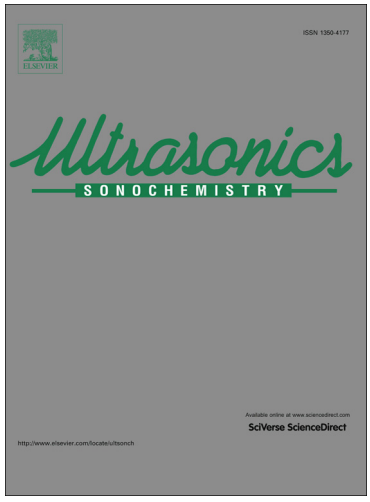

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Effect of ultrasound-assisted freezing on the physico-chemical properties and volatile compounds of red radish

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Abstract

Power ultrasound, which can enhance nucleation rate and crystal growth rate, can also affect the physico-chemical properties of immersion frozen products. In this study, the influence of slow freezing (SF), immersion freezing (IF) and ultrasound-assisted freezing (UAF) on physico-chemical properties and volatile compounds of red radish was investigated. Results showed that ultrasound application significantly improved the freezing rate; the freezing time of ultrasound application at 0.26 W/cm^2 was shorten by 14% and 90%, compared to IF and SF, respectively. UAF products showed significant (p<0.05) reduction in drip loss and phytonutrients (anthocyanins, Vitamin C and phenolics) loss. Compared to SF products, IF and UAF products showed better textural preservation and higher calcium content. The radish tissues exhibited better cellular structures under ultrasonic power intensities of 0.17