

SEPTEMBER
23-27TH
2024



BRAZILIAN MEETING
ON ORGANIC SYNTHESIS
BENTO GONÇALVES, RS - BRAZIL

Biocatalytic oxidation of glycerol carbonate promoted by laccase-mediator system

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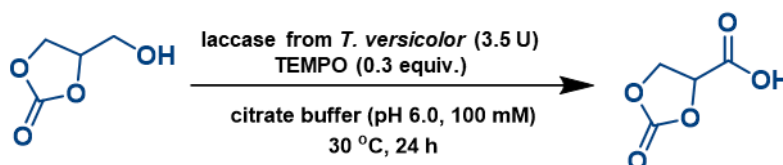
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Keywords: *Biocatalysis, laccase, oxidation.*

ABSTRACT

Glycerol carbonate has been recognized as an important compound due to its eco-friendly nature, versatility in chemical synthesis, and wide-ranging industrial applications. Derived from glycerol, it serves as a precursor for polymers and pharmaceuticals, enhancing the performance and sustainability of materials and drugs.^{1,2} Additionally, the oxidation of glycerol carbonate using biocatalysis represents a sustainable approach, further expanding its utility and contributing to developing an environmentally friendly chemical process. Therefore, we present the main results for the biocatalytic approach based on the laccase-mediator system to obtain the 2-oxo-1,3-dioxolane-4-carboxylic acid from glycerol carbonate. The combination of *Trametes versicolor* laccase and TEMPO was identified as an optimal oxidation system, using citrate buffer as the reaction medium. The glycerol carbonate oxidation process achieved a conversion rate of 98.9% at 30°C after 24 hours, with 99% selectivity for the intended product.



ACKNOWLEDGEMENTS

CAPES, CNPq and FAPERGS

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