TECHNISCHE UNIVERSITÄT DRESDEN

Technical University of Dresden, Food Chemistry

Volatiles for the Detection of Immature Harvested Acacia Honeys

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Abstract

- Harvesting immature honey increases honey production
- Removal of water to 18% is necessary to avoid yeast growth
- Dehumidification may influence the aroma profile
- The Markes® micro-chamber is suitable for the enrichment of volatiles
- Comparing analysis of European and Chinese acacia honeys:

  Chinese honeys showed lower intensities and less substances

  In some Chinese honeys a higher furfural content was detectable

Introduction

Acacia honey is produced by the honeybees by collecting nectar from the flowers, transforming and mixing it with their secretions, storing and letting it ripen in the combs [1].
The most important change during the ripening process is the reduction of the water content to less than 18%, which is achieved by constant fanning with the bee's wings to circulate the air [2]. To generate more profit, some beekeepers harvest immature honey followed by dehydration to increase their honey production [3]. The analysis of volatiles has proven to be a promising authentication method for monofloral blossom honeys [4,5].
It can be assumed that the removal of water also influences volatile aroma compounds. Due to the lack of unambiguous methods for distinguishing between mature and immature honey we analysed different honeys from different regions with a Thermodesorption (TD) - GC/MS method.

Method

Honey was solved in sodium chloride solution and benzaldehyde-d6 as internal standard was added. Samples were placed into in a micro-chamber/thermal extractor (Fig. 1) from Markes® International. For sampling, the volatile compounds were purged with nitrogen through adsorption tubes filled with Tenax®.
Desorption of the flavouring substances was carried out using the Markes® Thermodesorber TD100-xr (Fig. 2, left). Analytes were desorbed from the sorbent tubes, collected on a cold trap and desorbed again for injection into the Thermo Scientific GC/MS (Fig. 2, right).

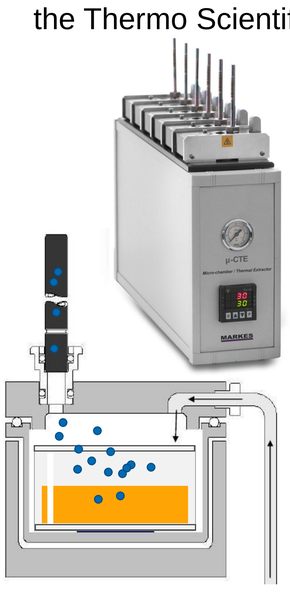

Fig. 1 Micro-chamber/ thermal extractor (1)

Fig. 2 Thermodesorber TD100-xr (left) coupled to Thermo Scientific GC/MS

GC/MS profiles of European and Chinese Acacia Honeys

The recorded profiles of several acacia honeys from Europe and China were compared (Fig. 3, Fig. 4).

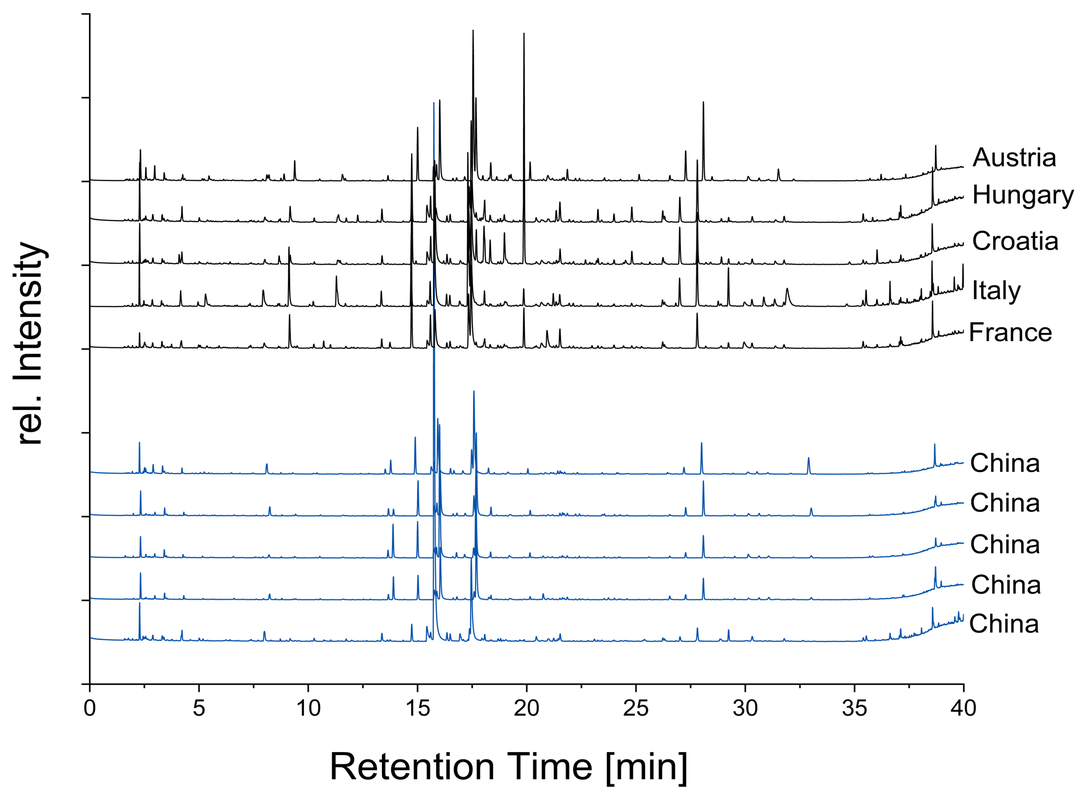

Fig. 3 TIC profiles acacia honeys (40-500 m/z); comparison of European (black) and Chinese honeys (blue)

Chinese honeys showed lower intensities and less volatile compounds in their aroma profiles than European ones.

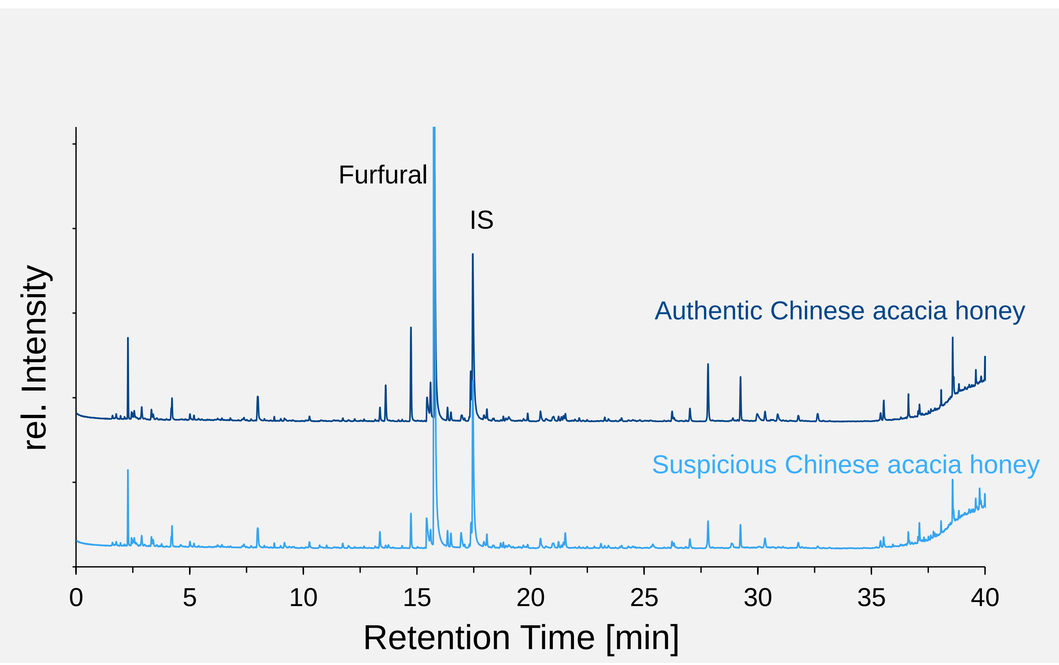

Fig. 4 TIC profiles acacia honeys (40-500 m/z); comparison of an authentic Chinese acacia honey and a potential immature Chinese acacia honey with high furfural content.

Acacia honeys from China partly showed higher furfural contents.

Conclusions

- Dehumidification of immature harvested honeys changes the aroma profile
- Higher temperatures in dehydration may increase the furfural content

References
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[2] Horn, H. and Lüllmann, C., Kosmos Verlag Stuttgart, 2006
[3] Zhang, Guo-Zhi et al. Foods (Basel, Switzerland) 2021, vol. 10 (11) 2882
[4] Beitlich, N. et al. J. Agric. Food Chem. 2014, 62 (27) 6435-6444
[5] Machado, A. M. et al. Molecules 2020, 25 (2) 374

Pictures
(1) Markes International, Brochure micro-chamber/thermal extractor

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