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TOPIC(s) : Alternative solvents

Fractionation of monomers derived from the lignin oxidative depolymerization liquor using aqueous biphasic systems

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PURPOSE OF THE ABSTRACT

Lignin, one of the main structural components of all woody plants, plays a significant role in the current industry framework. It is available at large-scale from the pulping liquor produced by the pulp and paper industry, representing a potential renewable resource. Nowadays, pulp and paper mills largely burn this liquor in an integrated process to produce electric and thermal energy, consequently recovering the inorganic chemical content. Although this combustion is still a valuable contribution to reduce fossil fuels consumption, lignin offers perspectives for higher added-valued applications and could be converted into several profitable commodities, a key factor for creating economically feasible biorefinery processes. This is an opportunity to transform conventional pulp and paper mills into integrated forest biorefineries that not only produce pulp and paper but also new biochemicals or biomaterials, in compliance with the recommendations for sustainable development required for the forest industry.

In this framework, oxidative processes for lignin conversion to phenolic compounds are widely recognized.[1] As such, in this work we propose to determine efficient ways to separate a synthetic, representative mixture of lignin's oxidative depolymerization liquor, composed of five aromatic monomer compounds: vanillin, vanillic acid, syringaldehyde, acetovanillone, and p-hydroxybenzaldehyde. This was accomplished using three types of aqueous biphasic systems (ABSs), namely polymer-polymer-electrolyte, polymer-salt and co-polymer-salt.[2] The identification of the partition coefficients of the different monomers in the ABSs were determined and the most performant systems selected.

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FIGURES

FIGURE 1

FIGURE 2

KEYWORDS

depolymerization | aqueous biphasic systems | ionic liquids | electrolytes

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