

# Preservation techniques and their impact on bee pollen chemical and microbiological composition

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## Introduction

Bee pollen has been used as a food supplement for many years because of its antioxidant, antibacterial and antifungal properties, and is currently undervalued in the Portuguese market compared to honey [1]. This may be partly explained by the lack of information on the benefits of pollen and on the influence of preservation methods on composition and chemical quality. Therefore, this work will evaluate the possible impact of various preservation techniques, namely freezing, oven drying at 35°C, 40°C and 45°C and freeze-drying, on the chemical composition and microbiological load of the pollen.

## Methodology

Bee pollen samples collected in the Bragança region were submitted to various preservation techniques, namely freezing at -20°C, oven drying at 35°C during 15 hours, oven drying at 40°C during 7 hours and 30 minutes, and oven drying at 45°C during 5 hours and 50 minutes, and freeze-drying. The chemical composition (moisture, ash, crude fat and crude protein) was evaluated according to the methodologies described by Almeida -Muradian *et al.*, [2]. The microbiological loads (aerobic mesophiles, lactic acid bacteria, and yeasts and molds) were determined by the methods described in ISO 4833:2013, ISO 15214:1998, and ISO 21527-2:2008, respectively. All the analysis were performed in triplicate.

## Results

### Chemical composition

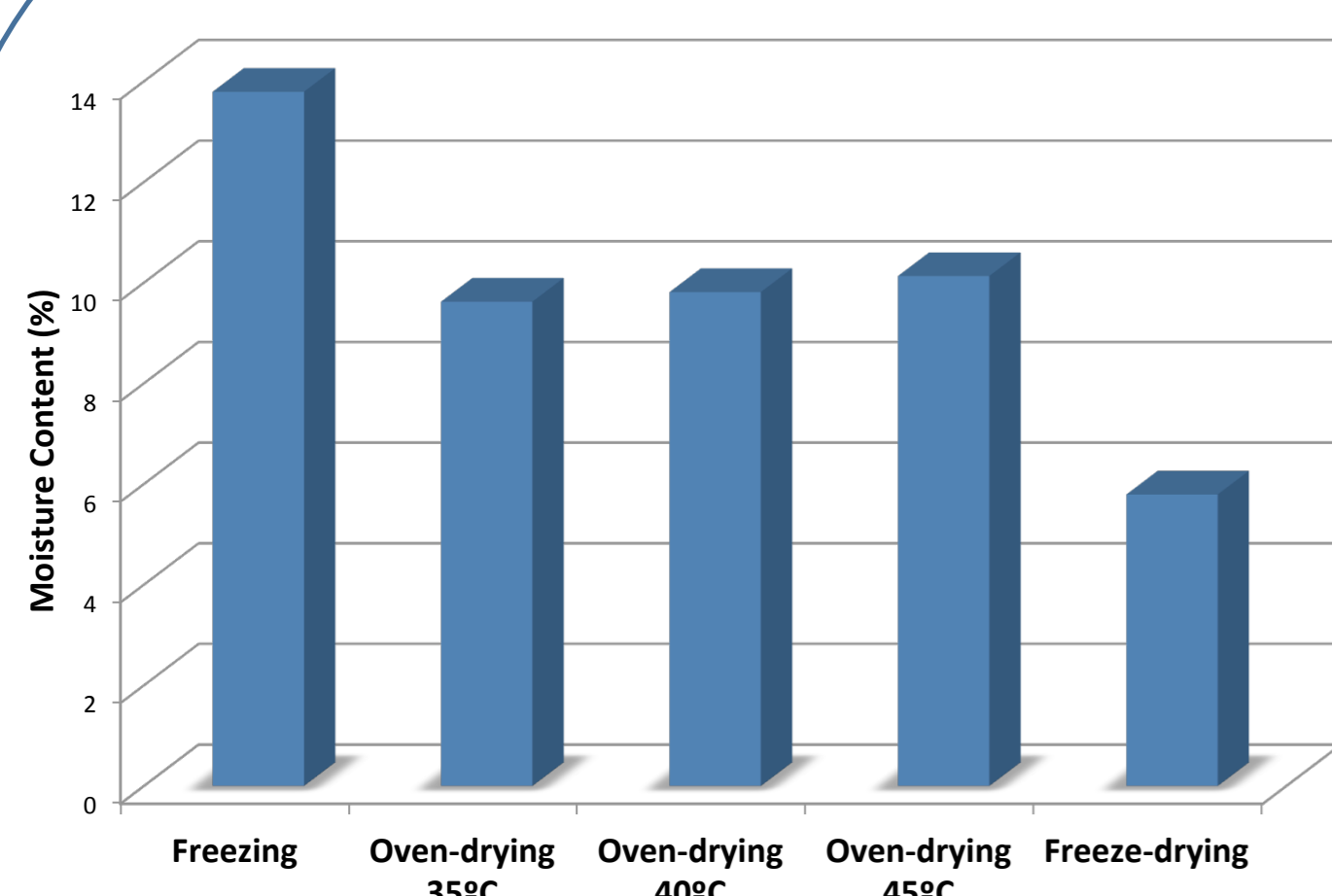


Figure 1- Moisture content of bee pollen samples after applying the preservation techniques.

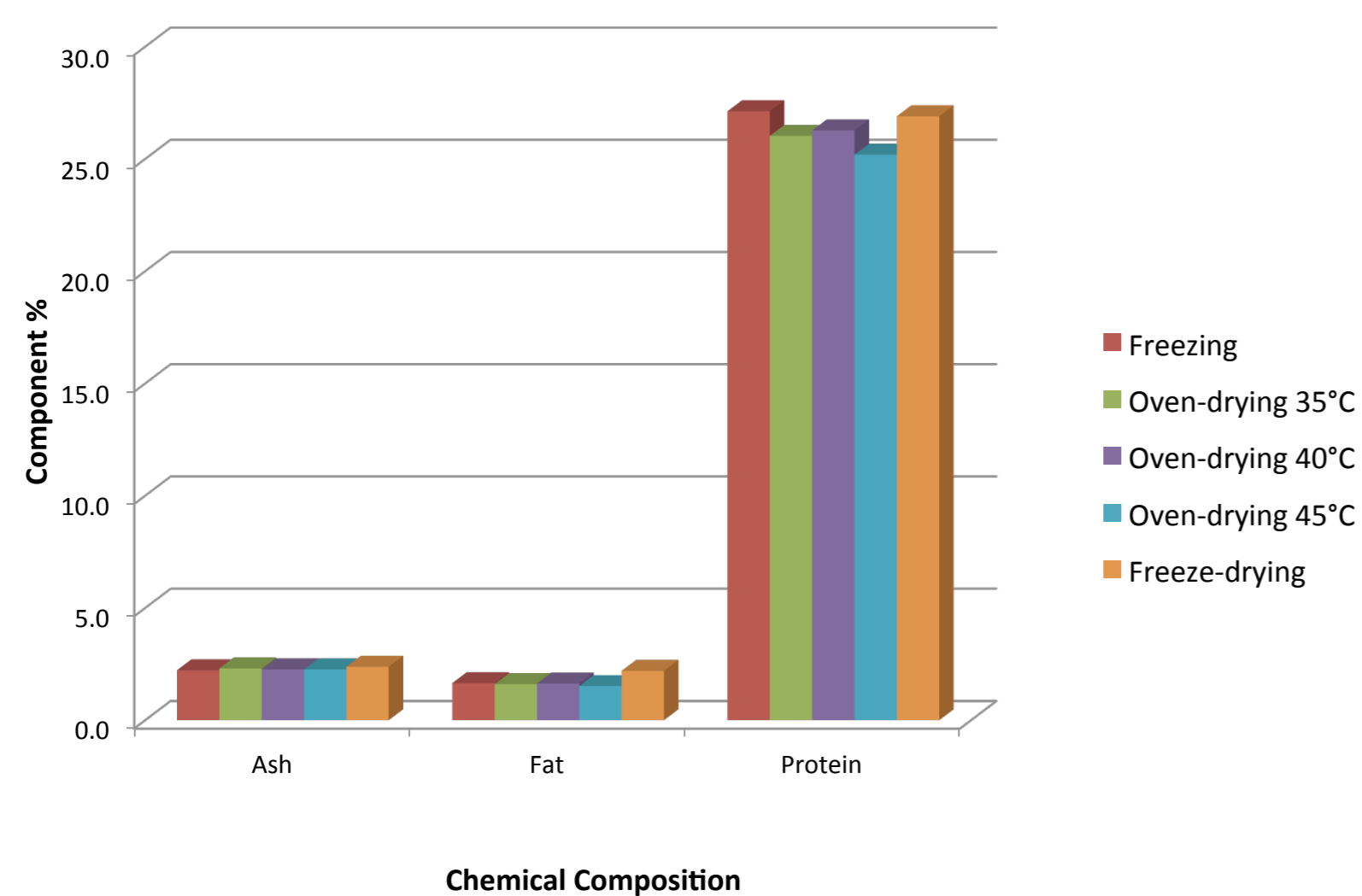


Figure 2- Ash, fat, and protein contents of bee pollen samples after applying the preservation techniques.

### Microbiological loads

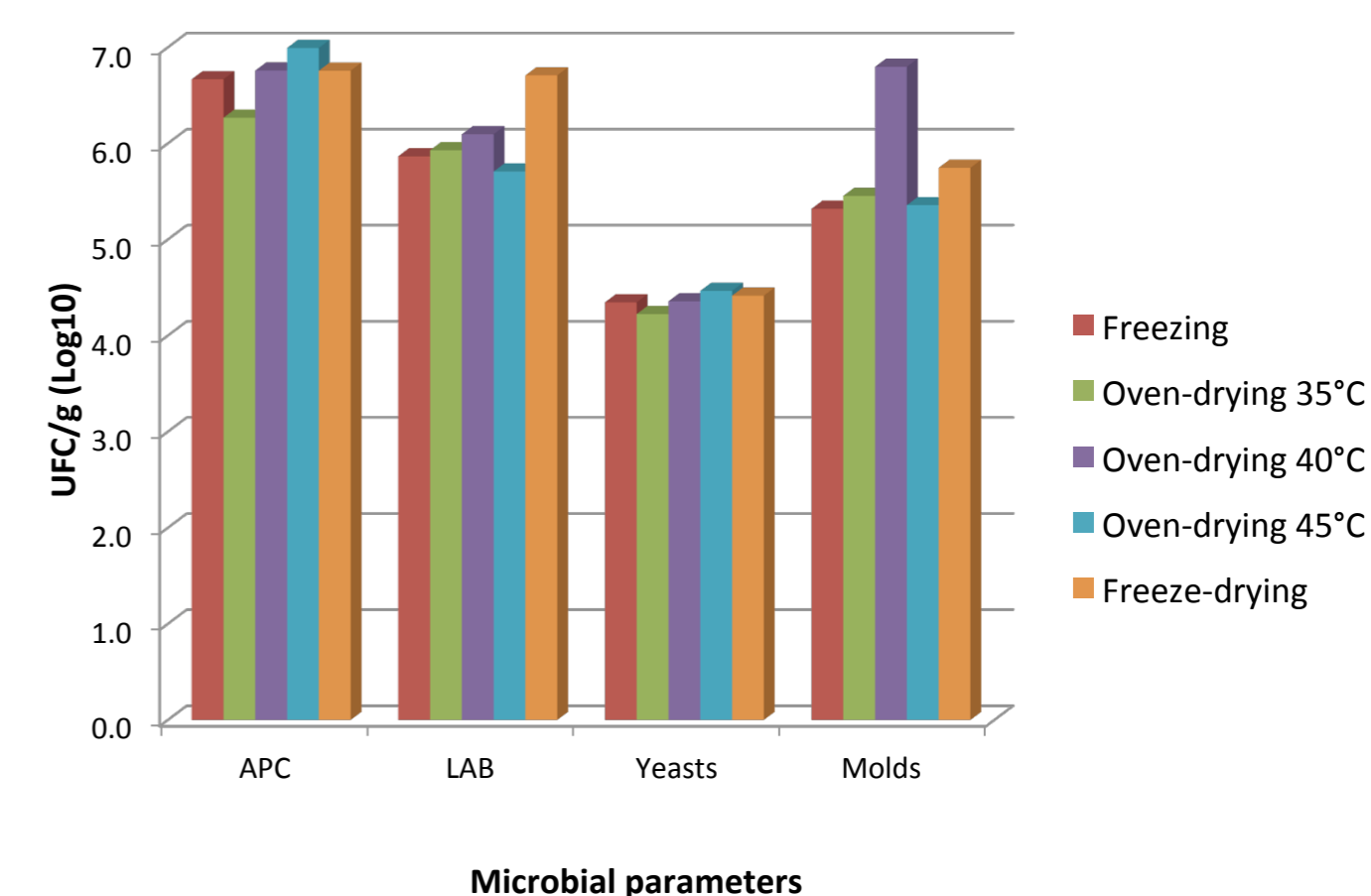


Figure 3- Aerobic mesophiles (APC), lactic acid bacteria (LAB), yeasts, and molds loads of bee pollen samples after applying the preservation techniques.

## Conclusions

- ❖ The use of oven-drying and freeze-drying preservation techniques reduced the moisture content of bee pollen to values considered safe;
- ❖ The preservation techniques under evaluation did not seem to have an impact on the chemical composition and microbiological loads of the bee pollen samples;
- ❖ Further studies are being carried out in order to evaluate the effect of these preservation techniques on the stability of bee pollen over time.

## References

- [1] Li, Q-Q.; Wang, K.; Marcucci, M. C.; Sawaya, A. C. H. F.; Hu, L.; Xue, X-F.; Wu, L-M.; Hu, F-L. 2018. **Nutrient-rich bee pollen: A treasure trove of active natural metabolites.** *Journal of Functional Foods*, v. 49, 472-484
- [2] Almeida-Muradian, L. B.; Arruda, V. A. S.; Barreto, L. M. R. C. 2012. **Manual de controlo de qualidade do pólen apícola.** São Paulo. APACAME.

## Acknowledgments

This work was financed by the Rural Development Program 2014-2020, PDR 2020.