

OP-22 The Aroma Compounds of *Vitex*, *Helianthus*, and *Tamarix* Honey Collected from Kazakhstan

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Kazakhstan is rich in honey plants. There are about a thousand species of them. In this regard, interest in Kazakhstan honey is present in all countries, from east to west. However, this domestic honey needs to be studied more. This prevents Kazakhstan, as a manufacturer of bee products, from entering the world market. To study their quality, it is necessary to determine their physicochemical properties, composition and activity using various scientific methods.

Vitex, *Helianthus*, and *Tamarix* honey samples were collected from three regions of Kazakhstan, such as East Kazakhstan (Oskemen), Zhambyl (T. Ryskulov), Akmola (Kokshetau). Their pollen analyses and physicochemical properties were performed according to IHC methods. The volatile compounds were also determined using head space-GC-MS instruments [1]. The pollen analysis, provided that 22-D-1 was *Vitex agnus castus*, while 22-D-2, 22-D-4 *Helianthus annuus*, and 22-D-3, 22-D-5 *Tamarix* (Tamariceae). As a result, 32 aromatic compounds were identified. The major compounds identified are Hotrienol, Carvone, Benzaldehyde, Benzene acetaldehyde, etc. Moreover, limonene, linalyloxide, *trans*-4-metyl benzaldehyde, 1-terpineol, 1,3,8-*p*-menthatriene, β -terpineol, nereloxide, chrysanthemum, pinacarvone, beta-citronellal, *cis*-carveol, *p*-cymene-8-ol, α -terpineol, satanal, myrtenal, *trans*-3-decen-1-ol, eucarvone, camphene, cuminal, *cis*-*p*-mentha-2,8-dien-1-ol, cinnamaldehyde, phellandrene, α -terpinen-7-ol, thymol, α -terpinyl acetate, cinnamyl acetate were also detected in the honey samples as volatile compounds. These compounds may be used to detect the originality of Kazakhstan honey.

Keywords: Aroma; honey; GC-MS.

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References

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OP-23 A New Method to Determine the Foreign α -Amylases in Honey

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α -Amylase is an enzyme that determines the diastase number in honey. According to the Turkish Food Codex Honey Communique, the number of honey diastases should be 8 and above. The amount of α -amylase in authentic or raw honey exceeds 8 diastase numbers. However, if the honey does not preserve its freshness, if it was stored in bad conditions or heated to high temperatures, or alternatively, if honey is obtained by feeding the bee with inverted sugars, the diastase number is generally below 8. According to the Turkish Food Codex Honey Communique, honey is unsuitable in these cases. Therefore, α -amylase is added externally to ensure compliance with the communique by malicious people. In addition, starch-based syrups are generally converted to a bee food that bees can use via hydrolysis either chemically with inorganic acids or by α -amylase enzyme of plant or bacterial origin. If honey is obtained by giving this hydrolysate to the bee, foreign α -amylase is transferred to the honey as α -amylase. In the last case, the bee may convert the foreign α -amylase to β/γ -amylase. In both cases, honey is adulterous. Because according to the Turkish Food Honey Communique, Article 5, paragraph 1, subparagraph (a), no external food component or any external substance is added to honey. Fadabas and Shade Tests recommended in IHC methods are insufficient to detect foreign α -amylase. Therefore, an inexpensive method was developed in the Natural Products Research Laboratory of Muğla Sıtkı Koçman University to determine the foreign α -amylase, which is a sought-after criterion in honey exported to Europe.

The method is based on determining the molecular weight of α -amylase using HPLC-GPC-RI. For this purpose, α -amylase was separated from honey using the cut-off filters technique, and average molecular weights were successfully determined with standardized GPC columns. The study was confirmed using western blot analyses as well as antibodies. Since it will be an analysis parameter that should be done in honey primarily exported, the newly developed method will soon be able to perform in accredited laboratories under the Ministry of Agriculture and Forestry.

Of course, with the increasing technology, the development of cheap and practical adulteration detection methods can often be used by companies employed in the honey trade to