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

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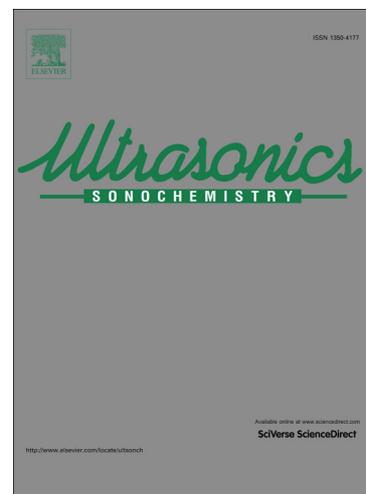
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1 Effect of ultrasound-assisted freezing on the physico-chemical
2 properties and volatile compounds of red radish

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12
13 **Abstract**

14 Power ultrasound, which can enhance nucleation rate and crystal growth rate,
15 can also affect the physico-chemical properties of immersion frozen products. In this
16 study, the influence of slow freezing (SF), immersion freezing (IF) and
17 ultrasound-assisted freezing (UAF) on physico-chemical properties and volatile
18 compounds of red radish was investigated. Results showed that ultrasound application
19 significantly improved the freezing rate; the freezing time of ultrasound application at
20 0.26 W/cm² was shorten by 14% and 90%, compared to IF and SF, respectively. UAF
21 products showed significant ($p<0.05$) reduction in drip loss and phytonutrients
22 (anthocyanins, Vitamin C and phenolics) loss. Compared to SF products, IF and UAF
23 products showed better textural preservation and higher calcium content. The radish
24 tissues exhibited better cellular structures under ultrasonic power intensities of 0.17

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