VALORIZATION OF SUGARS OBTAINED BY LIQUEFACTION OF LIGNOCELLULOSIC MATERIALS

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Introduction

❑Wood residues are raw materials for the extraction of sugars resulting from depolymerization of the lignocellulosic biomass.[1]

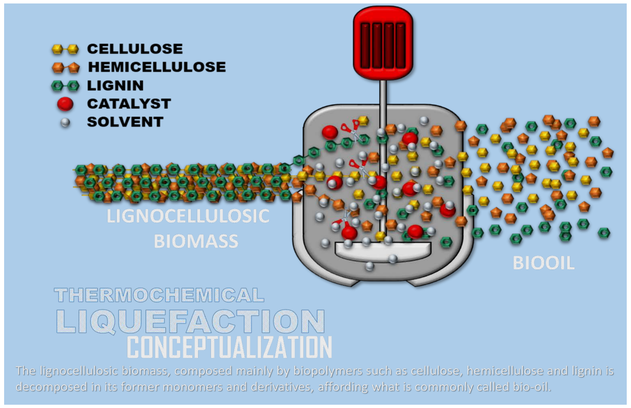
❑This accessible and abundant material has also been used for bio-oil production,[2] and has a unique potential as a sustainable source of energy,[3] and of sustainable materials.

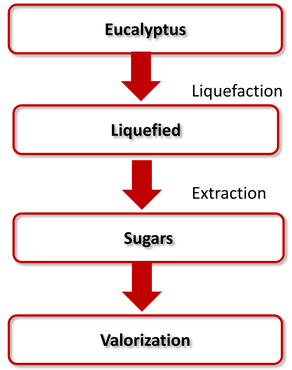
❑ The components present in the wood biomass are cellulose, hemicellulose and lignin. Among these components, hemicellulose and cellulose can lead to the formation of simple sugars by the liquefaction process, while lignin leads to the formation of phenols, which composition is still thoroughly investigated.[4]

❑ The study of lignocellulosic biomass liquefaction process remains a challenge as the chemical reactions and mechanisms occurring during the liquefaction process are not yet clear.[5]

Objectives

❑The objective of this work is to investigate the recovery of sugars from the eucalyptus liquefaction process.





Conclusions

Although there are some studies on the process of liquefying eucalyptus biomass, the methodologies applied have not yet been sufficient to elucidate the characteristics of the blends resulting from liquefaction and the structure of the sugars originated during this process. The aqueous fraction originated by the process of liquefying the biomass of the eucalyptus has been studied and glucose was, indeed, the major component identified so far. By HPLC. Amongst the panel of 13 standard sugars that are usual components of hemicelluloses, none of them was found in the studied extract. Presently synthetic approaches are under evaluation to further use industrial or agro-industrial applications of the eucalyptus extract,, used as raw material for the production of compounds with potential as antioxidants or for the pharmaceutical industry.

References:

1. Isikgor, F. H., Becer, C. R., Polym Chem 6 (2015) 4497–4559.
2. dos Santos, R. G. et al., J Clean Prod 137 (2016) 195-199.
3. Hertzog, J. et al., Energy & Fuels 30 (2016) 5729-5739.
4. Braz, A, et al, Biomass and Bioenergy, 120 (2019) 200-210.
5. Hu, Y. L. et al., Energy Conversion and Management 171 (2018) 618-625.

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