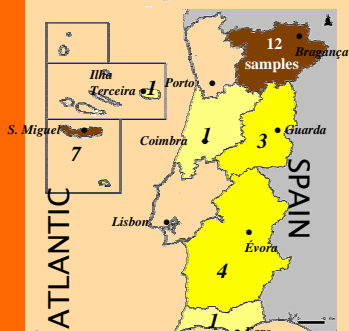


The chemical composition of propolis is highly variable, depending strongly on the plant sources available to the bees at different locations, the geographic and climatic characteristics of these locations. In the temperate zone, propolis originates mostly from bud exudates of poplar trees (*Populus* spp.). For this reason, European propolis contains the typical 'poplar bud' phenolics: flavonoid aglicones (flavones and flavanones), phenolic acids and their esters. The aim of this work was to characterize the phenolic composition of propolis samples from Portugal.

Sampling

▶ 30 propolis samples were provided by beekeepers all around the country. Samples of poplar buds and *cistus* leaves were also collected.



▶ Samples color vary from dark green to orange.



▶ Potential floral sources: *Populus* spp. (orange) and *Cistus ladanifer* (dark green).



Extraction

Samples were submitted to extraction with 80 % of ethanol/water (1/10, w/v) at 70 °C for 1h. Other conditions were also tested, with no improvement.

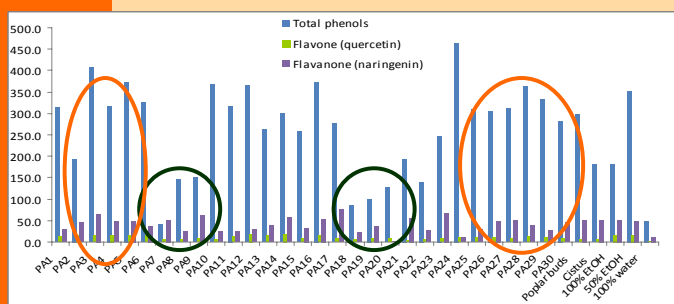


Extraction yield in the interval 39 - 81%, with lower values for dark green propolis

Spectrophotometric phenolic analysis

▶ Samples extracts were analyzed spectrophotometrically for total phenol, flavone/flavonol and flavanone/dihydroflavonol content:

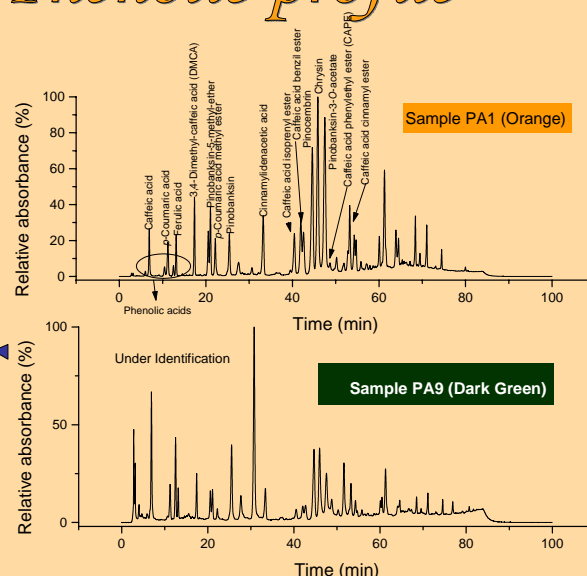
- ▶ Total phenolics - Modified Folin-Ciocalteu assay
- ▶ Flavone/flavonol- $AlCl_3$ assay
- ▶ Flavanone/dihydroflavonol - 2,4-dinitrophenylhydrazin assay



- ▶ Higher phenolic content in orange colored propolis
- ▶ Samples richer in flavanones compared to flavones (eq. standards)
- ▶ Extraction with water is very poor in phenolics

Phenolic profile

Phenolic profile were assessed by mass spectrometry (*ESI-MS* and *ESI-MS²*) after HPLC fractioned



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