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Scale-up studies of the supercritical fluid extraction of triterpenic acids from *Eucalyptus globulus* bark

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Abstract

The supercritical fluid extraction (SFE) of *Eucalyptus globulus* deciduous bark is investigated, under the context of biorefinery, aiming at the definition of a pathway for the production of enriched extracts in triterpenic acids (TTAs). Scale-up studies are performed, well supported by modelling and by experiments carried out at lab, intermediate and pilot scales (0.5, 5.0 and 80.0 L, respectively). By acknowledging the significant role played by cosolvent (ethanol) addition on the concentration of TTAs, extraction curves are measured at 200 bar and 40°C, using two different ethanol contents, 2.5% and 5.0% (wt). Taking into account the results achieved by four distinct models, the intraparticle diffusion is confirmed as the prevailing mass transfer resistance in both conditions. Accordingly, the ratio between CO₂ flow rate and biomass weight is adopted as scale-up criterion. Despite the geometric differences between the three units, the measured extraction yields and TTAs concentration evidence good agreement, which validates the established scale-up rule. In the whole, our results legitimate the technical viability of the SFE of *Eucalyptus globulus* deciduous bark for future exploitation at larger scales.

Keywords

Scale-up; Supercritical Fluid Extraction; *Eucalyptus globulus*, Bark, Modeling

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