

## Products From beekeeping

### Honey

Honey prepared from the nectar of a single flower source is called unifloral or monofloral honeys, while honeys prepared from nectars of several sources is called multifloral. Honey is extremely variable in its properties and composition. It has characteristic flavours and aromas depending upon the plant source. Freshly extracted honey is a viscous liquid and hygroscopic. It is the low surface tension of honey that makes it excellent humectants in cosmetic products. Colour in liquid honey varies from clear and colourless (like water) to dark amber or black and depends on the botanical origin, age and storage conditions. Crystallization is another important characteristic. The crystallization results from the formation of monohydrate glucose crystals.

*Average composition of ripened Indian honey is given below*

Component	Percentage (Approximate)
Water	20.89 % (Apiary honey) 18.9 - 24.2 % (Rockbee honey) 16.5 % (Dwarf bee honey) 24.1 % (Stingless bee honey)
Levulose (Fructose)	41 %
Dextrose (Glucose )	35 %
Sucrose	1.9 %
Dextrins	less than 2 %
Ash (Minerals)	0.185 – 1.4 %

In addition, rare sugars (maltose and raffinose) are also present in small quantity. Honey contains about 0.1 % N that exists in the form of protein derivatives and amino acids, and various vitamins that are important for human nutrition. Free acids (ex. Gluconic acid) and Enzymes – Diastase, Invertase, Catalase, and Glucose Oxidase are also reported to be present. Honey also contains several species of sugar tolerant yeasts.

## **Uses**

In virtually every culture, evidence can be found of its use as a food source and as a symbol employed in religious, magic and therapeutic ceremonies.

A major part of the production is presently consumed as food or food ingredient.

## **About**

10 per cent of the production is used in industry mainly in Ayurvedic preparations, pharmaceuticals, bakery, and confectionary and tobacco industries.

It is valued for its nutritive value, giving energy, health, strength and vigour. It facilitates better physical performance, resistance to fatigue, higher mental efficiency. It also serves as a general tonic for newborn infants, the young and the elderly, the convalescent.

A recent scientific study on human, that honey is reported to slow down the oxidation of LDL (low density lipoproteins) and checks atherosclerotic plaque deposition in blood vessels. Honey is a potential dietary antioxidant to counter reactive free radicals.

Honey is used in preparation of pickles, jams, jellies, marmalades, squashes, sauces and ketchups, and sweetmeats like tarts, pancakes, pastries, pries and pudies and confectionery like sweets, candies, toffees, eclairs and chocolates, and in bakery products, like breads, biscuits, cakes and cookies.

Traditionally, honey has been used as vehicle in Ayurveda, Siddha, Unani, and other indigenous systems of medicine. It is anti-microbial and antiseptic and helps in healing of wounds and burns in a natural way. It has a mild bleaching action on skin and used in facials, shampoos and other cosmetics.

## **Beeswax**

Beeswax is a metabolic product of honeybees. Worker honeybees of less than two weeks of age produce beeswax in a process of synthesizing esters in the fat body behind the wax glands. Rockbee wax is usually dark yellow to brownish in colour. Beeswax from the hive bees is white to pale yellow in colour. The melting point of rockbees is 59.6°C, and that of the stingless bees, 66.5°C, and that of the European bee is 62.5°C.

Beeswax is a highly complex mixture of hydrocarbons and esters of monohydric alcohols combined with straight chain fatty acids and hydroxy-

acids. The total unsaponifiable matter (hydrocarbons and alcohols) is about 58 per cent in both the Indian and European beeswax.

## Uses

- Beeswax is consumed by beekeepers for the making of wax foundations, which are given to the bees as a guide for construction of their combs.
- Its very special characteristics like medicinal benefits, plasticity and aroma ensure its continuing use. Beeswax is in high demand for commercial purposes.
- Being inert, beeswax is safe for human consumption as an ingredient in human food. It is used for coating for drugs or pills and also to fill capsules with equal amounts of drugs or other ingredients of various granule sizes.
- High quality beeswax obtained from capping is compatible with cosmetic ingredients and frequently used in ointments, cleansing creams cold cream and lotions, emollient and barrier creams, depilatories, lipsticks, nail creams, sun protection products, eye and face make up, and foundation creams.
- Beeswax is used in preparation of candles, in metal castings and modeling because due to its plasticity.

## Royal jelly

Royal jelly is a special liquid food, rich in proteins, hormones, vitamins, organic acids and minerals, secreted by the hypopharyngeal gland of young worker (nurse) bees. Royal jelly is whitish in colour with yellow tinge with a pungent phenolic odour and a characteristic sour flavour. It is partially soluble in water. It is acidic (pH 3.6 to 4.2). About two thirds of it is water. By dry weight, proteins (73.9%) and sugars are the largest fractions. A total of 29 amino acids and their derivatives have been identified. A number of enzymes are also present including glucose oxidase, phosphatases and cholinesterases. The lipid fraction consists of free fatty. The major mineral salts of K, Ca, Na, Zn, Fe, Cu and Mn.

## Uses

The spectacular fertility and long life-span of the queen fed on royal jelly, has suggestively led people to believe that royal jelly may produce similar effects in humans too. People have experienced it as a general tonic and stimulant improving general well-being, resistance to fatigue, learning capacity and memory, appetite, and general health improvement.

Royal jelly improves immune response and general body functions.

Royal jelly is used as ingredient in medicine-like products. It is usually mixed with medicines, tonics, beverages and cosmetic products soon after its production or sometime it is freeze dried.

A mixture of royal jelly in honey (1-3 % royal jelly) is probably the most common way in which royal jelly is used as a food ingredient.

Probably the largest use of royal jelly is in cosmetics and dermatological preparations.

## **Pollen**

In India, Rock bees collect enormous quantities of pollen. The Central Bee Research and Training Institute, Pune made pollen supplements using rock bee pollen. After harvest from bee colonies, pollen loads are carefully air-dried or fresh-frozen for preservation and packed in airtight glass bottles. Pollen is also sold as tablets, in capsules mixed with honey.

The major components are proteins and amino acid, lipids and sugars. The minor components are more diverse including flavonoids, carotenoids, vitamins, minerals, terpenes, nucleic acids and nucleosides, enzymes and growth regulators. All essential amino acids are found in pollen.

## **Use**

The major use of pollen today is as a food or food supplement. Tribals eat the combs pollen while harvesting honey.

Pollen is used in medicine for treatment of diseases like chronic prostatitis, bleeding stomach ulcers, respiratory infections and in control of allergy reactions.

There is good number of non-scientific reports of benefits, cures or improvements in athletic performance, digestive assimilation, rejuvenation, general vitality, skin vitality, appetite, hemoglobin content, and sexual powers by use of bee-collected pollen.

Pollen has only recently been included in some cosmetic preparations with claims of rejuvenating and nourishing effects for the skin.

## **Propolis**

Propolis is a mixture of the beeswax and the resins collected by honeybee from plants. In the process of collection of resins, it is mixed with some saliva as well

as with wax. Propolis is used by worker bees to line the inside of nest cavities, brood combs, to repair combs, seal small cracks in hive, reduce the size of hive entrances and to seal brood cells. These uses are significant, because they take advantage of the antibacterial and antifungal effects of propolis.

Propolis ranges from yellow to dark brown in colour. At temperatures of 25 to 45°C, propolis is a soft and very sticky substance. Typically, propolis will become liquid at 600 to 700°C, but for some samples the melting point may be as high as 1000°C. *Use*

The Greeks, Romans and Egyptians already knew that propolis would heal skin abscesses.

In sub-Saharan Africa, propolis is still used today in herbal medicines.

In Africa, it is still used today as a medicine, an adhesive for tuning drums, sealing cracked water containers or canoes.

It has been incorporated in special varnishes.

Its anti-bacterial, anti-fungal, anti-viral, anti-acne, anti-inflammatory and anti-oxidant characteristics provide many benefits of its applications in medicines, dermatological and cosmetic treatment. The antioxidant, antimicrobial and antifungal activities of propolis also offer scope for its applications as a preservative in food technology.

## **Venom**

Honeybee venom is a clear, odourless, watery liquid. Honeybee venom is produced by two glands associated with the sting apparatus of worker bees. Sting is evolved from ovipositors. Its production increases during the first two weeks of the adult worker's life and reaches a maximum when the worker bee becomes involved in hive defence and foraging.

About 88% of venom is water. The glucose, fructose and phospholipid contents of venom are similar to those in bee's blood. At least 18 pharmacologically active components, including various enzymes (Phospholipase A<sub>2</sub>, Hyaluronidase, Acid Phosphomonoesterase,

Lysophospholipase and B -glucosidase), proteins and peptides (Melittin, Pamine, Mast Cell Degranulating Peptide - MCD), Secapin, Procamine, Adolapin, Protease inhibitor, Tertiapin, and various small peptides), and amines (Histamine, Dopamine and Noradrenalin) have been described in venom.

## Use

Bee venom has long been used in traditional medicine for the treatment of various kinds of rheumatism.

Ointments can be prepared by thoroughly homogenizing bee venom with white Vaseline, petrolatum or melted animal fat, and salicylic acid, in the ratio of 1:10:1.

Its use in cure of the diseases, like arthritis, chronic pain, epilepsy, rhinosinusitis, polyneuritis, neuralgia, migraine, multiple sclerosis, asthma, and tropical ulcers etcis reported.