

PROCESS OF EXTRACTION OF CAROTENOIDS FROM CO₂ UNDER LIQUID-VAPOR EQUILIBRIUM CONDITIONS

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ABSTRACT

In this study, the extractability of lycopene and β -carotene from tomato skin and pulp using as solvent the liquid CO₂ under its liquid-vapor equilibrium conditions was studied. The temperature effect (281K and 299K, corresponding to CO₂ equilibrium pressures of 54 bar and 64 bar respectively) and the use of non-toxic modifiers (ethanol, olive oil) in the lycopene and β -carotene content of the liquid CO₂ extracts from tomato skin and pulp are observed. The liquid CO₂ extraction of tomato pulp at 299K yielded a higher content of β -carotene (18.2 μ g/g tomato) than at 281 K. The best results regarding the amount of lycopene were obtained at a temperature of 299K in presence of olive oil (6.84 μ g/g tomato) whereas the optimal extraction process parameters of β -carotene are at 299K temperature and 64 bar in presence of ethanol (19.8 μ g/g tomato). The addition of 2% ethanol as CO₂ co-solvent at 299 K increased the amount of lycopene and β -carotene extracted from tomato skin and pulp whereas the addition of 2% olive oil at 299 K increased slightly the extracted amounts of lycopene but decreased drastically the extracted β -carotene from both tomato skin and pulp.

Keywords: lycopene, β -carotene, liquid carbon dioxide, tomato, high pressure