



MULTI-FEEDSTOCK BIOREFINERY FOR VALORIZATION OF FOREST AND MARGINAL LAND RESOURCES: COMPARATIVE AUTOHYDROLYSIS STUDY

Rita Pontes ^{1,2,3*}, Aloia Romaní ², Michele Michelin ², Lucília Domingues ², José Teixeira ² and João Nunes ¹

¹ Association BLC3 - Technology and Innovation Campus, 3405-155 Oliveira do Hospital, Portugal.

² CEB - Centre of Biological Engineering, University of Minho, Campus Gualtar, 4710-057 Braga, Portugal.

³ CNC - Center for Neuroscience and Cell Biology, University of Coimbra, 3004-504 Coimbra.

*corresponding author: rita.pontes@blc3.pt

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Abstract

This work is focused on evaluating two mixtures of lignocellulosic feedstock: forest and marginal land resources, in order to produce glucose under a biorefinery concept. The selection of renewable bio-mixtures, broom (*Cytisus sp.*), carqueja (*Genista tridentate*), mimosa (*Acacia dealbata*), rockrose (*Cistus ladanifer*), eucalyptus (*Eucalyptus globulus*) and pine (*Pinus pinaster*) was based on several criteria, namely, territorial distribution, fire risk during summer months and total sugar content. These species were identified as the most important sources related with the fuel available responsible of forest fire problem in Portugal. Furthermore, the use of multiple bio-mixtures rather than a single raw material can minimize the problems related to biomass availability, seasonality, price volatility and storage, converging in security supply model. The two mixtures were submitted to autohydrolysis pretreatment under non-isothermal conditions (in the range of 190 °C - 240 °C corresponding to severity of 3.71 to 4.82) and their susceptibility to enzymatic hydrolysis was evaluated. It was demonstrated that by increasing the pretreatment severity, the cellulose to glucose conversion yield improved from 45 to 90%. This comparative study confirmed autohydrolysis as a suitable process for the valorization of both mixtures within a biorefinery concept.