Recovery and valorization of hydroxyacids from chemical pulping

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Green chemistry concepts are becoming more and more important in every industrial sector as the depletion of fossil resources dramatically rises through years. Biorefineries are exploring alternatives and renewable sources of energy, chemicals, and value-added products. In fact, there is a strong industrial interest in obtaining traditional petrochemicals based products from bio-based feedstocks. One such of renewable source is lignocellulosic biomass, which is the most abundant on earth, but still remains challenging to fully valorize [1].

Pulp industry uses wood as a raw material to obtain cellulose-based products. The extraction of cellulose fibres leads to a liquor which contains non-desired species of the wood, like lignin and hemicelluloses residues. Liquors are the most important by-product of chemical pulping and their valorization are currently energy oriented. However, there is also a major amount of carbohydrate degradation products with a low calorific value in comparison to lignin. The recovery of these compounds can be achieved to find better purposes. The alkaline degradation of polysaccharides occurring during cellulose extraction forms organic acids by scission of glycosidic linkages, according to the Neff-Isbell mechanism [2]. These aliphatic carboxylic acids can be divided into volatile acids or nonvolatile hydroxyacids.

The latter gathers low molecular weight acids like glycolic, lactic, 2hydroxybutanoic, and also saccharinic acids, constituted of 5 to 6 carbons. These high molecular weight acids can also be find as their lactone and better reactive form. Their isolation gives access to a new bio-based platform compounds for the production of chemicals and polymers [3]. The main aim of this study is to recover hydroxyacids in liquor, as single component or purified mixture, to be selectively functionalized.

References:

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