BEE POLLEN AS ANTIOXIDANT INGREDIENT IN READY-TO-SERVE CITRUS JUICE

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Content

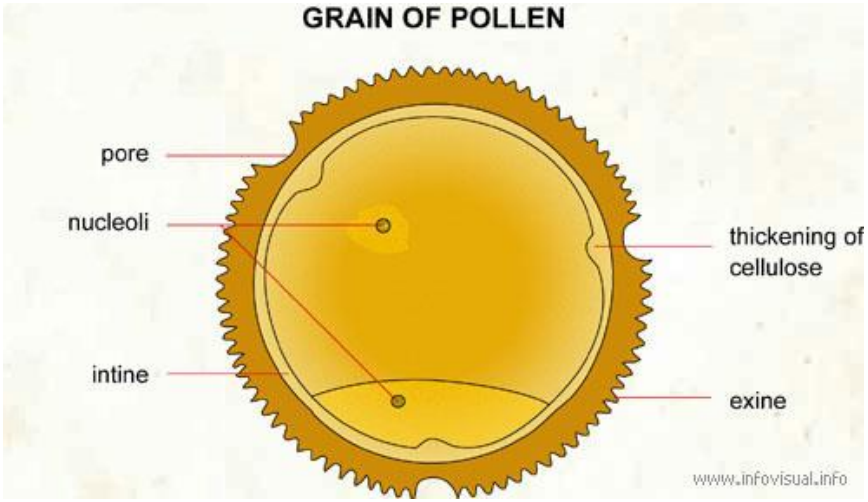
- **Bee pollen**
- **Aim and objectives of the study**
- **Materials and methods**
- **Results**
- **Conclusions**

Why do bees collect bee pollen?

- Pollination → economic value 82 billion worldwide (USDA, 2017)
- BP = unique source of proteins in honey bee diet → role in physiological development of worker bee – pollen basket and wax glands

What is bee pollen?

- BP = male sexual cell of plants



http://www.encyclopollens.fr/

- intine = cellulose, starch
- Recommendation for human consumption BP + acid food (water, honey, yoghurt, fruit/veg. juice)

(Stangaciu, 2015)

Why use bee pollen (BP)?

- EC 1924/2006: **BP functional food** "BP intake can improve gastroenterological and liver health"
- FP7-SME-2008-2: **Market potential of BP**
- **Standardization criteria** (Campos et al., 2010)

  (CHO 60%, proteins 20% - es. aa. 10%, lipids 8%)
- National Honey Board (USA, 2018) – **restaurants and bars** are increasing the menu items with bee products
- Increased political, research, producers and consumer awareness and interest about bees and bee products

Aim and objectives

Aim:

preparation and evaluation of citrus juice enriched with bee pollen

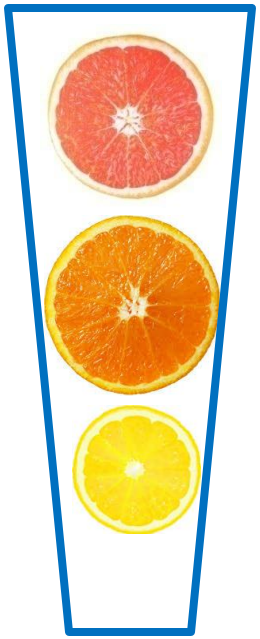
Objectives:

1. physico-chemical characterization
2. Sensory evaluation of the product

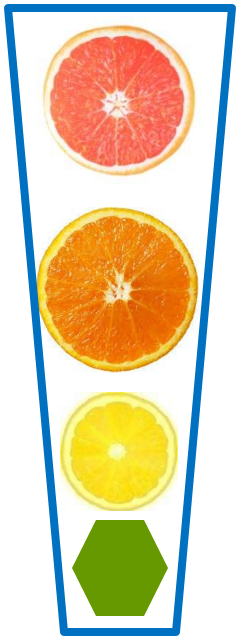
Materials and methods

- Preparation of juices

Regular juice (**RJ**):
Orange 3:
Lemon 1.5:
Grapefruit 1
(v/v/v)



Citrus juice with BP (**JBP**):
Same RJ (base)
+
honey 8% (w/v)
BP 5% (w/v)



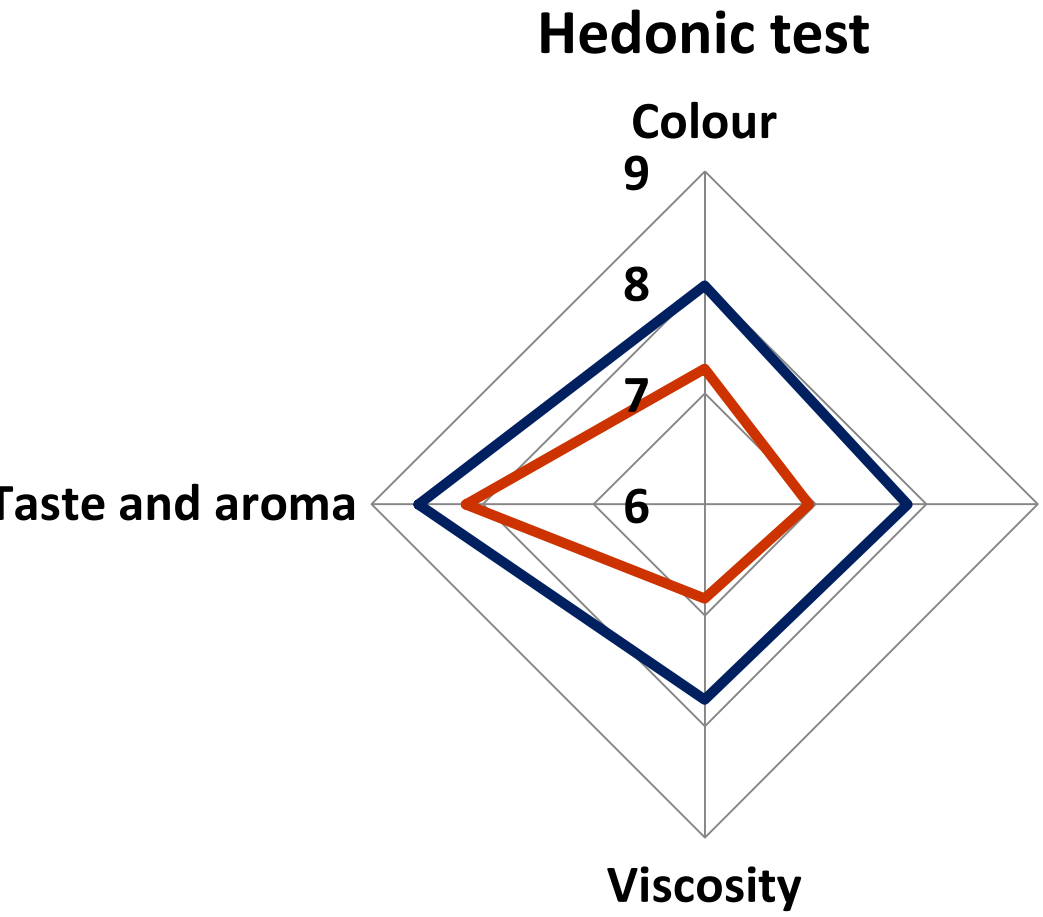
Materials and methods

- Vitamin C – titration (KIO_3)
- Total polyphenols – spetrophotometric / Folin Ciocalteu
- Radical scavenging activity – spetrophotometric / DPPH
- Sensory analysis: hedonic test 9 point scale (N=125 consumers, regular consumers of fruit juices, 56% female, 44% male, age 36 $\pm$ 2,27)

Results

Parameter	RJ (Mean ±S.D.)	JBP (Mean ±S.D.)
Vitamic C (mg%)	38.91 ± 2.07	41.53 ± 2.94
Total polyphenols (mg $GAEg^{-1}$)	13.39 ± 1.08	16.97 ± 1.57
RSA (%)	65.24 ± 3.25	81.63 ± 4.94**

Results



Differences:
color matt orange,
viscosity –flour-like mouth-feeling,
smell and taste – hey like

Results

- Sensory analysis – hedonic (9 point) overall appreciation: RJ 8.04±0.73; JBP 7.29 ±1,61
  1. Comparison between samples in terms of sensory characteristics – significant difference ($p < 0.05$)
  2. **70% declared positive willingness to buy**, although only **20% regular consumers of BP, and 34% regular consumers of honey**

Discussion: Increased use of honey and bee pollen will encourage farmers to cultivate melliferous plants → maintain bee population.

Conclusions

- Addition of honey and BP to citrus juice improves its functional quality
- Need of consumer education: to regard bee products as food (traditionally in Romania, honey and BP are considered healthy foods, therefore consumed only in case of illness, not on regular basis).

Thank you!

Bibliography

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USDA, 2017, Cots of pollination