

## PP-220 [Beekeeping Technology and Quality]

### Sensory profile of Portuguese honeys with Protected Designations of Origin

Guedes, H. L.<sup>1,2</sup>; Furtado, C.<sup>3</sup>; Beirão da Costa, S.<sup>4</sup>

<sup>1</sup>Federação Nacional dos Apicultores de Portugal; <sup>2</sup>CCAB - Centro de Competências da Apicultura e Biodiversidade; <sup>3</sup>Instituto Superior de Agronomia; <sup>4</sup>Prosenhe, Lda

#### INTRODUCTION

##### Honey and Protected Designation of Origin (PDO)

**High Value:** Strong commercial relevance (Portugal & global)

**Market Trend:** Rising demand for quality and authenticity

**PDO Role:** Increases consumer confidence in the origin and ensures protection for beekeepers

**Gap:** Lack of precise, or not updated, organoleptic data in Portuguese PDO specifications

**Need:** Organoleptic info vital for product evaluation and compliance

**Approach:** Sensory analysis complements physicochemical & pollen tests

**Outcome:** Stronger categorization. Validates if product features match the PDO designation

**Portugal:** 8 PDO in Mainland and 1 in Azores

#### METHODOLOGY

##### Constitution of the sensory panel

Selection and training of assessor layed on ISO 8586 guidelines

##### Sensory profiles establishment

Honey profiles were established according Consensus Profile (ISO 13299) regarding colour (intensity and tone), odour (intensity and description) and taste (intensity and description)

##### Samples preparation

Honey samples (20 cl) were placed in a closed containers (30 cl) and left to stabilize at room temperature at least 12h

##### Honey Tasting procedure - 3 Steps

1. Colour assessment with the container sealed and after rotation to spread honey along the walls and assess tonal variations
2. Odour assessment smelling the sample after removing the lid, taking long and short inhalations to assess the aromas.
3. Taste assessment diluting the honey in the mouth to identify flavours, their intensity, and persistence.

#### AIM

##### 1. Establish an honey expert sensory analysis panel

##### 2. Define sensory profiles of five Portuguese honeys with PDO:

###### Terra Quente PDO

1 Unifloral butterfly lavender (*Lavandula* sp.)

###### Ribatejo Norte PDO - 4 subregions

3 Multifloral: **Albufeira de Castelo de Bode**; **Alto Nabão** and **Bairro**  
1 Unifloral rosemary (*Rosmarinus officinalis*): **Serra de Aire**

#### MAIN RESULTS

##### SENSORY PANEL

###### Initial recruitment – 61 Naïve sensory assessors

- Beekeeping technicians, consumers, producers and academics

###### Selection – 54 Initiated sensory assessors

- Impairment screening [not qualified (- 5)]
- Sensory acuity screening
- Potential for describing sensory perceptions [not qualified (- 4)]

- Personal unavailability [withdrawals (- 21)]

24 Selected sensory assessors

###### Training – 20 selected sensory assessors

- Detection and recognition tastes and odours
- Development and use of descriptors
- Use of scales
- Specific training for honey analysis

- Personal unavailability [withdrawals (- 2)]

18 Expert sensory assessors

##### ALTO NABÃO



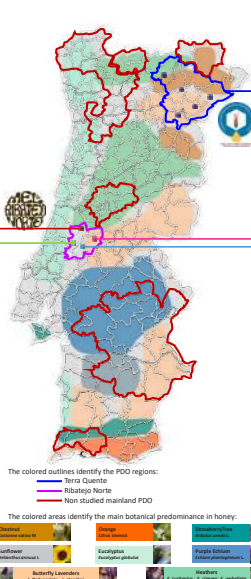
|                                                        |                                                                                                 |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Multifloral with Eucalyptus, Purple echium and Heather |                                                                                                 |
| Sampling                                               | 2012 - 2021                                                                                     |
| Colour                                                 | Amber to dark amber, with reddish tones                                                         |
| Odour                                                  | Floral ( <i>Ericaceae</i> ), woody. Intense but with low persistence                            |
| Taste                                                  | Slightly sweet to sweet. Slightly acidic. Some salty notes and occasionally slight bitter hints |

##### SERRA DE AIRE



|                                                           |                                                  |
|-----------------------------------------------------------|--------------------------------------------------|
| Unifloral from Rosemary ( <i>Rosmarinus officinalis</i> ) |                                                  |
| Sampling                                                  | 2017 - 2021                                      |
| Colour                                                    | Very light amber                                 |
| Odour                                                     | Floral. Moderately intense, with low persistence |
| Taste                                                     | Sweet to very sweet. Slightly acidic.            |

##### Map of Honey Production in Mainland Portugal



##### TERRA QUENTE



|                                    |                                                                                      |
|------------------------------------|--------------------------------------------------------------------------------------|
| Unifloral from Butterfly lavenders |                                                                                      |
| Sampling                           | Collection points (7) from different areas (5) 2014 - 2021                           |
| Colour                             | Very light amber to light amber                                                      |
| Odour                              | Predominantly floral. Low intensity and persistence. Possible fruity and fresh notes |
| Taste                              | Very sweet. Persistent acidic notes on aftertaste                                    |

##### ALBUFEIRA CASTELO DE BODE



|                                                                       |                                                                                   |
|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Multifloral with Eucalyptus, Chestnut and Heather ( <i>Erica</i> sp.) |                                                                                   |
| Sampling                                                              | 2013 - 2021                                                                       |
| Colour                                                                | Light amber to amber, with greenish tones (occasionally may appear as dark amber) |
| Odour                                                                 | Predominantly woody, floral ( <i>Ericaceae</i> ), with moderate intensity         |
| Taste                                                                 | Slightly sweet with. Salty notes and slight acidity, with occasional bitter notes |

##### BAIRRO



|                                                                              |                                                                                   |
|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Multifloral with Purple echium and Thistle ( <i>Carlinia hispanica</i> Lam.) |                                                                                   |
| Sampling                                                                     | 2013 - 2020                                                                       |
| Colour                                                                       | Light amber to amber                                                              |
| Odour                                                                        | Floral and fruity (fresh fruits). Low to moderately intense, with low persistence |
| Taste                                                                        | Sweet to very sweet. Slightly acidic. Salty notes                                 |

#### CONCLUSION

- The establishment of a **sensory analysis panel** for honey evaluation was successfully achieved.
- A sensory analysis panel is a dynamic tool, and the results of evaluations depend on its members. Regular activity and training are needed to ensure reliable performance.
- The validation sessions showed that the group of experts is **able to qualify compliance** in Portuguese butterfly lavender honeys with the profile defined for **Mel da Terra Quente PDO**, as well as in multifloral honeys for the profiles of the **Alto Nabão**, **Serra de Aire** and **Bairro** from **Ribatejo Norte PDO** sub-regions.
- Performance testing also demonstrated that the **Albufeira de Castelo de Bode** honey sensory profile seemed too broad, making it difficult to differentiate samples. Therefore, more honey samples from this subregion are needed for the validation or reformulation of the profile.
- This will also be an analytical tool that can be useful in **combating fraud** or detecting natural responses to **landscape evolution** due to **climate change** or catastrophic events such as wildfires and droughts.

#### REFERENCES

- ISO 8586 Sensory analysis – General guidelines for the selection, training and monitoring of selected assessors and expert sensory assessors
- ISO 8586 Sensory analysis – Methodology – General guidance to establish a sensory profile
- Programa Apícola Nacional 2017-2019, GPP | MAR (2016)
- <https://www.agroportal.pt/qualis-as-especies-que-estao-na-origem-do-mel-portugues/>
- Caderno de Especificações para a utilização da Denominação de Origem do Mel do Ribatejo Norte, AAC, Lda (1994)
- Caderno de Especificações da Denominação de Origem do Mel da Terra Quente, CAAP (1994)

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  - ANA – Associação dos Apicultores do Nordeste
  - Cooperativa de Produtores de Mel da Terra Quente e Frutos Secos, CRL

Helena Isabel Guedes<sup>1</sup>, Helena Isabel Guedes<sup>2</sup>, Carolina Furtado<sup>3</sup>, Sara Beirão Da Costa<sup>4</sup>

<sup>1</sup>FNAP - Federação Nacional dos Apicultores de Portugal

<sup>2</sup>CCAB - Centro de Competências da Apicultura e da Biodiversidade

<sup>3</sup>Instituto Superior de Agronomia

<sup>4</sup>Prosense, Lda

Honey is a product of high commercial value not only in the Portuguese market but throughout the world, with a growing demand for high quality and authentic products. The regulation of Protected Designations of Origin (PDO) is a European tool that provides consumers with safety and confidence in the origin. However, for Portuguese honeys with PDO, the registered specifications lacks information on the organoleptic characteristic, making this reference information necessary for evaluating the product and for validating compliance with the same. The evaluation of honey through sensory analysis methodologies, complements the physicochemical and pollen analysis and provides greater robustness in the categorization of whether its characteristics correspond (or not) to a given PDO. The aim of the work was to define the sensory profile of five Portuguese honeys with PDO, namely: Terra Quente, unifloral butterfly lavender – *Lavandula stoechas* honey, and Ribatejo Norte (4 subregions), with three multifloral and an unifloral rosemary – *Rosmarinus officinalis* honey. To establish these profiles a sensory analysis panel was formed. The participants were recruited from several fields (beekeeping technicians, consumers, producers and academics). The assessors were selected and trained according to ISO8586. The sensory profiles were defined by consensus method (ISO13299) regarding colour (intensity and tone), odour (intensity and description) and taste (intensity and description) attributes. A collection of several selected honey samples, with different pollen predominance, representative of Portuguese honeys was presented to assessors to adequate descriptors development. Honey samples from both regions, collected during 2-5 years period in different locations within PDO areas, were chosen to create the sensory profiles. Here we shown, it was possible to define the sensory profile of 4 out of 5 proposed honeys. In subtype of Ribatejo Norte (Albufeira de Castelo de Bode) the defined profile appears to be too broad, not allowing samples discrimination. More samples of honey are need to confirm or redefine the profile. The results obtained are of great relevance for the Portuguese honey sector, since the first step was taken in the creation of an important analytical tool for the sensory characterization of honey and verification of its authenticity and preventing fraud.