy of carbon.

In this sense, it is important to stand out enzymes as highly efficient biocatalytic species in organic synthesis, allowing a high degree of sustainability, specificity, non-toxicity and energy and atomic economy. Thus, one of the main objectives of the Biocatalysis, could be the application of the exchange of fossil sources to renewable resources, which allow to mitigate the disadvantages generated by the high level of CO₂ and the improvement of the circular economy of carbon.

This work reports on a new sustainable strategy for esterification of fatty acids and subsequent preparation of monoesters, then to be used as fuels. In this context, ionic liquids, as reaction media, and lipases, as biocatalysts, exhibit an important application to reach the maximum efficiency and selectivity of chemical reactions, including the minimization of the immiscibility problems. Finally, a new method has been developed, which allows the biocatalytic synthesis of the Fatty Acid Solketal Esters (FASEs) through direct reaction.

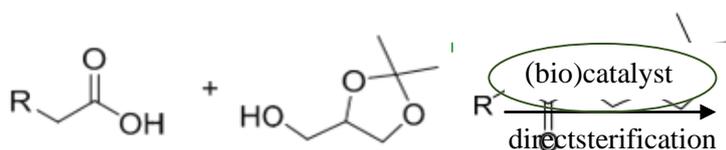


Figure 1. Scheme of synthesis reaction of FASEs.

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References

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