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Experimental and modeling investigation on the solubility of β -carotene in pure and ethanol-modified subcritical water

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Abstract

The solubility of β -carotene in pure and ethanol-modified subcritical water was measured for the first time. Response surface methodology (BBD) was used to evaluate the experimental conditions. The independent variables were temperature (70-130) °C, subcritical water flow rate (0.2-0.64) mL/min and (0-10) % (v/v) of ethanol as co-solvent. Samples were analyzed by HPLC. The solubility of β -carotene was found as 272.341 ppm in the optimum experimental conditions. Additionally, CPA EOS was used for describing the solubility of β -carotene in subcritical water and in ethanol. The binary regressed parameters were applied to predict the solubility of β -carotene in (ethanol + water) solution.

Keywords:

Solubility, β -carotene, subcritical water, RSM, CPA

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