

EFFECT OF THE APPLICATION OF LASER PERFORATION ON THE DEHYDRATION OF APPLE SLICES IN REFRACTIVE WINDOW.

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Refractive window technology (VR) is a novel drying technology, which allows for obtaining high-quality products and presents a high energy efficiency. On the other hand, the application of micro-perforations with CO₂ laser is an innovative technology that allows for the improvement of the transfer of matter without cross-contamination.

The objective of this research was to evaluate the effect on the antioxidant capacity and total polyphenol content of the application of micro-perforation with CO₂ laser technology in the drying of a Granny Smith apple snack in a refractive window.

Apple slices 4 mm thick and 40 mm in diameter were microperforated with a CO₂ laser with 3 pore diameters (200, 400, and 600 µm) and 3 pore densities (9, 16, and 25 pores/cm²). Drying in a refractive window was carried out at 70, 80, and 95 °C, in addition, tunnel drying and lyophilization were used as controls. Selected samples were used for an accelerated storage study at 45 °C with a relative humidity of 75%.

The results obtained show that the refractive window at 95 °C presents retention of the properties of the samples without micro perforation similar to the lyophilized, except for the hardness. In addition, the treatment that presents the best result in terms of total polyphenol content and antioxidant capacity corresponds to a configuration that has a drying temperature of 95 °C, a diameter of 600 µm, and/or a pore density of 25 pores/cm². On the other hand, in storage, this configuration presents a degradation of the antioxidant capacity and the content of total polyphenols, as well as color alteration, more accelerated compared to another configuration. Given the above, a configuration with a low pore diameter and density (200 or 400 µm and 9 pores/cm²), dried at an operating temperature of 70 °C, is an interesting and feasible alternative, since it allows for reducing the time of dried significantly, thus maintaining the properties in terms of color, antioxidant capacity and total polyphenol content after drying and during prolonged storage.