Synthesis of sustainable polymers from sugars derived from lignocellulosic biomass with application in the pharmaceutical industry

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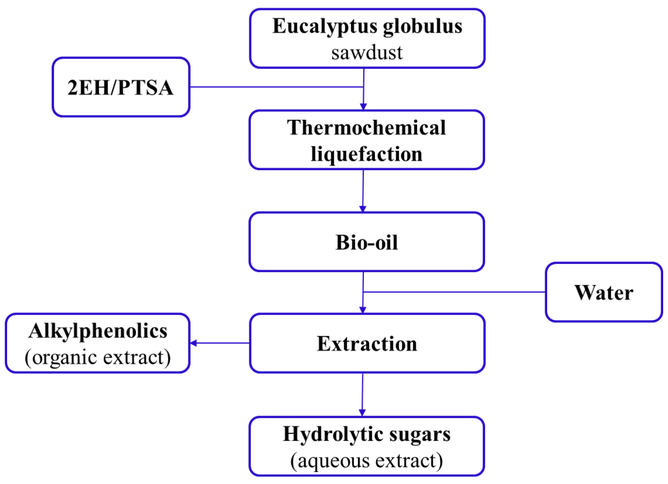
Introduction

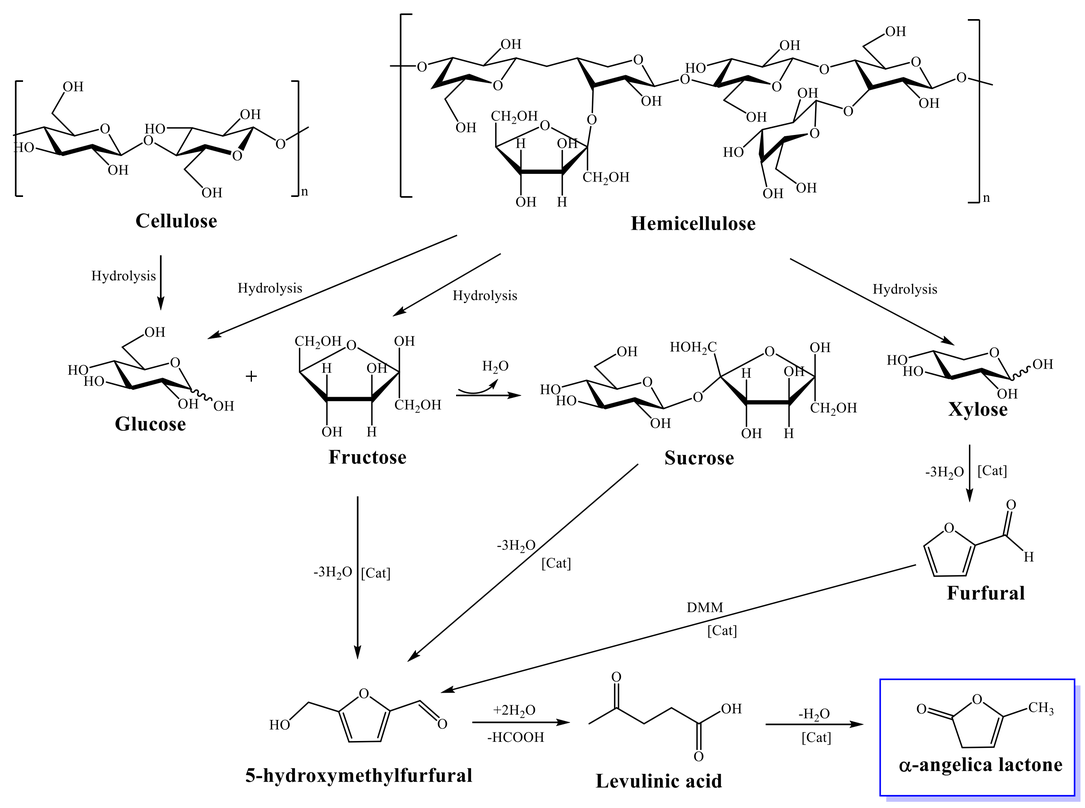
- Studies on the liquefaction of eucalyptus wood residues show that eucalyptus sawdust / sawdust comprises 41% cellulose, 31% hemicellulose, 29% acid-insoluble lignin and 5.1% sugars [1].
- However, the fraction composed by sugars has not well been studied and they have not been characterized [2], making it important to study and value these sugars aiming at greater process sustainability, as well as the formation of new molecules from these sugars. In this context, the study of the liquefaction process of lignocellulosic biomass is of great relevance because the chemical reactions that occur during this process, as well as the mechanisms that lead to the formation of sugars, have not yet been properly elucidated, constituting an innovation.
- Levulinic acid can be produced from the catalytic principle in presence of inorganic salts such as NaCl and KCl [3]. The α-angelica lactone, can be obtained from levulinic acid by intramolecular condensation reaction followed by dehydration [4].
- Therefore, α-angelica lactone as a raw material for the production of sustainable unsaturated polyesters presents itself as a promising alternative for the sustainable polymers industry.

Objectives

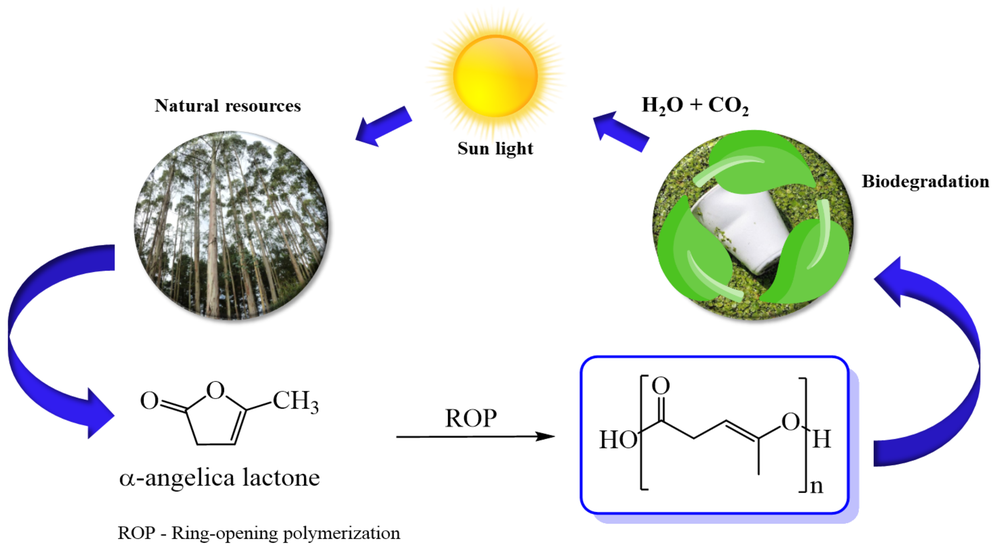
- This work has as main objective the investigation of the valorization of sugars and their derivatives, present as major components in the aqueous fraction resulting from the liquefaction processes of the wood biomass, aiming at its use in the production of sustainable and biodegradable polymers, which can be applied to industrial or agro-industry processes.



Methodology



Results



Conclusions

Therefore, α-angelica lactone as a raw material for the production of sustainable unsaturated polyesters, presents itself as a promising alternative for the sustainable polymer industry, as it can be produced from sugars from lignocellulosic biomass, in addition to being a raw material commercially available raw material at low cost. α-angelica lactone can be used in ROP mechanisms for the formation of polymers that can be functionalized due to the presence of unsaturations in the polymer chain, increasing its added economic value.

References:

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