

## Effect of High-Pressure Processing pretreatment on osmotic dehydration of fresh-cut potatoes

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Osmotic dehydration (OD), as a pretreatment step, is used to increase the quality and shelf life of fresh-cut high-moisture content fruits/vegetables. OD potato can be used as a quick-cooking product or as an ingredient in salads/soup mixes. Due to plant tissue structure, OD is inhibited by slow mass transport. Novel non-thermal processing methods suitable for application during or before OD are proposed to enhance mass transfer. High-Pressure Processing (HP) increases plant cell permeability while controlling the activity of endogenous enzymes such as enzymatic browning, via phenolic compounds' oxidation by polyphenol oxidase (PPO) which affects negatively the quality and shelf life of fresh-cut potatoes.

The effect of HP pretreatment on OD of fresh-cut potatoes was studied to optimize processing conditions that accelerate OD and improve product quality.

Fresh-cut potatoes were pretreated at 100-600 MPa for 5-15min at 25-40°C. Determination of enzyme activity (PPO) and objective firmness, were performed. Non- and HP-treated samples were dehydrated using an osmotic solution of glycerol, sodium chloride, calcium chloride, ascorbic acid, sodium sulfite, papain, 4-hexylresorcinol, at a liquid to solid ratio of 1:5, at 35°C. Water loss, solids gain, water activity, sensory properties, and quality indices evolution were determined (0-180 min). WL and SG were modeled using Fick's second law of diffusion.

HP increased the cell permeability and facilitated the diffusion (by increasing the moisture diffusion coefficient) up to 400Mpa, while inducing changes in the structure of raw potato tissue decreasing the firmness and rigidity (up to 30%). OD resulted in high-quality potatoes of lower aw (0.870-0.920) and increased stability. Pre-treated potatoes improved the overall visual quality and reduced browning/discoloration and surface dehydration. PPO activity of pretreated potatoes which was significantly inhibited was modeled as a function of pressure and temperature.

Results confirmed the acceleration of aw reduction by HP and OD of fresh-cut potatoes while improving shelf-life and final product quality via pressure-induced enzymatic browning inhibition.

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