



CATOLICA

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PORTO

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

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Introduction

- 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 this waste is conveniently processed and transformed, novel food ingredients with potential health benefits may arise.

Objectives

- To transform cantaloupe melon rinds by freeze-drying process
- To study the effect of an ozone pre-treatment seeking **decontamination** and retention of bioactive compounds
 - ↓
 - microflora (mesophylls + yeasts + moulds)
 - ↓
 - vitamin C + total phenolics + chlorophylls + antioxidant activity
- To assess the impact of storage | 7 weeks at room temperature

Materials & Methods

1. Sample preparation

• Peel was manually removed and cut into small cubes

Cucumis melo L. var. reticulatus Initial moisture = 9.0 (dry basis)

2. Peel submitted to preservation processes + storage

• gaseous ozone

- 15 °C | 152 ppm | 30 min

• freeze-drying

- 50 °C | 20 Pa | 96 hours

+ 7 weeks storage in the dark at room temperature

3. Vitamin C - phenolics - chlorophylls - antioxidant activity

fresh & processed samples and at the end of storage

extractions with methanol

HPLC

- vitamin C: ascorbic + dehydroascorbic acids

Spectrophotometer

- phenolics: $\lambda = 750$ nm
- chlorophylls: $\lambda = 652.4$ & 665.2 nm
- antioxidant activity: $\lambda = 734$ nm

4. Mesophylls - yeasts - moulds

fresh & processed samples and at the end of storage

buffered peptone water

stomacher

• mesophylls

Plate Count Agar | 37 °C | 48 h

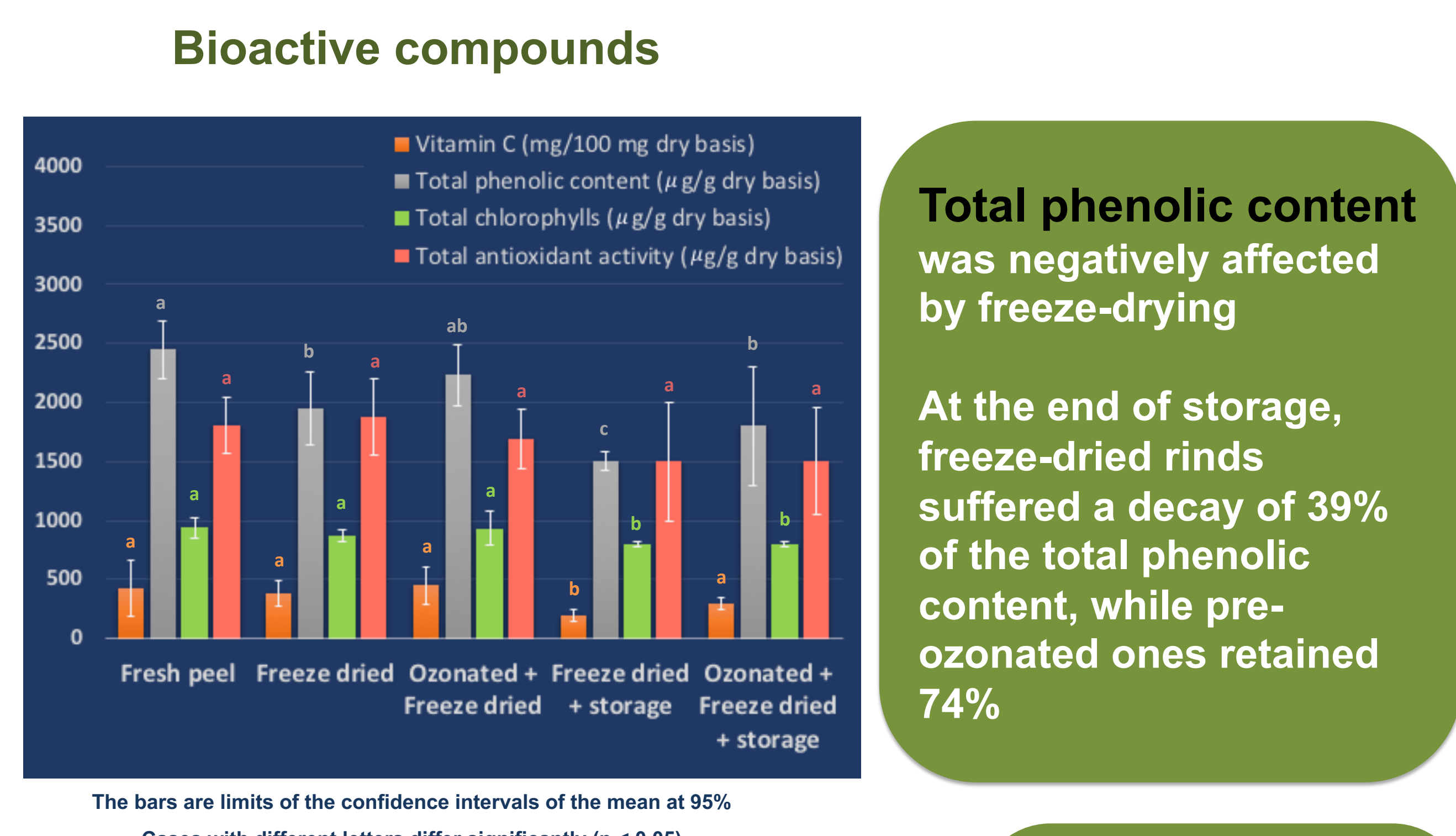
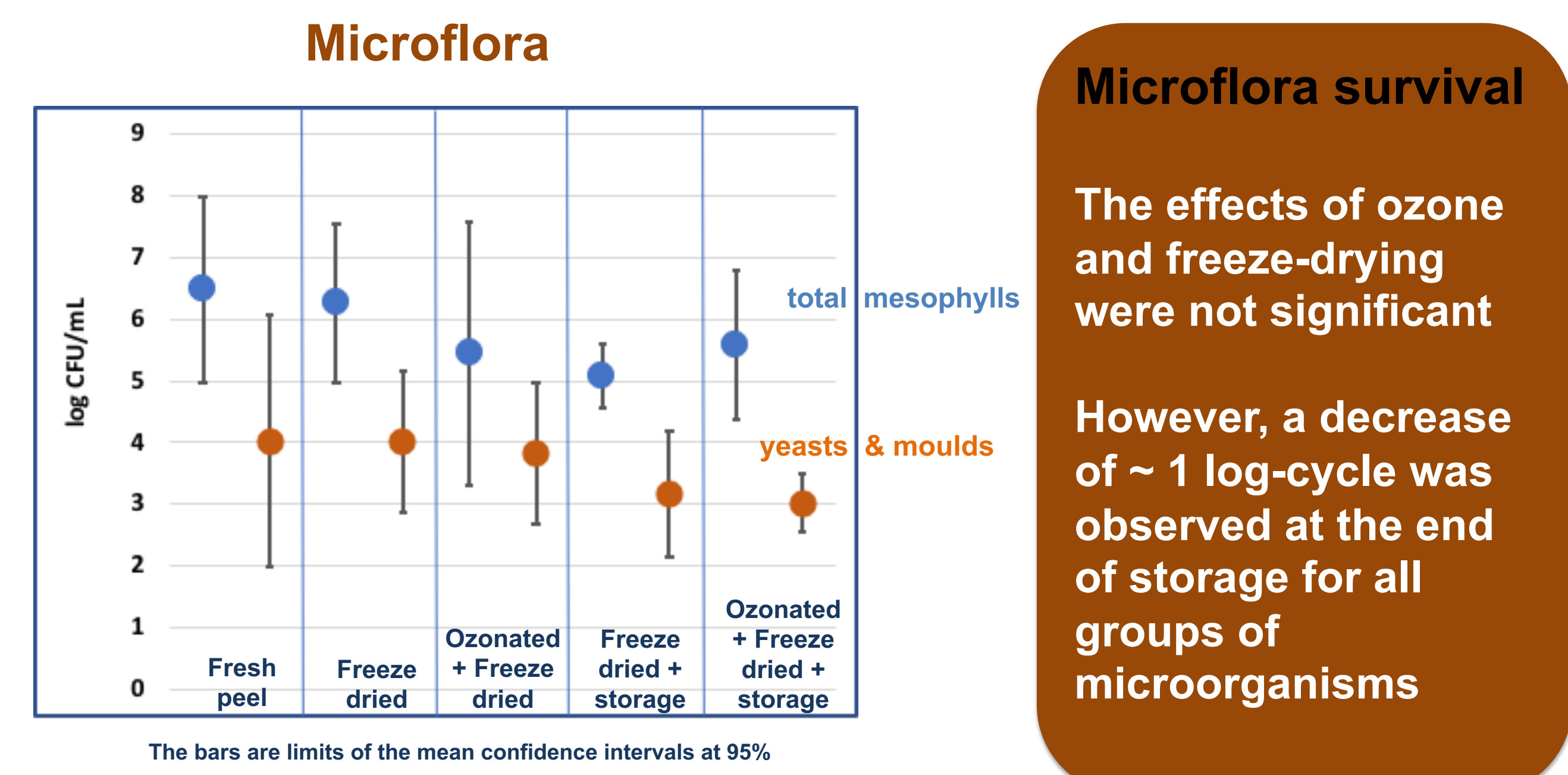
• yeasts + moulds

Rose Bengal Agar | 25 °C | 60 h

5. Data analysis

Three replicates were performed | ANOVA + Post-hoc tests

Results



Antioxidant activity was not affected by the processes and storage

Total chlorophylls decreased 15% at the end of storage, in both ozonated and non-ozonated samples

Vitamin C at the end of storage, ozonated samples retained higher vitamin C content than non-ozonated ones: 71% and 47%, respectively

Key achievements | Further work

- Ozone pre-treatment did not impact microbial survival. Studies with undesirable target microorganisms are required to attain a safe product.
- At the end of storage, ozonated melon rinds retained higher vitamin C and phenolic contents than non-ozonated ones.
- Ozone + freeze-drying can be used to transform melon rinds into an edible form. Freeze-dried rinds become lighter and softer and can be incorporated into different matrixes (e.g., cakes, breads, yogurts) enriching their nutritional profile and creating a value-added food ingredient.