

FILIPE LEMA¹, IMEN MEKKI¹, ANDREIA TOMÁS¹, SORAIA FALCÃO¹, PAULA RODRIGUES¹, VITOR MARTINS^{1,2}, MIGUEL VILAS-BOAS¹

¹ Centro de Investigação de Montanha (CIMO), Instituto Politécnico de Bragança, Campus de Santa Apolónia, 5300-253 Bragança, Portugal

² QOPNA & LAQV-REQUIMTE -Departamento de Química, Universidade de Aveiro, 3810-193 Aveiro, Portugal (e-mail: vmartins@ipb.pt)

Introduction



The moisture content of bee pollen is one of the most important parameters for the preservation and quality of this product and can vary from 18 to 25%, depending on the technique and time of collection [1]. These moisture content values can contribute to proliferation of microbiological contamination and changes in the nutritional value of pollen, which can make its consumption and commercialization unfeasible [2 and 4]. Therefore, this study pretends to evaluate the impact of different preservation techniques in the nutritional value, microbial stability, and antioxidant properties of bee pollen.

Methodology

Pollen samples were collected in Bragança (Portugal) and frozen at -20°C. The frozen samples, which presented an initial moisture content of 13.8%, were subsequently submitted to various preservation techniques: oven drying at three different temperatures (35°C, 40°C and 45°C) and lyophilization. The samples dried at 35°C, 40°C and 45°C presented a moisture content of 9,6%, 9,8% and 10,1%, respectively, and the lyophilized sample presented a moisture content of 5,8%. Nutritional value (moisture, ash, protein, fat, and sugars), total phenolics, antioxidant properties (DPPH and reducing power), and microbiological quality (aerobic mesophiles, lactic acid bacteria, yeast and mold) of pollen were evaluated over time for a period of 6 months (0, 1, 3 and 6 months) of preservation [3].

Results

CHEMICAL PARAMETERS

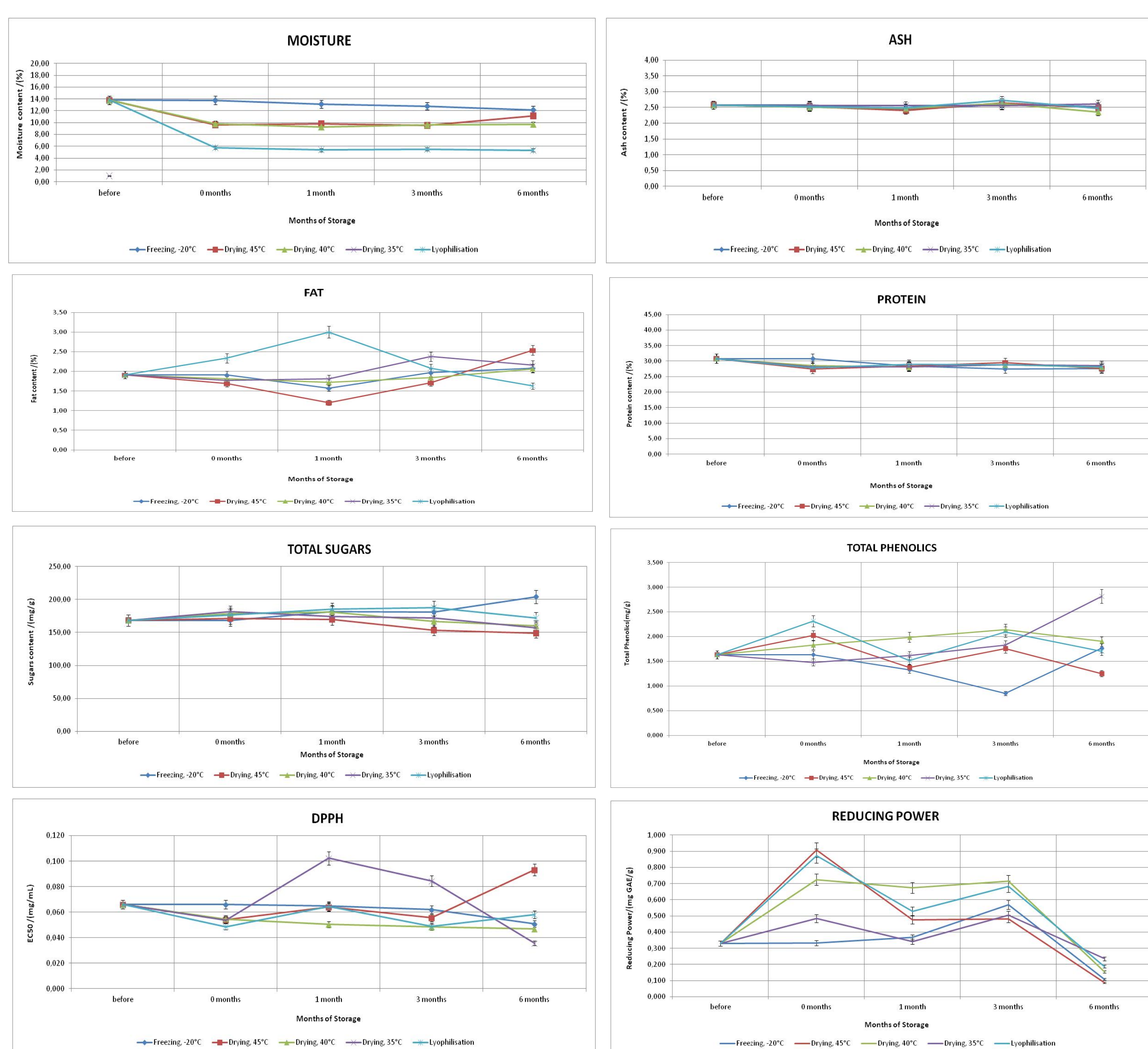


Figure 1. Evaluation of the chemical parameters before applying the preservation treatments and over a storage period of 6 months.

MICROBIAL LOADS

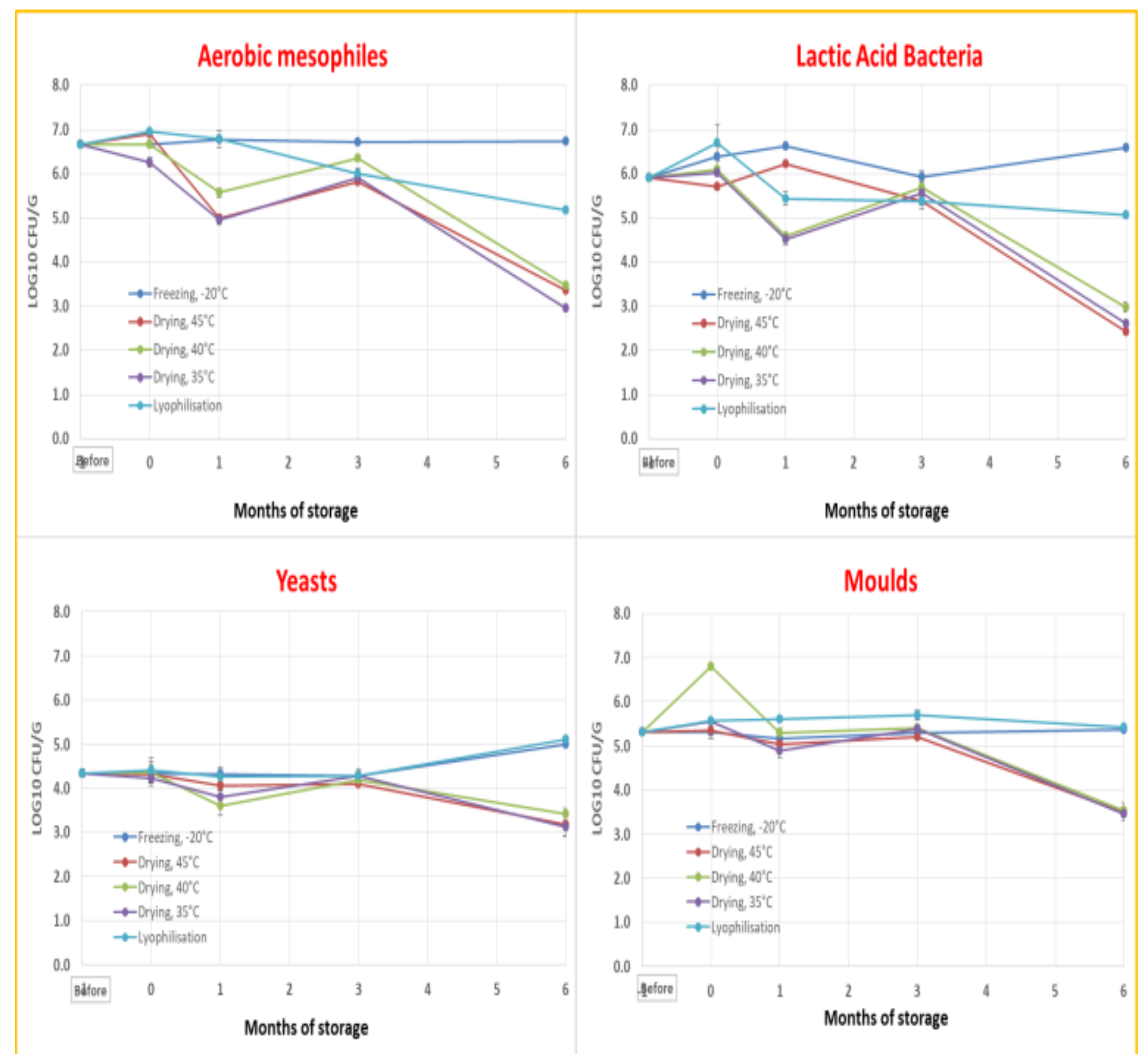


Figure 2. Evaluation of the microbial parameters before applying the preservation treatments and over a storage period of 6 months.

Conclusions

The oven-drying and lyophilization preservation methodologies caused a decrease in the moisture content of the frozen samples without showing no significant immediate impact on the ash and fat contents, and microbial loads. However, some changes in protein, total sugars and phenolics, and antioxidant properties were observed. Over time, and particularly for a storage period of 6 months, it was also possible to register some significant changes in the total sugars content, antioxidant properties and microbial loads, particularly when oven drying techniques were employed. Although a more in depth study is needed, these results evidence that the chemical, antioxidant, and microbial parameters of bee pollen are influenced by the preservation technique employed, and that these changes become particularly evident after 6 months of storage period.

References

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