

Mixture of bee bread with honey - nutritional and microbiological characterization

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1. Introduction

Beebread is a hive product produced in the honeycomb, through the lactic fermentation of pollen collected and partially processed by bees. This hive product has a chemical composition that makes it an interesting product, not only because of its nutritional value, but also related with its biological properties, such as anti-inflammatory, anticancer, antinociceptive, and antidiabetic. In fact, beebread has earned some attention from the scientific community, being reported as a functional food with nutritional benefits, healing and preventive effects of some diseases.

2. Materials and Methods

Nutritional analysis

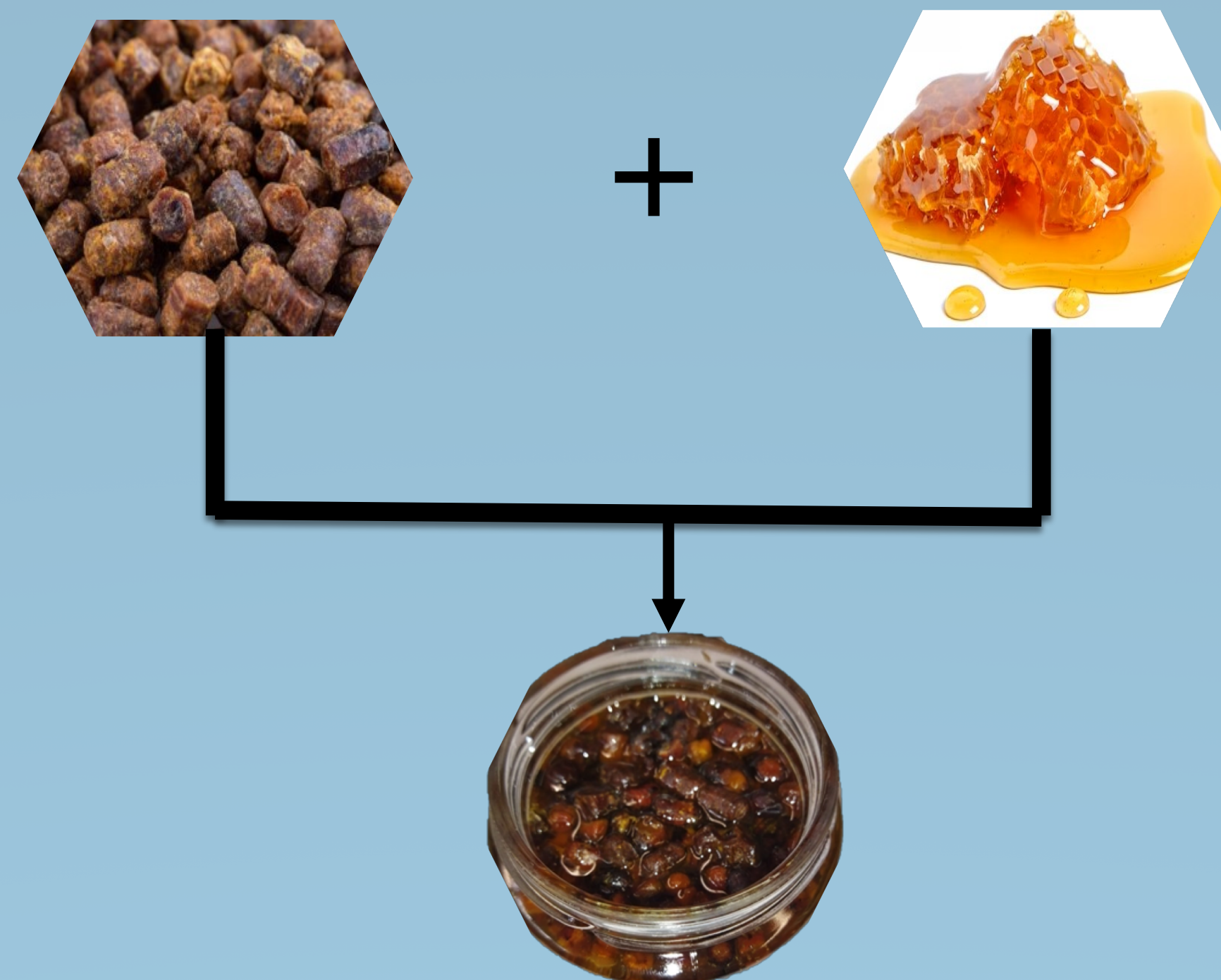
Water activity – Dew point principle

Moisture – Infrared balance at 105 °C

Ash – Incineration at 550 °C

Protein – Quantification of total N by Kjeldahl method

Fat contents – Soxhlet method (petroleum ether as solvent)



Microbiological analysis

Aerobic mesophiles - described in ISO 4833:2003

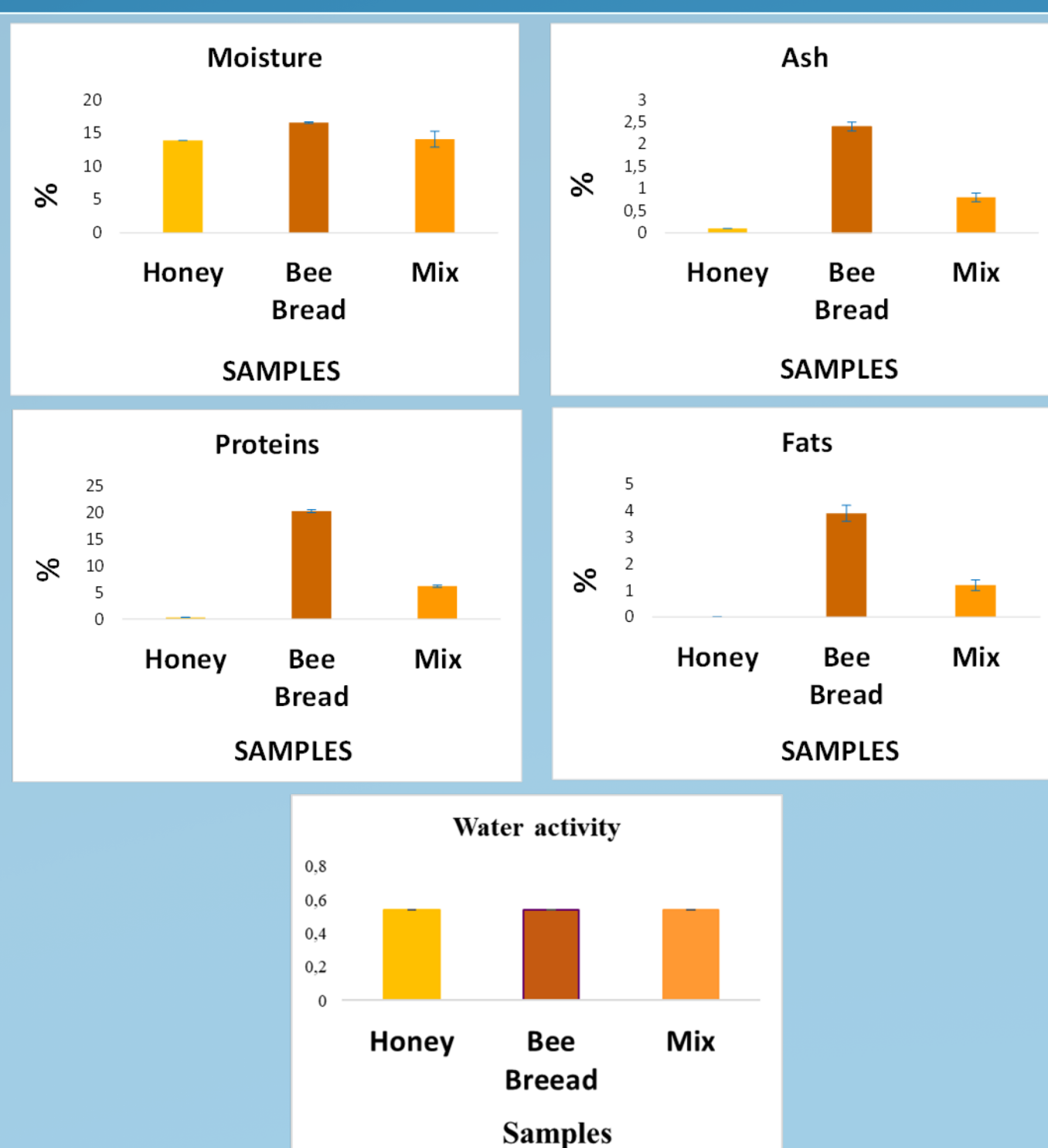
Yeasts and molds - described in ISO 21527-2:2008

Lactic acid bacteria - described in ISO 15214:1998

Spores of sulfite-reducing clostridium - described in ISO 15213:2003

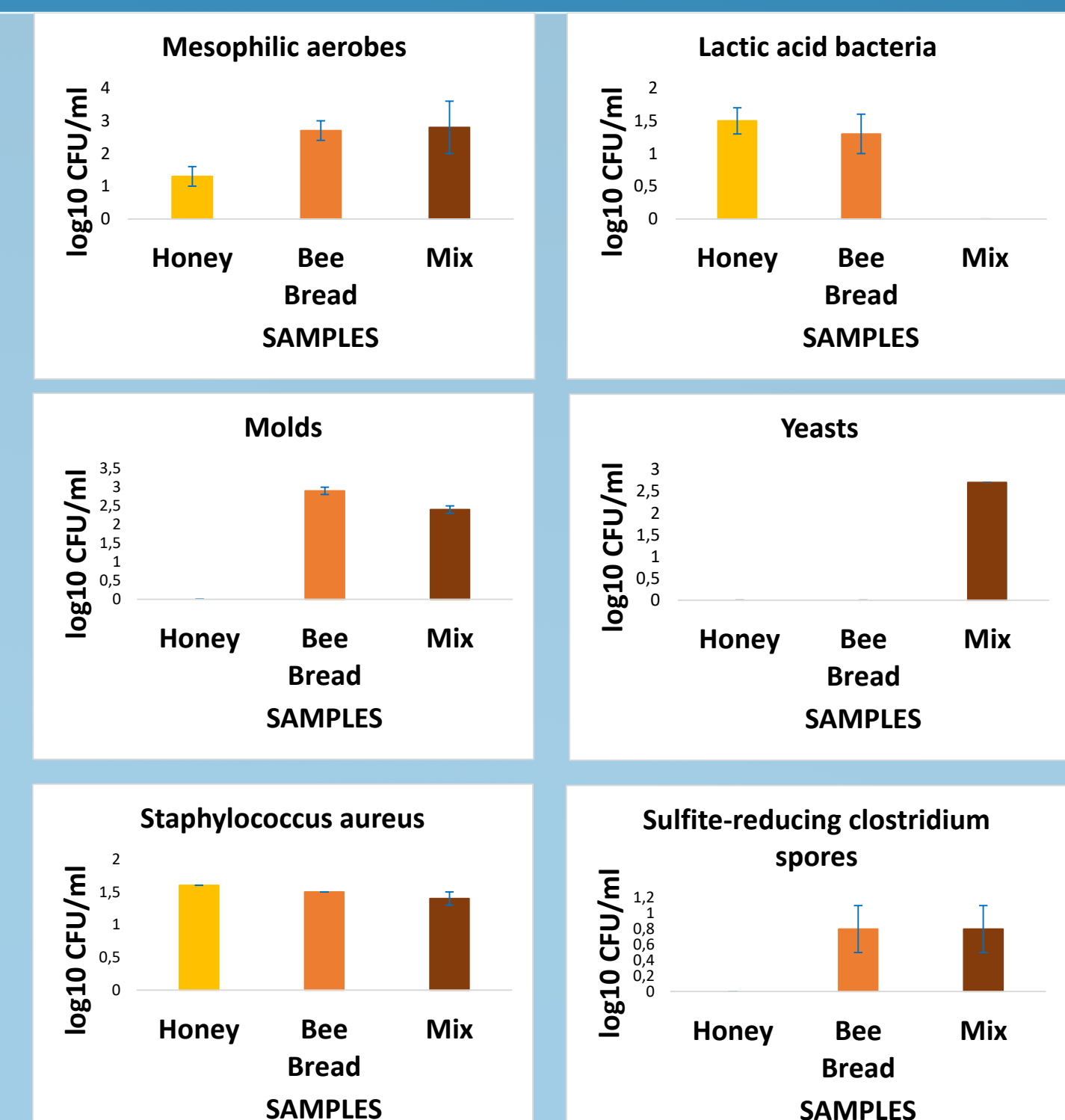
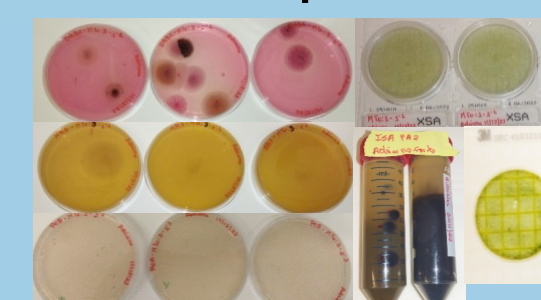
Coliforms and *E. coli* - Compact Dry EC (r-biopharm)

Staphylococcus aureus - Compact Dry S-XA (r-biopharm)



3. Results and Discussion

Major nutritional differences were observed between honey and bee bread in the ash, protein, and fat contents. Bee bread showed higher contents of these components ($2.4 \pm 0.1\%$, $20.3 \pm 0.3\%$, and $3.9 \pm 0.4\%$, for ash, protein, and fat contents, respectively), against very low or undetected levels in honey ($0.1 \pm 0\%$ of ash, $0.29 \pm 0.02\%$ of protein and undetected fat). The mixture showed a balanced content of these components, considering the proportion of each raw material ($0.8 \pm 0.1\%$ ash, $6.2 \pm 0.2\%$ protein and 1.2 ± 0.2 fat). Microorganisms were detected at very low levels, except for coliforms and *E. coli*, which were not detected.



4. Conclusions

- The mixtures of bee bread and honey constitute a more balanced option in terms of nutritional parameters when compared to the highly consumed honey, which is relatively poor in minerals, proteins, and fats;
- The mixtures of bee bread and honey exhibited a low water activity, which is an important preservation parameter, contributing to the negligible microorganism growth.

Acknowledgements

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