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# Using Honey Bee Products for Human Health


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**ABSTRACT**

This review is realized to investigate usage of honey bee product for human health. In the World Turkey is the 2nd for honey production after China and 3rd for bee colony after India and China. On the other hand bee products is only meant for honey production by ignoring other honey bee products. The other honey bee products are pollen, royal jelly, propolis, bee venom and wax which are highly helpful for not only as human food but also necessary for human health. To increase the awareness level of beekeeping products will increase the demand for this product. In this case manufacturers, as well as to contribute to increase their income, will contribute to a more healthy society.



***Key words:*** Apis mellifera anatolica, beeswax, pollen, propolis, royal jelly.


## INTRODUCTION

Beekeeping have been used for feeding and curative health care for centuries by using vegetable sources, bees and labor together. Beekeeping is not only production items of honey, pollen, royaljell, propolis and bee venom, but also it is important for production items of queen bee, swarm,package bees (Parlakay et al., 2008). Turkey has a great potential for beekeeping in terms of itsgeographical structure, diversity of plants and nectar sources which are well suited for the production of honey. According to FAO data 35.637.137 bee colonies of 6.011.332 and 88.162 tonnes honey of 1.592.701 are produced in Turkey. Turkey is the 2nd for honey production after China and 3rd for bee colony after India and China in the World (Erturkve Yilmaz, 2013; Anon, 2014j).

Beekeeping products of honey, pollen, royal jelly, propolis, bee venom and wax are important products for human nutrition and health. Honey bees produce honey after collecting the royal jell, propolis, wax and bee venom secreted from glands in their bodies by collecting nectar and pollen from nature (Gencer, 2009). Excellent antibiotic of these products as propolis, and royal jelly is a rich source of energy nutrients and hormones. High nutritional value of honey and pollen are used for treatment of a group of diseases and infections (Sahinler, 2000). In addition honey is used as Manuscript Click here to download Manuscript Honey Bee Products in Turkey.docx prepared foods and food ingredient such as bakery products, confectionery, spreads, marmalades, jams, honey with milk and milk products, ice cream, and soft drinks. It is used as fermentation products such as honey wine, honey beer, honey liqueur, honey vinegar. It is also used as ingredients of drugs and cosmetics (Young, 2009).

## PRODUCTS

Apiculture continiously increased in Turkey between 1936 and 2012. Modern type hives were about 2,9 % (33.489) in 1936 but it increased up to 97,5 % (6.191.232) in 2012. This achievement caused to 17 times more honey production and seven times more wax production (Table 1) (Kurt, 2007).

Turkish apiculture has rank of 3rd for bee colonies and 2nd for honey production in the World, but honey production per hive is about 16 kg which is lower than world's average of 20 kg (Anon, 2014b). In Turkey there was started to rear organic beekeeping in 1980s. The organic beekeeping is made under regulation of 'Organic Livestock Production' which was issued on the Gazette dated on 10 June 2005 and numbered as 25841. The organic beekeeping is mainly reared in Province of Mugla which realized about 67 % production of Turkey (Kurt, 2007). The main product of beekeeping is honey, but beeswax, honeycomb, pollen, propolis, royal jelly, bee venom, bee swarm, package bee, queen bee, and bee hive are also in beekeeping economy (Sirali, 2002; Tryjarski, 2011).

Table 1. Production of apiculture (Anon 2010, Anon 2013).

| Year | Old TypeHives | Modern TypeHives | Honey Production | Wax Production |
|---|---|---|---|---|
| 1936 | 1.128.071 | 33.489 | 5.261 | 602 |
| 1940 | 1.119.483 | 29.092 | 5.333 | 571 |
| 1950 | 972.631 | 56.500 | 5.200 | 644 |
| 1960 | 1.302.000 | 185.400 | 9.690 | 1.001 |
| 1970 | 1.253.568 | 567.394 | 14.889 | 293.948 |
| 1980 | 893.260 | 1.332.217 | 25.170 | 199.609 |
| 1990 | 293.948 | 2.989.510 | 51.286 | 156.777 |
| 2000 | 199.609 | 4.067.514 | 61.091 | |
| 2012 | 156.777 | 6.191.232 | 89.162 | |

**Honey:**Between 1936-2012 honey and beeswax production increased up 17 and 7 times respectively (Table 2). As unifloral honey there are produced numerous kids of honey including 'yonca' (alfalfa), 'Anzer', 'kestane' (chestnut), 'deli' (crazy), 'okaliptus' (eucalyptus), 'ihlamur' (linden), 'nane' (mint), 'portakal' (orange), 'cam' (pine), 'kusdili'/'biberiye' (rosemary), 'aycicegi' (sunflower), 'kekik' (thyme) honey in Turkey (Table 5) (Sirali 2002,

Sonmez 2004). Anzer Honey is produced in small region, Anzer Highland, located in Rize province of Northeast of Turkey (Sirali, 2002; Anon, 2014c). The most expensive honey is Anzer honey. Anzer honey is about 30 times more expensive than common flower honey (Anon, 2014d).

Table2. Somekind of uniflorahoneyandimportantproperties (OddoandPiro 2004, PiazzaandOddo 2004, Ozmenand Alkin 2006, CeterandGuney 2011, Anon 2014[e], Anon 2014[f])

| Types of honey (Turkish in brackets) | Importantproperties |
|---|---|
| Acacia (Akasya) | Anti- cancerand anti-stress, usefulformetabolicdiseases, osteoporosisanddeficiency of zinc, selenium and iron |
| Alfalfa (Yonca) | Strengthenthevisualand skin rheumatismremovaland treatment of vascularcongestion |
| Anzer | As an alternativetherapyforgastrointestinaldisorders (gastritis, constipation), hypertension, believedtoincreasethesexualpoweragainsttoimpotence |
| Astragalus (Geven) | Strengtheningthenervoussystem, inflammatoryforbladderandprostateandbeneficialforrenaldiseases |
| Black cumin (Corekotu) | Improvesactivity of strengtheningthekidneyandurinesystem, andremovingbloodpoisoning |
| Chestnut (Kestane) | Relievingupperrespiratorytractinfectionsli relievingstomachandliverfatigue; boosterir |
| Coriander (Kisnis) | Sedativeandsleepadjustment, ,strengtheningthedigestivesystemandshort |
| Crazy (Deli) | Alternativetherapy in gastritis, ga coronaryheartdiseaseand is believedtoincr |
| Eucalyptus (Okaliptus) | Treatment of lung disorders, asthma, cold |
| Linden (Ihlamur) | Protectsandstrengthensthenervoussystem, |
| Mint (Nane) | usefulforchildrensgrowth, Prevent intestinalgas, curescolic, increase |
| Orange (Portakal) | Calmness of thenerves, relievnees of cram |
| Pine(Cam coronaryheartdiseaseand is | Treatment of throatdisorders |
| Rosemary (Biberiye) | Treatment of liverdiseasesanddigestivedis |
| Sunflower (Aycicegi) | Makingyoung skin cells, coldremoval, anc |
| Thyme (Kekik) | sedative, bloodmaker, anti Strong anti-bacterial, anti-coughandco strengthentherespiratorysystemanddigestiv |
| Ziziphus (Hunnap) | nervousandbrainsystemand, patients, lightening of skin Treating of kidney diseases, boost libido |

Crazy Honey is produced by bees by using different kinds of Rhododendron plants (Sirali, 2002; Ceter and Guney, 2011). Rhododendron plants contains high level of grayanatocsin which penetrates to honey from the plant (Ceter and Guney, 2011; Anon, 2014d). In case of being eaten crazy honey too much, some symptons are seen such as burning sensation in skin and throat; mouth and nose itching; redness of the skin and eyes; vertigo and headache; urinary and fecal incontinence; blurred vision or temporary blindness; hypotension or collapse, nausea, vomiting, salivation, cramps style abdominal pain, gastroenteritis, feeling of lassitude, fatigue, malaria fever resembling seizures, deep bradycardia, delirium and even coma (Sirali, 2002; Ceter and Guney, 2011). Minimum 5 gr of honey poisons (Yilmaz et al., 2006). Pine honey is a kind of honeydew honey and produced by scale insect, Marchalinahellenic (Sirali, 2002; Anon, 2014a). Pine honey is used as diuretic and for respiratory diseases (Sonmez, 2004). Thyme honey is not only famous in Turkey, but it is also famous in some world countries (Sirali 2002).

**Wax:** It used to be as a candle to light at home, worship or work places. The wax and tallow used to mix and made candle to light. Some camphor used to add into the candle for fragrance. The wax also used use to seal envelopes (Kilinc, 2011).

**Pollen:** Pollen used by beed is a fine to coarse powder containing the microgametophytes of seed plants, which produce the male gametes (sperm cells) (Anon, 2014g). Trully pollen is not consumed by bees as collected by foragers. In fact the pollen pellets are stored in comb cells and honey, nectar, or glandular secretions are added to the mass of stored pollen. Pollen stored in this way undergoes a lactic acid fermentation and becomes what is called 'bee bread'. Stored pollen generally has a specific bacterial flora associated with it. Pain and Maugenet found three microbial genera in bee bread: Pseudomonas, Lactobacillus, and Saccharomyces. This suggests that microorganisms are probably involved in the storage of pollen (Herbert and Shimanuki, 1978).

**Propolis:** It is an antimicrobial, antifungal, antivirus, antienflamatuar, and anesthetic substance. (Marcucci, 1995; Kumova et al., 2002). Propolis is a resinous substance and used by bees protection, disinfection, and isolation of beehives (Kolayli et al., 2010). In 20th century impotance of propolis for human life were not known, but nowadays it is accepted that propolis is like a miracle substance. According to analysis there are at least 149 compounds and 22 minerals in propolis (Walker, 1987; Marcucci, 1995). Hence some bee breeds which produce and use propolis in hive are getting importance to be reared recently (Kumova et al., 2002). In a study 240 laying hens were divided into four groups and 0, 100, 200, and 400 gr of propolis doses added into the feed ration for four seperate groups for 32 weeks. According to observed results there were statistically no difference for Haugh unit which is a measure of egg protein quality based on the height of its egg white (albumen) and egg shell thickness (Silici et al., 2010).

**Royal jelly:** Generally royal jelly is secreted by bees which 5-15 days old age. It is gel consistency, in bone colour, and has a peculiar odor, bitter taste, and pH 3,5. Some people believe that royal jelly provides vigor and fitness, moreover renews cells (Anon, 2014f).

**Bee venom:** It is a sharp smell, bitter taste, yellowish coloured, crystallize when contact to air substance. Bee venom mainly contains mellitin, apamin, MCD-peptid, histamin, hyaluronidase, foshpholipase-A2 substances. A bee can carry 0,05-0,3 ml bee venom. Bee venom were used for joint diseases, especially in arthritis and rheuma in Europe. It is also used for griabal infections and orthopedic diseases. Bee venom affects as anti-inflammatory and analgesic (Anon, 2014f).

## CONSERVATION MEASURES

Although apiculture increased in last 100 years, some livestock genetic resources of Turkey decreased which showed that livestock genetic resources of Turkey should

be conserved (Ertugrul et al., 2010). A project of 'In Vitro Conservation and Preliminary Molecular identification of some Turkish Domestic Animal Genetic Resources (TURKHAYGEN-I)' was prepared by Genetic Engineering and Biotechnical Institute (GEBI), Marmara Research Centre (MRC) Gebze, Kocaeli and aplied between 2007-2011. Numerous breeds were contained in this project under species of horse, water buffalo, cattle, sheep, goat, and silkworm (Anon, 2014h), but unfortunately not bee.

The Turkish Governments provided some subventions and supportings in different ways. The Caucasian Bee was contained among breed list which will be supported in 2012 (Anon, 2014i). On the other hand in structure of Ministry of Agriculture and some universities, there are some Apiculture Research and Development Centres. In Israel there used to be Syrian Bee (A. m. syriaca) until 1990s. Israeli beekeepers preferred to rear Italien Bee (A. m. ligustica) instead of Syrian Bee because of aggression of it. Italien Bee could not be succesfully reared, because they could not fight against to Oriental Hornet (Vespa orientalis). Syrian Bee was aggressive but succesfull to fight against to Oriental Hornet. In short term Italien beekeepers had high income but in long term ecosystem was deteriorated and ecologic balance was damaged (Kence, 2006). For this reason Turkish native bee breeds should be saved. Institute of

Aegean Agricultural Research (in Menemen county of Izmir province) has started a project to protect and develop bees in 'EsekAdasi' (Donkey Island). This island is free from any bees, near to city of Cesme, Izmir, and 11 km far from the mainland. Chosen colonies is taken to the island and bred there (Karaca, 2010).

## CONCLUSIONS

Beekeeping can be carried out in a manner compatible with the various branches of agriculture and is a breeding made without soil cultivation (Inal and Guclu, 1998). Honey bees are social insects and carry on community life. They produce honey, beeswax, royal jelly, bee venom, pollen, and

propolis which are vital in terms of nutrition and health. Honey bees also extremely valuable in the natural balance and agricultural production in terms of pollination (Talu, 2004) .

Traditionally the most common trade of bee products is natural (untreated) honey. The highest awareness among bee products is honey. Natural honey is generally consumed as liquid, crystalline or in honeycomb. However, it is also widely used as a medicament or additives to the food or drink.

The honey wax, pollen, propolis, royal jelly, and bee venom are also other bee products. In

recognition of pollen, royal jelly, and wax are 61.6%, (52.8%) and 46.4% respectively. However, bee venom and propolis are recognized less as 16.3% and 8.9% respectively. Today, some countries have begun significant income from the trade of these products than natural honey (Boluktepe and Yilmaz, 2008; Seyyidoglu, 2014).

Beekeeping is an important agricultural activity by providing additional income to the small and medium-sized agricultural smallholders. In order to increase income of beekeepers, primarily knowledge about beekeeping products should be increased among manufacturers and consumers. Positive ideas about bee products of consumers will increase the demand of these products. The manufacturers who will be able to increase product differentiation have more income and welfare.

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