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EFFECT OF TEMPERATURE ON THE BIOACTIVE PROPERTIES OF BEE POLLEN

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Introduction and Objective

Bee pollen is flower pollen collected by the honey bee, *Apis mellifera*, for the purpose of feeding its larvae in the early stages of development. It is recognized to be a valuable apitherapeutic product with potential for medical, health and nutritional applications. The objective of this work was to compares the effect of different storage conditions in the bioactive compounds and biological properties of bee pollen.

Material and Methods

Bee Pollen

methanol

filtration

evaporator

dry pollen extract

Figure 1. Preparation of Methanol Extracts of Pollen (EMP).

- The amount of phenolic compounds was determined by *Folin-Ciocalteu* as flavonoids by the method of *aluminum chloride*.
- In determining the antioxidant activity two methods were used: evaluation of blocking effect of free radicals DPPH and evaluation of the Power Reducer.
- The phenolic compounds were identified by HPLC-DAD.

Results

Table 2. Retention time (Tr) and phenolic compounds identified by HPLC in the samples dehydrated and frozen pollen after extraction with Amberlite..

Samples	Peak	T.r (min.)	Phenolic Compounds
B0 fresh	1	59,938	Quercetin
	2	64,552	Kaempferol
B0 dry	1	60,345	Quercetin
B1	1	59,209	Quercetin
B2	1	36,108	Ferulic acid

Table 1. Total phenols and flavonoids and EC50 values obtained for the antioxidant activity of the sample dehydrated and frozen pollen.

Samples	Total Phenol (mg GAE/g)	Total Flavonoid (mg CAE/g)	EC_{50} DPPH (mg/mL)	EC_{50} Reducing Power (mg/mL)
B0 dry	32,64±2,10 a	6,99±0,33 a	1,16±0,01 a	2,04±0,02 a
B0 fresh	48,40±0,39 b	6,58±0,29 a	0,74±0,01 b	2,11±0,15 b

We verified that the presence of pollen differentially affected the growth of bacterium Gram-positive (*Staphylococcus xylosus*, *Staphylococcus epidermidis*), Gram-negative (*Shigella dysenteriae*, *Klebsiella pneumoniae*) and yeasts (*Cândida parapsilosis, Pichia membranifaciens*, *Cândida gllabrata*) under study, depending this on the microorganism and the method of BP conservation.

Table 3. Retention time (Tr) and possible families of compounds identified in the samples by HPLC after extraction of pollen with methanol.

Samples	Peak	T.r (min.)	Families
B0 fresh	1	52,7 ± 4,08	Myricetin
	2	54,4 ± 2,29	Quercetin
	3	56,1 ± 0,89 56,4 ± 0,98 56,8 ± 1,10 57,6 ± 1,39	Flavones
	4	61,8 ± 1,95	Unknown
	5	64,3 ± 2,13	Chrysin
B0 dry	1	50,5 ± 1,60 51,0 ± 1,81 51,4 ± 2,10 51,9 ± 2,19	Flavones
	2	61,0 ± 1,13 63,4 ± 2,32 66,5 ± 1,74	Unknown
	3	69,9 ± 1,52	Chrysin

Conclusions

- The content of total phenolic compounds was higher in frozen pollen, flavonoids were higher in dehydrated bee pollen.
- The frozen pollen showed a higher antioxidant activity and a larger number of phenolic compounds, as determined by HPLC.
- The frozen pollen extract induced a accented inhibition than dehydrated pollen, against gram-negative and gram-positive bacteria.
- The freezing process was the best preservation of nutritional characteristics of bee pollen. Regardless of the conservation process, the pollen is a good source of phenolic compounds, suggesting that this product may be useful in preventing diseases.