Comparison of sucrose, inulin and fructo-oligosaccharides as osmotic agents in the Andean blackberry (*Rubus glaucus* Benth.)

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Abstract

Osmotic dehydration is widely used for the partial removal of water and the reduction of water activity in high water content foods such as fruits. The driving force for the diffusion of water from the tissue to the solution is provided by the higher osmotic pressure of the hypertonic solution. The type of osmotic agent is a very important factor that determines the rate of diffusion. The use of prebiotics, fructo-oligosaccharides (FOS) and inulin as osmotic agents in food dehydration processes is an efficient way to enrich human diet with physiologically active components, considering the mass transfer processes that take place when foods are placed in hypertonic solution and the known benefits of prebiotic substances. In this study, the osmotic effect of sucrose, inulin and fructo-oligosaccharides solutions on the Andean blackberry was evaluated. Blackberry slices (2.02±0.1 cm in diameter and 0.59±0.06 cm thick) were subjected to osmotic dehydration for 2 hours at 20°C with a range of osmotic solutions (45, 55 and 62°Brix). A kinetic study was performed through the determination of moisture content, water loss, solid gain and weight reduction of the study samples. Likewise, the effective diffusion coefficient of water and solute were calculated assuming that the process is governed by the flat plate model proposed by Fick, finding values in the range of 10^{-10} and 10^{-11} m^2 s^{-1} and clear evidence of the effect of the solute nature on the osmotic parameters. The osmotic solution concentration and the molecular size had the two most important effects on weight reduction and water loss. The diffusion of solute to the Andean blackberry was lower with the FOS and Inulin solutions than with sucrose. The results demonstrate the possibility for food industries to produce stable products with a functional potential by the enrichment of fruits and vegetables with physiologically active components such as prebiotic components.