

Romanian Honey - A Detailed Research On Physico-Chemical Properties & Classification

Honey is a natural sweetener used by people since ancient times because of its immense health benefits. Honey bees suck the flower nectar from different sources to make blossom honey and the plant parts secretions to make honeydew honey. This sweet liquid gold produced by the bees consists of 70-85% sugar, 10-20% water, and other compounds such as proteins, organic acids, amino acids, vitamins, minerals, and phenolic compounds in low amounts. The properties & composition of honey directly depend on the geographical & botanical source of nectar, harvesting time, climatic conditions, processing and storage conditions.

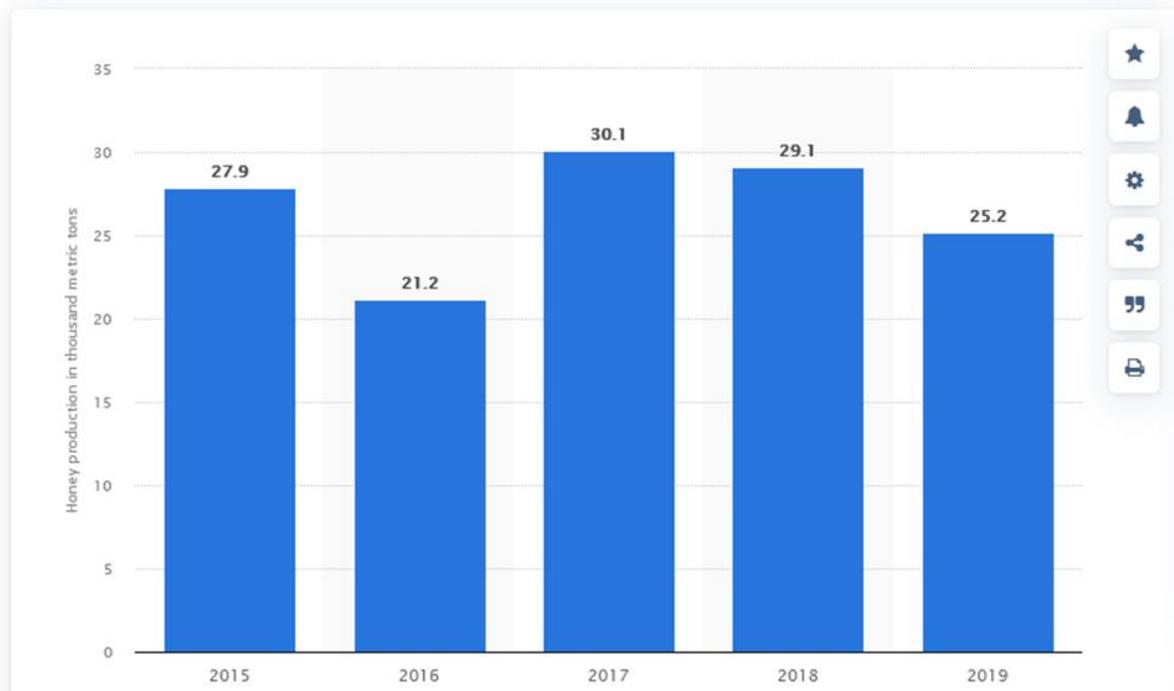
Though there is a lot of information about different honey types originating from different geographical areas, Romanian honey has enjoyed less attention. However, as the demand for authentic honey and the involvement of Romanian researchers in solving society-related issues have increased recently, detailed research on the characteristics & classification of Romanian honey was much needed.

Honey Production Market in Romania –

The climatic conditions of Romania are favorable for apiculture. Honey production as high as 30,000 metric tons has been achieved in the last few years. Alpine, steppe, and forest are the major vegetation zones. A large percentage of land in Romania is used for agriculture. 33% supports long-lasting fields; the rest is tillable.

Over half of the arable land is planted with grains (wheat, barley, oat, and maize). Oilseeds involve around 10%, primarily Brassica napus and Helianthus annuus. There are additionally different crops, like soy, vegetables (potatoes, tomatoes, cucumber, onion, cabbage, carrot, pepper, and melons), sugar beet, rice, and grape plantations. The most common honey type produced in Romania is [acacia honey](#), raspberry, sunflower, linden, mint, honeydew honey, etc.

Volume of honey produced in Romania from 2015 to 2019 (in 1,000 metric tons)



Whether the European Union addresses the most significant worldwide honey producer, it isn't self-dependent, and around 40% of Europe's honey consumption is covered with imports from different regions. On the other hand, only Romania, Hungary, and Spain can deal with a self-supply pace of 100 percent.

China and Argentina have been on the essential suppliers' list for quite a while, along with Mexico and Thailand. China is primarily known as Europe's primary supplier of low-priced honey for everyday use focused on the standard market. The historical backdrop of quality issues has demolished the place of Chinese honey in the worldwide honey market, making the European Union more careful about purchasing Chinese honey. It was Europe's primary honey provider concerning Argentina until ten years ago. Argentinian honey supplies have been impacted by the weighty loss of bee states and concentrated forage.

Organic Beekeeping –

The beekeeping sector in Romania has gone through a few times of progress and relapse, too, contingent upon the political and monetary conditions. Before the foundation of the socialist system in Romania, practically all farmers used to keep a couple of colonies of bees, in 1961 there were 653,000 colonies of bees across the country. During the socialist system, the beekeeping sector developed altogether and, by 1989, it arrived at a significant number of 1,418,000 bee colonies. The

political, financial, and cultural changes after 1990 emphatically affected this area of Romanian agribusiness.

Accordingly, by 1994, the number of bee colonies had dropped to 614,000, arriving at levels practically the same as in the sixties. Beginning around 2000, the honey bee colonies in Romania have begun to develop continually, having reached the limit of 1,962,000 by 2019. The year 2000 hit an achievement in Romanian agriculture as organic agriculture was established, and beekeeping being the areas of interest in this regard. If the honey has to be marketed as "organic," it has to fulfill the specified requirements of organic beekeeping such as –

- Crops should not be treated chemically as honey bees feed on them.
- All bee hives should be built with natural materials only
- Diseases should only be treated with approved organic substances and not by veterinary medicines.
- Beehives should be placed in areas free from industrial complexes, airports, or main roads.

As per the outcomes, 82% of the beekeepers expressed that they knew about the standards involved with organic beekeeping. When requested to specify these principles, some keywords were frequently heard: treatment, wax, organic, taxes, honeycomb, yearly, costly, medication. However, of the respondents, 58.9% knew nothing about the expenses engaged with rehearsing organic beekeeping.

A considerable percentage of respondents, precisely 84.1%, imagined that organic beekeeping could benefit the climate. Moreover, 92.4% of the beekeepers believed that making "ecological beekeeping regions" would be helpful for both the beekeepers and farmers. These regions could be utilized during the low-blooming season.

Physio-Chemical Characterization of Romanian Honey –

Numerous research groups have been engaged in studying the physico-chemical characteristics of Romanian honey. While the significant sugars present in honey are promptly accessible titrimetrically or spectrophotometrically, minor carbs in Transylvanian acacia honey have been determined by fluid chromatography, alongside individual phenolics.

Fructose and glucose, adding up to 42.4% and 31.9%, separately, have been joined by 2.94% maltose, 2.16% sucrose, and 0.91% trehalose. Out of the 13 phenolic acids and flavonoids distinguished in the black locust honey, pinobanksin, ferulic acid, abscisic acid, pinocembrin, chrysin, and acacetin have been found in all samples, p-hydroxybenzoic acid, t-cinnamic acid, kaempferol, and apigenin have showed up in half of the examples. In contrast, p-coumaric acid, vanillic acid, and vanillin have been recognized uniquely only in a quarter of the whole sample.

About 24 nectar & honeydew honey have been collected to determine the sugar profiles, water, color, and ash content by high-performance liquid chromatography

(HPLC). It was found that honeydew honey has a comparatively higher content than nectar honey. In addition, honeydew honey has the highest flavonoid content, followed by lime, sunflower, and acacia honey.

Volatile organic compounds are available in honey in totally different sums. Their profile has been expected to fluctuate with the botanical origin of the blossoms providing the nectar for honey production.

A few Romanian acacia and linden honey samples, alongside different samples starting from Slovakia, Serbia, Poland, Georgia, Germany, Ukraine, Czech Republic, Italy, France, Greece, and Moldavia have been subjected to two-dimensional GC-MS, the volatiles being first isolated utilizing a non-chiral fixed phase and further took fed to a chromatographic system containing a chiral stationary phase. Over 270 compounds have been identified: alkanes, alcohols, aldehydes, ketones, carboxylic acids, and their methyl and additionally ethyl esters. Hotrienol, linalool, and linalool oxides have been available at the highest concentration levels, while α -terpineol, 4-terpineol, and isomers of lilac aldehydes have been accounted for at significantly lower amounts.

Romania is one of the leading honey providers for the national and the European honey market. The quality regulation imposed for foodstuff, honey included, frequently requires specialized investigation techniques. Accordingly, it is of incredible interest to track down a reasonable strategy for honey classification, based on currently measured physicochemical properties, to affirm the declared botanic source. A careful factual investigation of honey properties variability is vital in this attempt. The European Union gave guidelines concerning the general and specific characteristics important in assessing authenticity: moisture, sugar content (fructose, glucose, and sucrose), free acidity, diastase activity, and HMF content.

These parameters are generally easy to measure and give a decent information value. The intricacy of honey characterization, control, and classification has been introduced using an enormous pool of scientific proof brought in by numerous Romanian researchers. Compared with the honey from other European nations, Romanian honey has great market qualities because of its different botanic sources and organic characters responsible for the particular flavor and consistency. This original research represents the chance of segregation between various honey types, dependent on the physicochemical properties measurements, as demanded by the quality control.