New processing route for strawberry puree using a fermented vegetable juice

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Processed products contribute to a regular fruit and vegetable consumption; however, their processing generally includes intensive thermal treatments and the use of additives, as in the production of strawberry preparation for yoghurts for instance. Indeed, chlorinated washing water as well as heat treatment are applied to reduce the microbial load of yeast and molds commonly spoiling fresh or processed strawberry. An alternative processing was explored in this study, based on the ability of lactic acid bacteria to produce antimicrobial compounds. The aim of this study was to assess the antifungal properties of a vegetable juice, fermented by strains of *Lactobacillus rhamnosus* and *Lactobacillus plantarum* and pasteurized, to stabilize a fresh strawberry puree. Antifungal properties of the juice were first studied in both strawberry puree and a synthetic medium. The synthetic medium, presenting similar physicochemical properties to strawberry, and model strains representative of strawberry spoilage agents (namely *Botrytis cinerea*, *Rhodotorula glutinis* and *Saccharomyces* spp.) were used to limit biological variability observed in the fresh strawberry puree. Compounds with antifungal activities were identified, quantified and their minimal inhibitory concentration (MIC) was determined for each strain using both dilution in broth for yeasts and dilution in solid medium for *B. cinerea*. Incubation temperature was 8°C to simulate chill chain conditions. The use of the fermented juice at 2% on fresh strawberry puree significantly delayed yeast and molds growth by two days. In the synthetic medium, the tested strains exhibited different behaviours with a significant increase in the generation time from 0.5±0.01 d to 0.97±0.3 d and in the lag phase from 0.6±0.1 d to 5.2±0.2 d of *Rhodotorula glutinis* after addition of 10% of juice. Antifungal properties could be attributed to organic acids, especially lactic and acetic acids quantified at 10 and 2 g/L respectively in the fermented juice. Antifungal compounds such as phenyllatic acid, succinic acid and mevalonolactone were also identified. These results are promising and optimisation of the fermented juice towards antifungal compound concentrations close or exceeding the MIC of spoilage agents should improve biopreservation properties, hereby limiting the use of chlorinated washing water and thermal treatments.