

Comparison between the bioavailability of nutrients processed by High Pressure Processing (HPP) and Thermal Processing (TP)

FOOD SYSTEM	COMPOUND	PROCESSING	RESULTS	REFERENCES
Kale-based juice	β -carotene Lutein	HPP: 500 MPa, 3 min, 35 °C TP: 90 °C, 0.5 min	Higher nutrient concentration in HPP. No statistical differences in bio-accessibility or uptake.	(Zhong et al., 2019)
Fruit smoothie (with milk or soy milk)	Calcium Phosphorus	HPP: 400 MPa, 5 min, 36 °C TP: 90 °C, 0.5 min	Calcium and phosphorus bio-accessibility improved by HPP and higher than TP. Calcium uptake efficiency of calcium by caco-2 cells depends on the matrix. In the case of phosphorus HPP is better.	(Cilla et al., 2011)
Fruit smoothie (with milk or soy milk)	Tocopherols Carotenoids Vitamin C	HPP: 400 MPa, 5 min, 40 °C TP: 90 °C, 0.5 min	Higher retention of α and γ -tocopherol with TP. Higher retention with HPP of δ -tocopherol. Higher bio-accessibility of all tocopherol with HPP. The concentration and the bio-accessibility of carotenoids depends on the matrix (HPP improved bio-accessibility in soy-based juice comparatively to control). Higher retention of ascorbic acid in HPP but improved bio-accessibility in TT.	(Cilla et al., 2012)
Fruit Juice (with water, milk or soy milk)	Carotenoids Antioxidant activity	HPP: 400 MPa, 5 min, 40 °C TP: 90 °C, 1 min	Higher concentration and bioavailability of all carotenoids with HPP. Higher antioxidant effect with HPP and TP after digestion.	(Rodríguez-Roque et al., 2016)
Fruit Juice (with water, milk or soy milk)	Vitamin C Phenolic compounds Antioxidant activity	HPP: 400 MPa, 5 min, 40 °C TP: 90 °C, 1 min	Higher concentration and bio-accessibility of all phenolic compounds and vitamin C with HPP. Higher antioxidant activity with HPP after digestion.	(Rodríguez-Roque et al., 2015)
Carrot pieces	β -carotene	HPP: 500 MPa, 16 min, 25 °C HPP: 600 MPa, 10 min, 45 °C TP: 70 °C, 2 min TP: 90 °C, 10 min	No statistical differences between HPP and TP in total β -carotene concentration. Bio-accessibility higher in mild HPP than mild TP, but higher in strong TP than strong HPP.	(Knockaert et al., 2011)

FOOD SYSTEM	COMPOUND	PROCESSING	RESULTS	REFERENCES
Carrot puree	β -carotene	HPP: 600 MPa, 20 min, 45 °C TP: 90 °C, 10 min	Higher concentration and bio-accessibility of total β -carotene and <i>trans</i> - and <i>cis</i> - β -carotene in TP. (Note: HPP did not decrease bio-accessibility comparatively to control).	(Knockaert et al., 2012)
Tomato juice	β -carotene Lycopene	HPP: 500-700 MPa, 0-10 min, 30 °C TP: 100 °C, 0-10 min	Higher bio-accessibility of <i>all-trans</i> - β -carotene in HPP (in the <i>digesta</i>). No statistical differences in the micelles, both in raw and hot-break juice. Lycopene content in the <i>digesta</i> was not different in HPP and TP raw and hot-break juice, but was higher in the micelles with TP (hot-break juice).	(Gupta et al., 2011)
Tomato puree	Lycopene	HPP: 450 MPa, 15 min, 20 °C HPP: 600 MPa, 20 min, 45 °C TP: 60 °C, 1 min TP: 90 °C, 10 min	No statistical differences in lycopene isomers concentration with mild pasteurization (HPP & TP). Higher concentration of <i>trans</i> isomers with intense HPP than intense TP. Higher concentration of <i>cis</i> isomers with intense TP than intense HPP. No statistical differences between treatments in the bio-accessibility of lycopene.	(Knockaert et al., 2012)

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