Eucalyptus globulus bark for fermentable sugars: preliminary results on the effect of pre-extraction and severity of pulping

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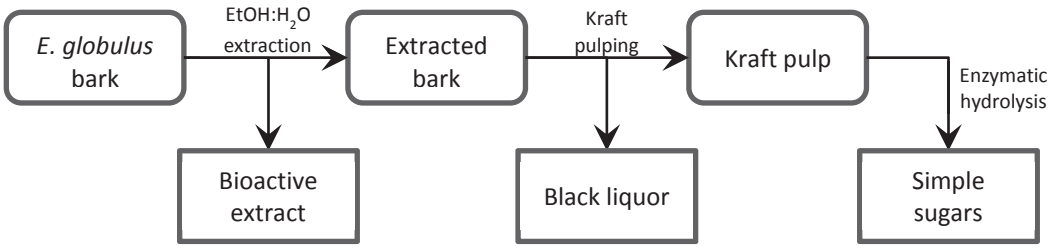
Eucalyptus globulus bark is generated at pulp mills in large amounts as a result of the debarking of wood logs and is currently used solely as fuel for electricity production. Bark contains bioactive polyphenols (e.g. for the reduction of human breast cancer cell proliferation) that can be recovered in a pre-extraction step.[1]

The kraft pulping process effectively renders a polysaccharide-rich – mainly cellulose – solid stream (kraft pulp) that can be used for enzymatic production of simple sugars with high yields, and a lignin-rich liquid stream (black liquor) also prone to either be integrated in a valorization chain or to be used for chemicals regeneration and electricity production.

The impact of the extraction with ethanol:water (50:50, v/v) in kraft pulping and saccharification performance was studied and discussed. Results showed that higher pulp yields and lower kappa number were obtained with extracted bark when compared to non-extracted bark, using the same pulping conditions (active alkali, temperature and cooking time). Moreover, the severity of kraft pulping was studied for extracted bark using experimental design. The independent variables were active alkali, cooking temperature and cooking time. Response surface models were developed, and the influence of the independent variables in pulp yield and kappa number was evaluated.

The pathway adopted in this work represents a valorization strategy for obtaining added-value products from this biomass side-stream as an valuable step towards the implementation of the biorefinery concept.



Proposed pathway for obtaining added-value products from *Eucalyptus globulus* bark.

1. Mota, I., Pinto, P. C. R., Novo, C. Silva, E., Sousa, G., Guerreiro, O., Guerra, A. R., Duarte, M.F, Rodrigues, A. E., Eucalyptus globulus bark as a source of polyphenolic compounds with biological activity, O Papel (Brazil), 74 (1), 57-64, 2013. Mota, I., Pinto, P. C. R., Novo, C. Silva, E., Sousa, G., Guerreiro, O., Guerra, A. R., Duarte, M.F, Rodrigues, A. E., Extraction of polyphenolic compounds from Eucalyptus globulus bark: process optimization and screening for biological activity, Industrial Engineering Chemistry Research, 51(20), 6991-7000, 2012.