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### IMPACT OF ADDITION OF POMEGRANATE PEEL EXTRACT AND HIGH-PRESSURE ON CARROT JUICE PRESERVATION: QUALITY, SAFETY AND SENSORIAL ASPECTS

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The consumption of fruit has been increasing as recommended by the World Health Organization and Europe already produces around 74 million metric tons of fruit per year. As a result, large amounts of wastes are generated and their disposal entails environmental problems requiring by-product management. These by-products can be valorized through the extraction of bioactive compounds, however conventional extraction methods, typically thermal-based, present several concerns mainly due to thermo-sensitive compound degradation. Non-thermal, green and emergent extraction technologies such as high-pressure extraction have been studied and its outputs are promising. In this research, pomegranate peel was valorized through the incorporation of its extracts in carrot juice. High-pressure extraction was performed to obtain an aqueous pomegranate peel extract, screened for potential cytotoxicity effects. Later, this extract was added to raw carrot juice subsequently pasteurized by high pressure and conventional heat to compare the results. Throughout storage, several microbiological, physicochemical, enzymatic, and sensorial analyses were conducted.

Pomegranate peel extract did not show significant metabolic inhibition. Indeed, all concentrations tested displayed higher levels of cell viability ( $p < 0.05$ ). Fortified juices showed lower counts ( $p < 0.05$ ) than the non-fortified ones (total aerobic mesophiles and psychrophiles). Increasing doses of extract lowered pH values of carrot juice. Total phenolics, flavonoids, and hydrolysable tannins contents, as well as antioxidant activity (FRAP, ABTS, and ORAC methods), had superior values ( $p < 0.05$ ) in supplemented juices (2.5 mg/mL) during the 28 days of storage. Generally, the extract addition did not affect any colour parameter or sensory descriptor. On the 28<sup>th</sup> day of storage, pressurized samples exhibited lower microbial loads in comparison to heated samples. Globally, phenolic compounds contents and antioxidant activity was identical between both pasteurization techniques ( $p > 0.05$ ). However, pressurized juices displayed less colour changing and, apart from pectin methyl esterase, exhibited higher residual values for polyphenol oxidase and peroxidase ( $p < 0.05$ ).  $\beta$ - and  $\alpha$ - carotene content in high-pressure treated juices decreased with increasing storage time and both preservation methods had similar sensorial scores ( $p > 0.05$ ) for odour, sweet/acid taste, persistency, and mouth-feel. These findings indicate that the incorporation of 2.5 mg/mL of pomegranate peel extract in carrot juice improves microbial safety as well as antioxidant activity over storage without apparent colour and sensorial losses.

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