MEASUREMENT AND CORRELATION OF SOLUBILITIES OF BOLDINE IN SUB- AND SUPERCRITICAL CO_2

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ABSTRACT

Boldine ((*S)*-2,9-dihydroxy-1,10-dimethoxyaporphine) extracted from leaves of boldo tree (*Peumus boldus* M.) is a valuable component used as ingredient in cosmetic and pharmaceutical industries. The use of supercritical carbon dioxide (SC-CO_2) as the solvent for vegetal substrates has received much attention lately, and it is being considered as an alternative for the replacement of conventional methods. The later are facing tough regulatory constrains to residual levels of toxic organic solvents. Besides, the moderated operating temperatures of SC-CO_2 extraction process could isolate heat-sensitive materials.
However, in order to find optimal design and operational conditions for a process using near-critical or supercritical CO_2 as solvent, thermodynamic constraints to solute solubility and selectivity should be experimentally established.

This contribution reports new experimental data on equilibrium solubilities of boldine in sub- and supercritical CO_2 using a static-analytic set-up consisting of a high-pressure equilibrium cell coupled to a high performance liquid chromatograph. Measurements on solid-fluid equilibrium were performed at several temperatures from 298 to 333 K, and over a pressure range from 6 to 40 MPa. There are not data available in literature. Experimental solubilities were correlated by using a density-based model (Chrastil, 1982), a cubic equation of state (Peng-Robinson, 1976) with different mixing rules. The two correlation models showed good agreement with the experimental data, aspect that is discussed in the study.

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Key words: Boldine, phase equilibria, solubility, supercritical extraction.