

Solubilization of eugenol from Piper betle leaves to supercritical carbon dioxide: Experimental and modelling

ABSTRACT

Piper betle leaves, which contains a high level of eugenol, is abundantly grown and distributed in many Asian countries. Eugenol is an important principal phytochemical found in betel leaves. This study proposed to determine the solubilization studies of eugenol in supercritical carbon dioxide from piper betle leaves. The variables were pressure of 10 MPa–30 MPa, temperature of 40 °C–70 °C and flow rate of 4 mL/min to 8 mL/min. In solubility study, the Chrastil model offered the best fitting to correlate the solubility data of Piper betle leaves extract with the lowest average absolute relative deviation (AARD) of 6.20%. The coefficient values of k for solubility of extract at flow rate of 4, 6 and 8 mL/min were – 0.27, 0.17 and 0.16, respectively. Furthermore, the coefficient values of k for solubility of eugenol at flow rate of 4, 6 and 8 mL/min were – 0.25, – 0.15 and – 0.05, respectively. It is hence believed that the solvation power of SC-CO₂ was higher at high flow rate to increase the solubility of Piper betle leaves extract and eugenol