BEESWAX

A Valuable Source Of Income From Bees

K. VANITHA
Scientist (Agricultural Entomolgy)
Crop Protection, ICAR-Directorate of
Cashew Research, Puttur.

Bees are important agents of pollination and they give us very useful products. The Indian apiculture (bee keeping) market was worth Rs. 16,818 million in 2018, which has been projected to reach Rs. 33,128 million by 2024 (Imarc, 2019). Bees give us honey and a number of other by-products including beeswax, propolis, royal jelly, pollen, honeycomb, etc each has its own value and several uses. Among all the honey bee products, the economic importance of beeswax is next to honey. Beeswax is a valuable product which can provide a sensible income in addition to honey.

What is beeswax and how is it produced?

Beeswax is a natural wax produced by honey bees mostly of the genus Apis. Bees, particularly worker bees produce their wax using its specialized wax glands present in their ventral abdomen. A worker honeybee produces eight scales of wax every 12 hours. Then the hive worker bees use it to form cells for honey storage and larval and pupal protection within the beehive. Each wax scale weighs about 1 mg. It is estimated that

Squeezed beeswax cappings and hive after honey extraction (bees moving over them)

Worker bees busy on a fresh honey comb

about 1 billion of scales are necessary to construct 2.5 m2 comb surface or otherwise, 1 gram of wax serves for construction of 20 cm3. For the wax-making bees to secrete wax, the ambient temperature in the hive must be 33 to 36 °C. To produce one kilogram of wax, around eight kilograms of honey are consumed by bees. Wax produced by the Asian species of honeybees is known as Ghedda wax. It differs in chemical and physical properties from the wax of *Apis mellifera*. The waxes produced by bumblebees and stingless bees are also very different.

Squeezed beeswax cappings and hive after honey extraction (bees moving over them) Worker bees busy on a fresh honey comb

Nature of beeswax: its constituents and properties

The fresh wax is initially glass-clear and colorless, becoming opaque after mastication and adulteration with pollen by the hive worker bees, becoming progressively more yellow or brown by addition of pollen oils and propolis. The main physical characteristics of wax are pleasant and honey-like odour, fine-granular, blunt, not crystalline structure while breaking and non-sticky to the knife when cutting (Bogdanov, 2016). Chemically, beeswax consists mainly of esters of fatty acids and various long-chain alcohols. Its main constituents are palmitate, palmitoleate, and oleate esters of long-chain aliphatic alcohols. Beeswax has a relatively low melting point range of 61 to 65 °C. Water < 1 %, acid number 17-22, saponification number 87-102 and Ester/acid ratio 3.3-4.3 (European bee wax), which is 8-9 for Asian wax types (Tulloch, 1980).

Manufacture of beeswax

India is the major producer of beeswax. The raw products for wax manufacture are old combs and capping. Thus, all old combs and pieces of wax should be saved for rendering into wax blocks. Old combs should be rendered separately from newer ones since the newer combs yield a higher quality wax and the cappings contain almost pure wax. Honey should be preferably removed from the stored combs, this will prevent eventual fermentation and moulds. Old combs, free of sugar feed and honey should be packed in plastic bags and be given to wax manufactures for recycling into pure wax as soon as possible. Thus the beekeeper can avoid problems with the wax moth and with moulds, which arise often when storing combs. The good quality of beeswax depends greatly on the production methods. There are two wax extraction methods: melting and chemical extraction. It is safer to recycle combs into raw wax by a sun wax melter. Wax blocks are dried and stored in a dark and cool place. They can be stored in wrapping paper, placed on shelves or in containers made of stainless steel, glass or plastic, for best preservation of colour and aroma.

Applications of beeswax

Beeswax is used in manufacture of more than 300 items. Beeswax can be

used again to prepare comb foundations by sheeting and casting methods. Beeswax can also be used to attract swarms towards hives. Beeswax is often preserved in archaeological deposits and thus there are many witnesses for its early use (Crane, 1983). Besides, beeswax is also used for following purposes: cosmetics 25-30, pharmacy 25-30 %, candles: 20 % and other purposes: 10-20 % (Crane, 1990). More details concerning the different uses of beeswax in past and present are available widely (Bogdanov, 2016). Beeswax has its use in the product categories of candles, art, sculptures, engraving, food processing, pharmaceuticals, physiotherapy, cosmetics, textiles, handicrafts, musical instruments, varnishes and polishes, industrial products and many.

Market outlook

Worldwide, tropical and developing countries dominate beeswax production and export, whereas industrialized countries import more beeswax. According to Comtrade statistics, the world wholesale price of beeswax is usually around US $ 4-10 per kilogram. India, Ethiopia, Argentina, Turkey, South Korea, Mexico and Brazil are some of the key manufacturers and consumers of beeswax. Organic beeswax has high demand from importing countries., for eg. 100 g of pure organic beeswax is sold for up to Rs. 200 through online marketing. Some of the key importing countries such as the U.S., Germany, France and Japan have a high significant demand for both organic and conventional beeswax.

Don't waste beeswax

Beeswax is a valuable product that can provide a worthwhile income in addition to honey. Worldwide, many beekeepers and honey hunters do not know that beeswax can be used for several purposes. Knowledge is often lacking. It is observed that only half of the beeswax produced in the world comes to the market, and remaining being thrown off or lost. Hence, honey hunters and beekeepers should realize the value of beeswax. Encouraging beekeepers to save beeswax, development of beeswax collecting systems, and organizing the sale of the combined honey and wax, cooperative marketing are the few ways to utilize the valuable resource without getting wasted.

Summary

Beeswax is a valuable product that can provide a worthwhile income in addition to honey. It is being used in manufacture of more than 300 items that are in market. But, due to lack of knowledge on its applications, this major resource is getting wasted in most places. Farmers and honey gatherers need to be made aware of the importance of beeswax and the effective ways of its utilization.

Reference:

Tulloch, A.P. 1980. Beeswax - Composition and analysis. Bee World, 61 (2): 47-62.

Bogdanov, S. 2016. Beeswax: Production, Properties Composition and Control. Bee Product Science, www.bee-hexagon.net, April 2016.

Crane, E. 1983. The Archaeology of Beekeeping. Gerald Duckworth & Co. Ltd. London

Crane, E. 1990. Bees and beekeeping: Science, practice and world resources. Cornell University Press Ithaca, New York.

Imarc. 2019 Indian Apiculture Market: Industry Trends, Share, Size, Growth, Opportunity and Forecast 2019-2024. Accessed on 12.7.2019 at https://www.imarcgroup.com/india-honey-beekeeping-apiculture-market