**Naturally-sweetened fruit juice fermented by *Fructobacillus* strains**

Mohamed F, Crespo LC, Raya RR, Mozzi F

Centro de Referencia para Lactobacilos (CERELA) - CONICET, San Miguel de Tucumán

[fmohamed@cerela.org.ar](mailto:fmohamed@cerela.org.ar)

ABSTRACT

Consumers demand for minimally processed foods and non-dairy beverages is constantly rising; in this regard fruit juices are an excellent option due to their high nutritional value. Moreover, the fermentation with lactic acid bacteria (LAB) can enhance the safety, nutritional and sensory properties of fruits. However, a high consumption of free sugars in beverages leads to the development of several non-communicable diseases. In this respect, LAB belonging to the *Fructobacillus* genus are good mannitol producers, commonly used in the food industry as a low-calorie sweetener. In this work, we aimed to reduce the sugar content and to produce mannitol *in situ* in a passion fruit and mango- based juice by using *Fructobacillus* strains. Fruit juice (30%, v/v) made of passion fruit and mango pulp in 2:1 ratio was used. Initially, two *Fructobacillus* strains (*F. sp,* CRL 2054 and *F. tropaeoli* CRL 2034) were assessed individually as starter cultures in the mentioned juice at 30 °C during 24 h by adjusting the initial pH to 5.0 with sodium bicarbonate or sodium citrate. The *F. tropaeoli* strain CRL 2034 stood out for its ability to consume almost the total amount of glucose and fructose present in the juices, and to produce *ca*. 7 g/L of mannitol. Consequently, several parameters related to bacterial growth, sugar consumption and mannitol production were monitored throughout the juice fermentation by *F. tropaeoli* CRL 2034 using sodium bicarbonate for pH adjustment. The maximum microbial cell count, glucose and fructose consumption and mannitol production were reached at 8 h of fermentation; however, a high concentration of sucrose (around 28 g/L) was still detected during the whole fermentation process. To reduce this high sugar concentration, 3 U/ml of invertase were added to the juice at the initial step along with the CRL 2034 strain. The total hydrolysis of sucrose into glucose and fructose was observed at the beginning of the fermentation. The maximum bacterial growth was also reached at 8 h, when the sugar content decreased to 17 g/L and the mannitol concentration exceeded 10 g/L. However, the maximum mannitol production (around 18 g/L) and lower sugar concentrations (5 g/L) were achieved at 16 h with also high acidity values (pH = 4,2). Additional technological and functional properties were evaluated in the latter fermented fruit juice at 8 and 16 h of fermentation. Results showed that the fermentation process did not significantly affect the total phenolic content and antioxidant activity (DPPH, ABTS and FRAP methods) of the fermented fruit juice compared to the non-inoculated one. Colorimetric analysis showed that fermented juices presented more intense yellow color (higher b\* parameter). In conclusion, the fermentation of a fruit juice with *Fructobacillus* allowed obtaining a naturally sweetened fruit juice with reduction of its sugar content, without modifying the functional properties of the original fruit matrix.

Keywords: lactic acid bacteria, mannitol, passion fruit, mango