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Turning tomato industrial waste into a resource of bioactive compounds

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Introduction. Tomato waste (seeds and skin) can be used as secondary raw materials for obtaining liposoluble extracts. This paper presents the content of lycopene in CO_2 extracts from tomato waste, obtained at different extraction regimes.

Materials and methods. Tomato waste was collected from the industrial scale production of tomato juice at "Orhei-Vit" JSC, Republic of Moldova. With the purpose of being used as raw material, tomato waste was dried by the conductive method in Biosec Domus B5 dryer to a final moisture content of 6.50 %. In order to increase the contact area with the carbon dioxide, to achieve a more efficient extraction, both quantitatively and qualitatively, the tomato waste was milled. Based on the experimental data, there was determined the influence of the extraction parameters: temperature, pressure and time on lycopene concentration in the fat-soluble CO_2 extracts from tomato waste.

Results. Under laboratory conditions, samples of CO_2 extracts from tomato waste were obtained at different extraction parameters. The lycopene concentration was taken as the output factor, and it was established the final form of the second order regression equation characterizing the CO_2 extraction process of lycopene in the fat-soluble fraction from the tomato waste. The regression equation allowed the optimization of the response using the gradient ascension method, thus establishing the optimal extraction parameters of the lycopene. The response surface plot described by the second degree polynomial which characterizes the CO_2 extraction process of lycopene from tomato waste at constant time, pressure or temperature. For supercritical CO_2 extraction parameters: T=36–73°C; P=18–42 MPa and t=24–96 min, the lycopene content in CO_2 fatty soluble extracts from tomato waste varies in the range from 10.80 to 47.12 mg/100 g. The regression equations allowed the optimization of the response using the gradient ascension method, thus establishing the optimal extraction parameters of the lycopene. The optimal parameters of supercritical CO_2 extraction of lycopene from tomato waste are temperature 60–75 °C, pressure 33–42 Pa and time 62–68 min.

Conclusions. Tomato waste can be used as a secondary raw material for the extraction of lycopene in liposoluble CO_2 extract. The greatest influence on the extracting process of lycopene in CO_2 extracts from tomato waste has the temperature, followed by pressure, and the duration of the process has the least influence.

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