

Portuguese monofloral honeys – the importance of volatile profile in botanical source differentiation

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INTRODUCTION

Honey's aroma depends on the volatile compounds present, mostly in the nectar, which help to discriminate honey types from different botanical and geographical origins. Mainland Portugal and the Azores and Madeira Islands are characterised by a rich and varied honey flora, contributing to the production of a great diversity of local monofloral honeys.

RESULTS AND DISCUSSION

Cluster analysis

Agglomerative cluster analysis of honey hydrodistillation obtained (HD) volatiles (Fig. 1) evidenced two main clusters, one of which had nine sub-clusters. Components grouped by biosynthetic pathway defined alkanes and fatty acids as dominant, namely *n*-nonadecane, *n*-heneicosane, *n*-tricosane and *n*-pentacosane and palmitic, linoleic and oleic acids. Oxygen-containing monoterpenes, such as *cis*- and *trans*-linalool oxide (furanoid), hotrienol and the apocarotenoid α -isophorone, were also present in lower amounts. Aromatic amino acid derivatives were also identified, namely benzene acetaldehyde and 3,4,5-trimethylphenol.

C: Chestnut, Ct: Carob tree, E: Eucalyptus, H: Bell heather, I: Incense, L: Lavender, O: Orange, R: Rape, Rb: Raspberry, Ro: Rosemary, Sf: Sunflower, St: Strawberry tree honeys.

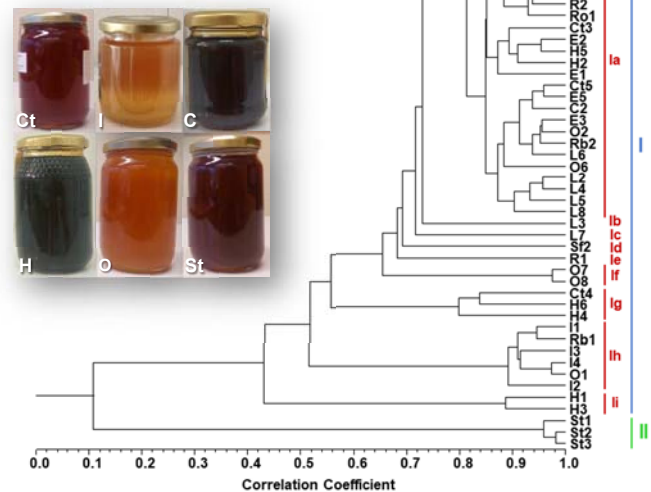


Figure 1. Dendrogram obtained by cluster analysis of the percentage composition of volatile compounds isolated by hydrodistillation from the 51 honey samples

Classification tree

A fully grown classification (Fig. 2) tree allowed the identification of the most relevant volatiles for discriminating the different honey types. Twelve volatile compounds were enough to fully discriminate eleven honey types (92%) according to the botanical origin: hotrienol, 2-furfural, *n*-decane, benzene acetaldehyde, heptacosene, *n*-tricosane, α -eudesmol, β -copaene, ethyl hexadecanoate, *cis*-linalool oxide (furanoid) and benzaldehyde.

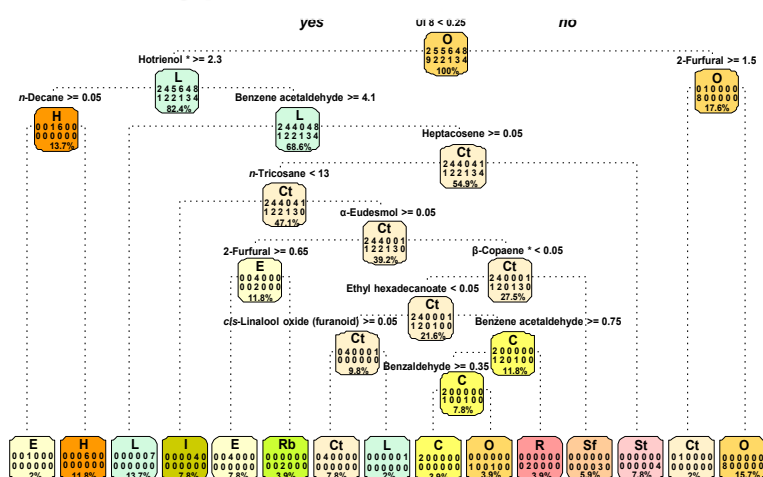


Figure 2. Classification tree with the honey types separated in nodes, according to volatile compounds discrimination. * Identification based on mass spectra only; Ul: unidentified compounds.

METHODS

The volatile profile of 51 samples from 12 monofloral-labelled Portuguese honey types were assessed: bell heather, carob tree, chestnut, eucalyptus, incense, lavender, orange, rape, raspberry, rosemary, sunflower and strawberry tree were collected from several regions from mainland Portugal and from the Azores Islands. Honey volatiles were isolated using solid-phase microextraction (SPME) and hydrodistillation (HD).