Food Technology-2013

OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference and Exhibition on
Food Processing & Technology

October 28-30, 2013 Kansas City, USA

Influence of sonication and high hydrostatic pressure on the quality of carrot juice

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Abstract

Combined effects of ultrasound and high hydrostatic pressure (US-HHP) on coloring pigments (total carotenoids, β-carotene and lycopene), enzymes (polyphenolase, peroxidase, pectinmethylesterase and lipoxygenase), microbes (total plate count, yeasts and molds), total phenols, flavonoids, tannins, ascorbic acid, pH, titratable acidity, °Brix and color of carrot juice were investigated. Carrot juice was sonicated (20 kHz and 70 % amplitude) using a pulse cycle of 5 sec on/off, following HHP treatment (250, 350 and 450 MPa) at room temperature for 10 min. For comparison, water blanching (WB) was carried out at 100℃ for 4 min. As results, highest improvements in coloring pigments were observed in WB and US-HHP450 treatments which also completely inactivated microorganisms. Highest reduction of enzymes was observed in WB treatment followed by US-HHP450. Total phenols, flavonoids and tannins were increased significantly in US, HHP and combined US-HHP treatments with highest increase in US-HHP450, which were decreased significantly in WB treatment. Ascorbic acid was significantly decreased in WB and HHP450 while increased in US and US-HHP treatments. Color values increased in WB and decreased in US, HHP and US-HHP treatments. Our results suggest that combined US-HHP450 treatment improved quality of carrot juice and serves as good alternative to blanching treatment.

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