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Coproduction of lignin and glucose from vine shoots by eco-friendly strategies: toward the development of an integrated biorefinery

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ABSTRACT

The objective of this work was to study the suitability of the pretreated vine shoots as a source of lignin and to determine its structural features. The best conditions to achieve the aim of this work were 12% NaOH, 124ºC and 105 min, as they permitted a removal of 67.7% of the lignin present in the pretreated vine shoots and the obtaining of a solid with a 69.4% of glucan. This delignified solid was subjected to an enzymatic hydrolysis achieving a conversion of glucan to glucose close to 100%. The characterization of lignins extracted from pretreated vine shoots was carried out for the first time and the following techniques were employed: a quantitative acid hydrolysis, HPSEC, TGA, FTIR and Pyrolysis-GC/MS. With this proposal, products from the main fractions of the vine shoots (hemicellulosic oligosaccharides, lignin fragments and cellulosic substrates) could be obtained separately, being potentially suitable for further applications.

Key words: lignin, alkaline delignification, enzymatic digestibility, biorefinery, structural characterization