



Major Products of Honey Bee and their Uses

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INTRODUCTION

Most of the cross-pollinated crops are pollinated by honey bees. Bees are essential for improving both the quality and quantity of produce. On earth, it is the primary pollinator. The honey bee produces a variety of products, such as honey, beeswax, pollen, royal jelly, propolis, and bee venom etc. (Kishan Tej *et al.*, 2017). The useful products of honey bee are described below.

a) Honey

Honey is a sweet, viscous substance produced when honeybees collect nectar from plants, regurgitate them and deposits in the cells of comb (Singh *et al.*, 2012). Depending on the types of floral and extra floral nectaries, honey quality varies. The collected honey can be divided into uni-floral and multifloral types. Despite the rarity of mono-floral honey, there are several honey types that can be divided into groups according to their floral sources, including litchi, berseem, eucalyptus, brassica, and others (Mishra, 1995). Honey is a rich source of carbohydrates, primarily consisting of fructose and glucose. Honey also primarily consists of water, in addition to a wide variety of different kinds of sugars, acids, vitamins, proteins and minerals (White, 1980). Honeybees reduce the honey's moisture content to less than 20% and then seal it in comb cells (Mishra, 1995). Table 1 shows the average composition of honey.

In the case of *Apis dorsata*, honey is obtained by squeezing the combs, which includes certain pollutants like pollen and larva, but honey from domesticated bees (*A. mellifera* and *A. cerana indica*) is extracted with a honey extractor using centrifugal force and is impurity-free. Honey can crystallise or remain liquid, therefore it can be sold to consumers as liquid honey or granular honey (Mishra, 1995). A two-step procedure is used to process honey. Firstly, the yeast cells that cause honey to ferment are killed by indirectly heating the honey in a water bath for 30 minutes at 60 °C. Later, when the honey's viscosity is lower, it is filtered while still warm through a two-layer cloth filter, chilled and then packaged in glass bottles (Kishan Tej *et al.*, 2017).

Uses

Honey is a significant source of carbohydrates. Honey is utilised as an immune booster, anti-inflammatory, antioxidant and antibacterial agent in addition to being a

natural sweetener. Honey is frequently applied topically to heal wounds and treat burns, skin infections and coughs. Peptic ulcers, gastritis, and gastroenteritis can all be prevented and treated with honey (Abeshu & Geleta, 2016).

Table 1: Composition of Honey

Sl. No.	Competent	% value
1	Fructose	38.2
2	Glucose	31.3
3	Water	17.2
4	Sucrose	1.9
5	Minerals	2
6	p ^H	3.9
7	Diastase value	20.80

a) Beeswax

Besides honey, wax is the other honeybee product. When the worker bee is between 14-18 days old, the wax glands start to generate wax. Bees utilise wax to construct their nests, which is typically white; however, depending on the pollen source the wax's colour may alter. Beeswax has a specific gravity of 0.95 and a melting point of 65 °C. Beeswax comprises complex esters of monoatomic alcohols and fatty acids (70.4% and 74.7%), free acids (13.5–15.0 %) and saturated hydrocarbons (12.5% and 15.0%) (Phadke and Phadke, 1977). Usually, damaged combs are utilised to produce wax.

There are two ways to extract wax: In India, utilising a hot water bath to extract wax is the most popular technique. Solar extractors are also used, which melt wax using solar energy. Wax is a crucial component of cosmetics like cold creams, lipsticks, and rouges because it adheres to the skin more effectively. It is also used to prepare comb foundation sheets, candles, polishes, furniture, pharmaceutical companies and the perfume industry (Mishra, 1995).

b) Bee Venom

Proteins and peptides are the primary ingredients in bee venom. According to

Urtubey (2005), apitherapy has been used in China, India, Egypt, Babylon, and Greece using bee venom. The venom sac of the bee contains the venom, which is injected when the bee stings. With the help of a venom extractor, which has a small electric current that irritates the bees and causes them to try to sting, the venom may be extracted from the bees, and the venom is then collected in the bottom glass plate. The top venom producer, the USA, produced only 3 kg of venom over the previous 30 years (Abrol, 2012). Apitherapy is a traditional treatment for joint pain that is used in India and several other nations. Patients are made to take bee stings by holding the bee by its wings with their thumb and index finger. By using the above-mentioned technique, venom can be made for subcutaneous injections. On the affected areas, an ointment produced by combining apitoxin, Vaseline, and salicylic acid (1: 10: 1) might be used. Salicylic acid softens skin and facilitates penetration (Mishra, 1995).

c) Propolis

Propolis is a sticky, dark-coloured substance that is utilised for covering the cracks and crevices of the hive as well as to build and modify honey bee nests (Burdock, 1998). In temperate areas, the propolis

coloration might vary; it can be ranging from a light yellow or brown to a dark-brown colour, frequently with a reddish hue. The longer propolis is kept in the hive, the darker it tends to get. Additionally, the trees and plants from which propolis is obtained affect its colour (Fearnley, 2005). It can be used to treat cancer, dermatitis, infections, and wounds. It works well as a disinfectant and fungicide (Ghisalberti, 1979). It contains antibacterial, antifungal, and antiyeast properties (Aspay, 1977 and Olivieri *et al.*, 1981). Only *A. mellifera* is known to forage for propolis among the *Apis* species. The tropical stingless bees do gather a resinous substance like propolis, which they utilise to seal the hive and make vessels for storing honey and pollen (Fearnley, 2005).

d) Royal Jelly

Royal jelly is white milky fluid. It is produced by nurse bees between the ages of 6-12 days and is very acidic, rich in protein,

carbohydrates, vitamins, RNA, and DNA. (Abrol, 2013). Additionally, it is a very nutritious diet for people because it boosts energy and vitality. Royal jelly is rich source of amino acids such alanine, arginine, aspartic acid, glutamic acid, glycine, isoleucine, lysine, methionine, phenylalanine, tryptophan, tyrosine and serine. Royal jelly contains eight of the necessary amino acids needed by humans. In addition, it contains silicon, sulphur, iron, copper, phosphorus, and vitamins A, B, and C. It can be taken out using the Doolittle method or the grafting technique, which involves fastening artificial queen cell cups made of pure wax to a brood frame constructed of bars holding small wax blocks. The queen cell cups will then be filled with one- or two-day-old larvae and retained inside the hive. The nursing bees provide royal jelly to larva as food that can be harvested (Mishra, 1995). The royal jelly can benefit humanity in a variety of ways since it is more nutritious.



Honey



Wax



Propolis



Royal jelly

CONCLUSION

Honey bees are the major pollinators of the cross-pollinated crops. It has potential to carry the pollen from one place to another place (long distance). Honey bee will be produced several products like; honey, royal jelly, wax, propolis and bee venom. Products have great medicinal properties and nutritional value.

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