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Use of lignins as a sustainable source of antioxidants

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The objective of this communication is to present and discuss different strategies for the recovery of lignin-based antioxidants. Lignins are phenolic polymers constitutive of plant cell-walls. Their multifunctionality confers them with a key role in plant mechanical support, water transport and resistance to biological attacks. During most lignocellulose biorefinery processes, native lignins are converted into heterogeneous by products, technical lignins, more or less depolymerized and contaminated by carbohydrates. Whatever their origin, technical lignins show antioxidant properties along with other properties of interest, such as antimicrobial, anti-UV, cross-linking and flame-retardant properties, which make them potential valuable ingredients for plastics, building materials, or cosmetics. In order to develop markets for lignin-biobased ingredients, an integrated value-chain approach from plant to end-product is necessary. Indeed, the composition and properties of technical lignins can be controlled both by selection of both the plant feedstock and the lignocellulose processing parameters. Grass lignins recovered by soda delignification process are good candidate to substitute commercial synthetic antioxidant. With a radical scavenging power of the same order as that of BHT, they might be used as additive in polyolefins or bio-based plastics such as poly (lactic acid). Higher-value applications could be targeted by applying solvent extraction combined with mild selective depolymerization yielding fractions with increased functionalities.

Keywords: *lignocellulose biorefinery, technical lignins, fractionation, depolymerization, antioxidants, bio-based materials, cosmetics.*