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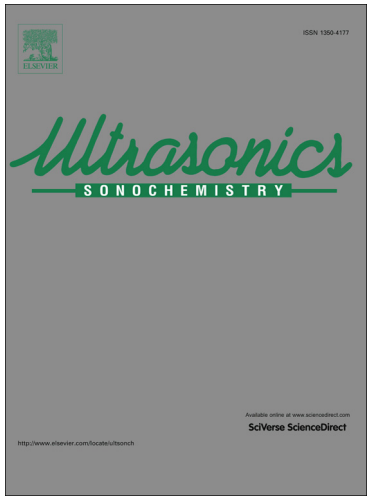

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Joanna Kroehnke, Justyna Szadzińska, Marcin Stasiak, Elżbieta Radziejewska-Kubzdela, Ró ża Biegańska-Marecik, Grzegorz Musielak

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Ultrasound- and Microwave-Assisted Convective Drying of Carrots – Process Kinetics and Product's Quality Analysis

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Abstract

The aim of these studies was to investigate the influence of airborne ultrasound-assisted convective drying and microwave-assisted convective drying, as well as their combination, on process kinetics, total color change, water activity, content of carotenoids, polyphenols and antioxidant activity of carrots (*Daucus carota* L.). The global model of drying kinetics based on coupled ordinary differential equations was used to describe the moisture and material temperature profiles during drying. Application of ultrasound and microwave in convective drying reduced drying time in the range of 9-81 %, but the shortest drying time was observed for simultaneous action of convection, ultrasound and microwave. The results of qualitative analysis showed a product improvement due to ultrasound as compared to convective drying and microwave-convective drying. The proposed mathematical model of drying kinetics successfully simulated real drying processes. The proposed mathematical model of drying kinetics successfully simulated real hybrid drying processes.

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