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Effect of mild thermal treatments combined with emulsified carvacrol and acidification on *Lactobacillus plantarum* in carrot juice

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The preservation of carrot juice by means of conventional thermal treatments causes deterioration in the nutritional, functional and sensory quality. For this reason, combined treatments based on the hurdle concept have been investigated with the objective to minimize the deterioration. In this study, the antimicrobial effect of combined mild thermal treatments (56, 58 and 60 °C), emulsified carvacrol (CA-E: 0.10, 0.15 and 0.20 µL/mL) and acidification with citric acid (pH 4.5, 5.0 and 5.5) was evaluated with the aim to find the most effective combinations on an acid resistant bacterium frequently found in carrot juice such as *Lactobacillus plantarum*, without affecting the quality of the juice. Two combined treatments were selected to evaluate the microbiological, physical and chemical stability during 21 days of storage at 5 °C. Survival curves showed that carvacrol addition and acidification enhanced inactivation at a given temperature, changing from 5.0 to 6.9 log cycles of inactivation at 60 °C for 2 min (individual treatment) and the combined treatment (pH 5.0 and 0.20 µL/mL CA-E), respectively. The application of the Weibull model allowed to quantify the responses and to compare the antimicrobial effect of the combinations, resulting in b values (inactivation degree) between 1.71 and 5.58. The storage study showed $<3\times10^1$ CFU/mL of aerobic mesophiles, enterobacteria, mold and yeasts and good physical and chemical stability during 21 days. Certain concentrations of pH and CA-E were useful to reduce the treatment temperature to 58 or 60 °C in order to obtain a safe and high quality carrot juice.

Biography

Cielo Char Aubry has completed her PhD at University of Buenos Aires and Postdoctoral studies from Consejo Superior de Investigaciones Científicas (CSIC), Madrid, Spain. She is currently an Assistant Professor at Facultad de Ciencias Agronómicas, Universidad de Chile. She has published more than 15 papers in reputed journals.

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