

Freeze-drying processes applied to melon rinds to attain a value-added food ingredient

Dr Teresa Brandão¹, Ms Sengly Sroy¹, Dr. Joana Fundo¹, Prof. Cristina Silva¹, Dr. Fátima Miller¹

¹*Universidade Católica Portuguesa, Porto, Portugal*

Aim:

Several studies pointed out melon rinds as rich sources of bioactive compounds with relevant antioxidant activity. Being considered a non-edible part with no economic value, fruit industries discharge large amounts of these residues to the environment. If these wastes are conveniently processed and transformed, novel food ingredients with potential health benefits may arise.

The objective was to transform melon rinds by freeze-drying to attain dried small bits that can be used as additives to enrich diverse food matrixes. An ozone pre-treatment was applied seeking decontamination and retention of quality characteristics. The impact of these processes was assessed in bioactive compounds (vitamin C, total phenolics and chlorophylls), antioxidant activity, and melon peel microflora (mesophylls, yeasts and moulds) during 7 weeks of storage of the dried materials at room temperature.

Method:

Melon rinds (*Cucumis melo* L. var. *reticulatus*) were cut in small cubes. Before freeze-drying (-50 °C, 1.5-2 bar, 80-90 h) and storage (7 weeks in the dark at room temperature), part of the samples was exposed to a gaseous ozone pre-treatment (15 °C, 152±71 ppm, 30 min).

Vitamin C, total phenolics, chlorophylls and antioxidant activity were analysed by HPLC and spectrophotometric methods in raw peel and throughout storage. Mesophylls, yeasts and moulds were also enumerated.

Results:

Vitamin C, total phenolics, chlorophylls, and antioxidant activity decreased during storage in both non-ozonized and ozonized dried samples. However, pre-ozonized samples retained better the bioactive compounds analyzed throughout the storage: almost 85% of total phenolics and chlorophylls were preserved, and 66% of vitamin C.

In terms of microflora inactivation, the effects of ozone and freeze-drying were not significant. However, a decrease of ~1 log-cycle was observed at the end of storage for the groups of microorganisms considered. Studies with undesirable target microorganisms are required to attain a safe product.

Conclusion:

Freeze-drying with an ozone pre-treatment can be considered a potential process to transform melon peel into an edible form. When the small cubes of melon rinds were freeze-dried, they became lighter and softer. They can be incorporated into different products (*e.g.*, cakes, breads, yogurts), enriching their nutritional profile and creating a value-added food ingredient.