

Valorisation of Cantaloupe melon peel by freeze drying process



CATOLICA

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PORTO

Introduction

Melon is a fruit with a high amount of waste parts, particularly peel (around 25% of total weight). Wastes are abundant sources of bioactive compounds, considered to be health beneficial. Waste parts deserve valorisation that may be attained by developing strategies to transform them into more convenient forms, which can be used as food ingredients.

Freeze drying is a well-known food process used in food industry to extend products self life by the inhibition of microbial growth and enzymatic activity. Therefore, freeze drying can be a potential process to transform melon peel into a value-added product with high quality characteristics.

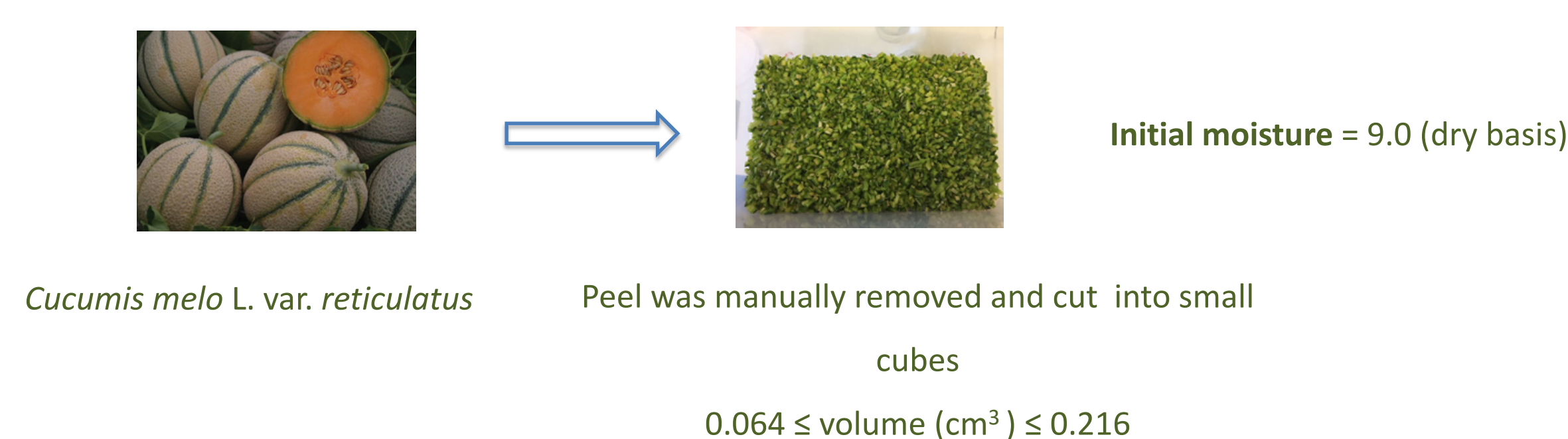
Objectives

The main objective of this study was to transform melon peel by freeze drying and assess the impact of the process on:

- intrinsic microflora - total mesophylls and yeasts and moulds
- quality characteristics – total phenolics and chlorophylls contents, and antioxidant activity

Methods

Sample preparation

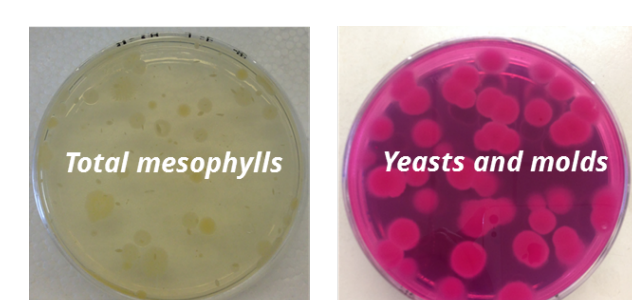


Freeze drying



Sample analysis

Microbiological analysis



Decimal dilutions were carried out for both mesophylls and yeasts and moulds with enumeration in PCA and Rose Bengal media, respectively

Quality

Total phenolics, chlorophylls and antioxidant activity

Extraction with methanol 100% → Spectrophotometer Model 5625, ATI Unicam



Results and Discussion

Microflora

Table 1. Initial counts of melon peel microflora

Microflora	Fresh peel (CFU/mL)
Total mesophylls	8.0×10^6
Yeasts and moulds	3.7×10^5

After freeze drying, total mesophylls and yeasts and moulds decreased 0.3 ± 0.1 and 1.1 ± 1.1 log-cycles, respectively

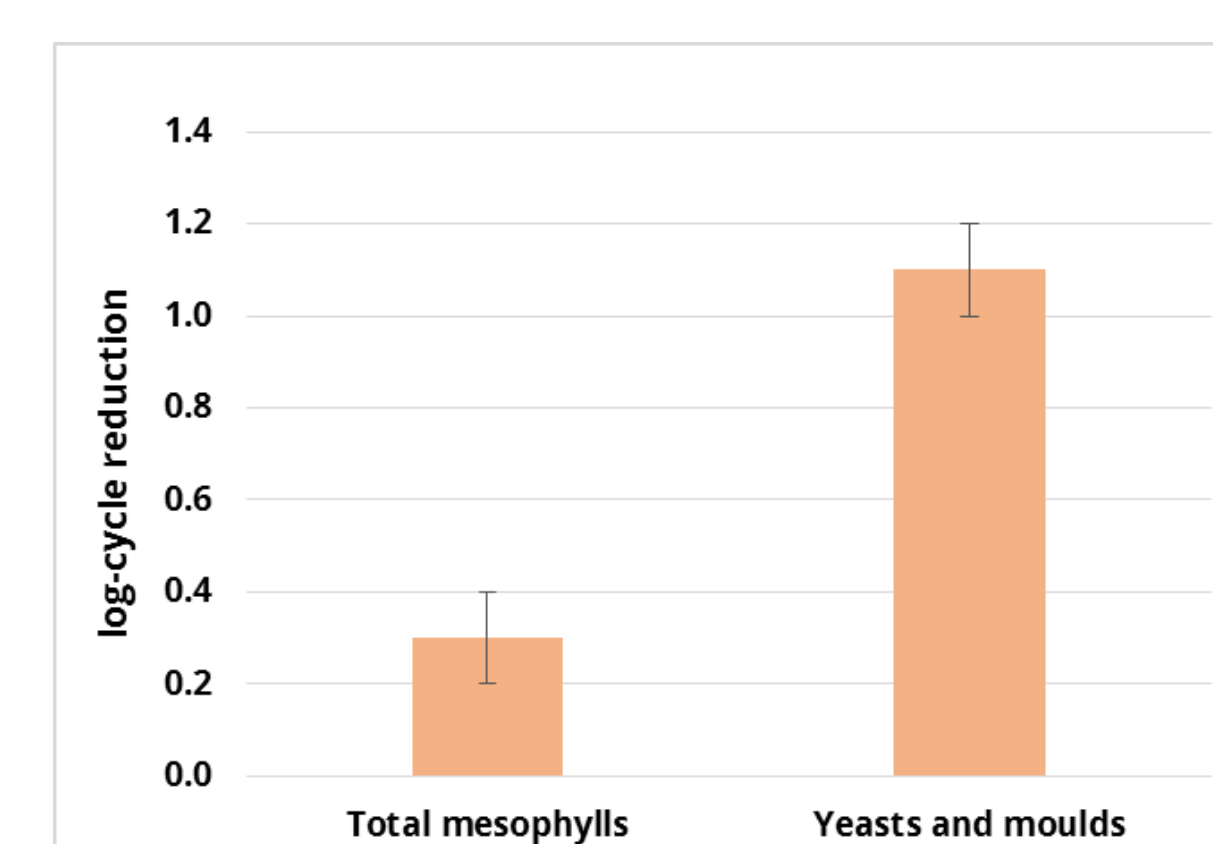


Figure 1. Effect of freeze drying on log-cycle reduction of total mesophylls, and yeasts and moulds. The bars are limits of confidence intervals at 95%.

Quality

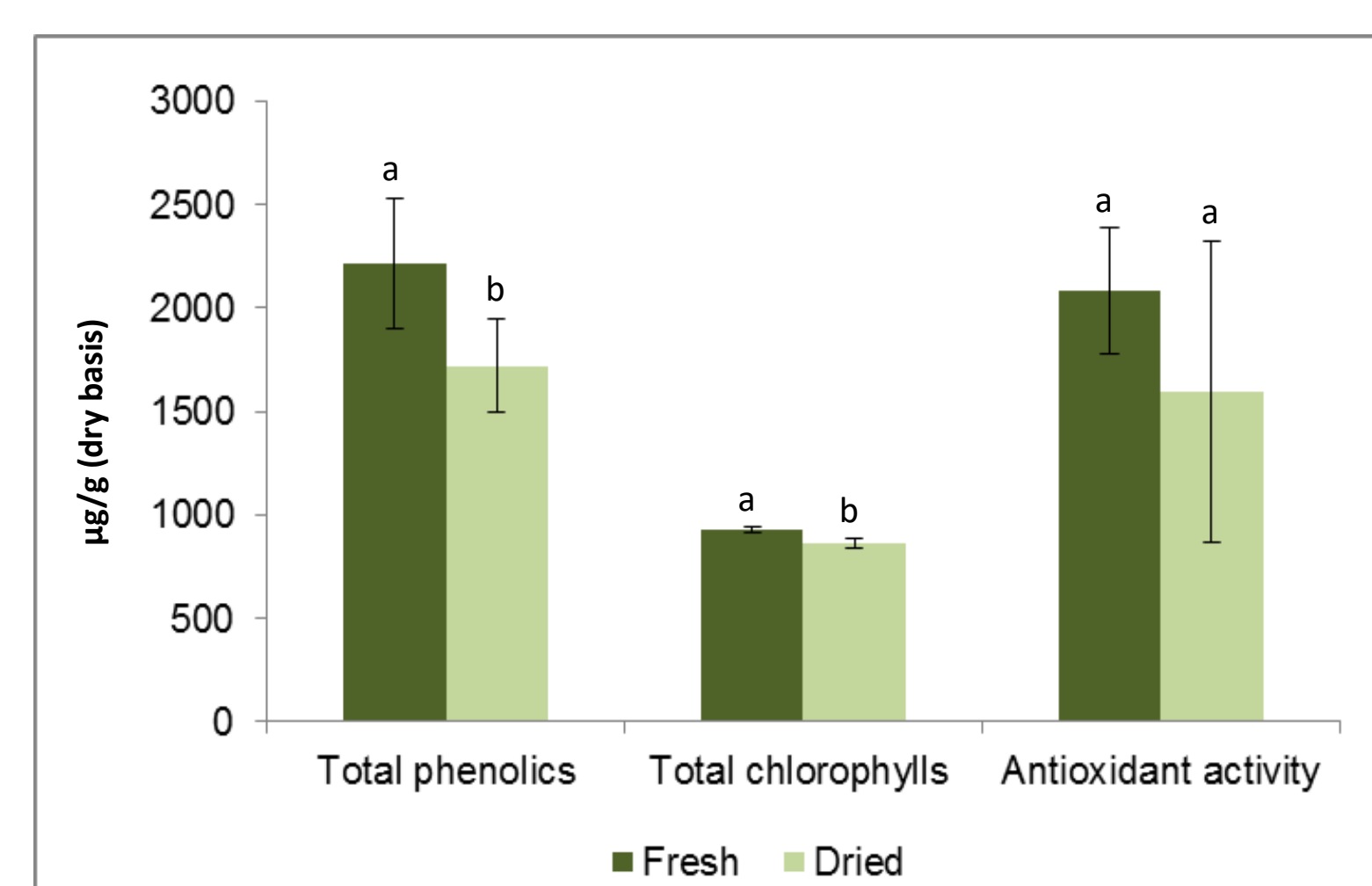


Figure 2. Effect of freeze drying on total phenolics, chlorophylls and antioxidant activity. The bars are limits of confidence intervals at 95%.

For a given characteristic, values with different letters differ significantly ($p < 0.05$).

• Total phenolics were significantly reduced after drying process as well as total chlorophylls

• Antioxidant activity was not significantly affected by freeze drying

Data analysis

Three replicates were performed ; ANOVA + Post-hoc tests

Conclusions

- ✓ Total phenolics content of freeze dried melon peel decreased 22%, when compared to fresh;
- ✓ Melon peel retained antioxidant activity and a considerable amount of total chlorophylls (93%) after the drying process;
- ✓ Freeze dried melon peel can be used as an innovative food ingredient with bioactive compounds;
- ✓ Investigation on decontamination processes is still required for maximum quality retention and safety levels of the material.

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