



## **A Comprehensive Study of Honey: A Review**

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### **ABSTRACT**

*As a natural sweetener that honey comes from bees. Generally honey is used as a sweetener and flavour in a selection of dishes and beverages. It additionally has spiritual and symbolic significance. It's also used to remedy a spread of diseases in many medicinal structures. Honey has been proven to help with a selection of human illnesses. It has been proven that honey helps to selection of human illnesses. Honey's broad-spectrum antimicrobial (antibacterial, antifungal, antiviral, ) properties have been confirmed clinical studies, which may be attributed to its acidity (low pH), osmotic effect, high sugar concentration, presence of bacteriostatic and bactericidal factors (hydrogen peroxide, antioxidants, lysozyme, polyphenols, phenolic acids, flavonoids, methylglyoxal, and Despite a significant body of evidence supporting honey's antibacterial properties, Honey is high in antioxidants and has antibacterial and antiseptic qualities. Flavours in honey various which depends on the source of nectar as well as how many types of honey are exist. It's also used to cure a variety of diseases in many medicinal systems. Humans have long recognised honey's health benefits. This evaluation's intention is to speak about the chemical characteristics of honey. The chemical functions of various substances, such as proteins, sugars, enzymes, amino acids, vitamins, organic acids, minerals ,phenolic substances present in honey, have been investigated.*

**Keywords-** Honey, Antibacterial activity, Antioxidant properties, Biological active compounds, Composition of honey, Basic categories of honey.

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### **INTRODUCTION**

By evaporation and regurgitation bees convert nectar into honey. In the beehive they keep honey as primary source of meal in wax honey combs. Reason of sweetness of Honey due to fructose, monosaccharide's and glucose. It is used in various liquids and foods as flavouring and natural sweetener. Nectar source and diverse type decides the flavours of honey . in numerous medicinal traditions treatment honey is used. Greek, Islamic, Vedic, Roman, and different texts have been reported the dietary and medicinal qualities of honey and also healing qualities of honey by various Physicians of ancient times. Antibacterial , antiseptic with antioxidants are the powerful properties of honey, evolution of honey are described elaborately in the earliest Hindu Vedic texts. To describe the sun as honeycomb it is used as a metaphor. To shape honey the honeybees incubate inside the cells, which is known as "the nectar of the solar" [1]. The four Vedas, the Hindu scriptures every other metaphor states are represented by means of the honeycomb that is said to be "sweet, stunning, and golden just like the solar". Honey is also known as a "blend of all of the Nectars of many flowers." This shows how of honey represents "oneness of everything. The four elements of Panchamrit are milk, ghee, sugar and buttermilk and the fifth nectar of Panchamrit is honey. [1]. also, its composition and fine range relying on manufacturing approach, of the region, nectar ,situations of handling and garage and the climatic conditions, that are main source of honey [2]. Honey contains potassium, sodium chlorine, sulphur, phosphate, calcium and also includes a fructose ,sugars inclusive of glucose and also including magnesium as minerals Honey also contain are, B2, B1, B6, C, B3 and B5 which depends on the quality of nectar and pollen . pH of honey is commonly between 3.2 and 4.5 This highly acidic pH degree resists the boom of several microorganisms. Composition of Honey is mixture of two saturated monosaccharides [1].

### **How nectar is produced**

Honey derives from nectar [3]. It contains amino acid, proteins, minerals, aqueous solution of sugars, different acids, lipids and other components. The overall sugar content material can range from 5 - 80 percent of the nectar the exact composition of nectar. [4]. In numbers of nectars, the distinctive or

primary sugar sucrose, even as in some nectars sugars are present in roughly equal quantities like fructose, glucose, and sucrose. As an instance, the sucrose is the dominant sugar in the Ranunculaceae (buttercups and clematis) and household Lamiaceae (mints), in some nectars have very less amount of sucrose however varying proportions of fructose and glucose as it is in the families Asteraceae (sunflowers, asters and daisies) and Brassicaceae (cabbage and mustard) [5]. Some other sugars are found like galactose, sorbitol and Raffinose have been discovered in nectars of few plants, however they are now not generally found [4]. The composition of the nectar has a precise effect on the taste and quality of the honey.

### **Conversion of Nectar**

Because of complex anatomy Bees use to acquire nectar from flowers. Approximately 25 mg of nectar is saved at the bottom in honey belly or honey sac referred as widened area of the esophagus when a worker bee drinks nectar from a flower, [4]. In some level in the nectar is mixed with hypopharyngeal and salivary secretions. These secretions of glands, that start to chemically adjust the nectar and start incorporate with enzymes. Enzyme Glucose oxidase is also present in nectar. Once the transformation of the nectar into honey starts chemically [6] within the hive, the forager bee ejects the nectar and transport it to a house bee. The complete conversion of nectar into honey is done by process: the evaporation of extra water and the conversion of sucrose into glucose and fructose. [6].

### **Biological active compound**

Honey contains mainly glucose and fructose as well as is a supersaturated sugar. It also contains proteins, amino acids, minerals, oligosaccharides and other enzymes [7][8]. Vitamins like B6, ascorbic acid, thiamine, riboflavin also present [9]. Additionally some valuable bioactive compounds, mainly tocopherols and polyphenols also present in honey. However, the composition of plant and honey are different from each other where the honey the bees have collected the nectar [10][7][8]. The minerals are Na, Fe, Ca, Mg, Mn, Zn, and Cu are present as minor additives of royal jelly, amino acids and nutrients (B complex, A, C and E) and as a minor heterocyclic compounds, enzymes, nucleotides, polyphenols, hormones these are present [7].

### **Types of honey**

Depending upon several floral resources honey has nearly 320 one-of-a-kind sorts. The properties of honey like look, flavour, aroma and shade depends on the numerous resources. Honey's colour varies from light brown to dark brown. [16].

- Acacia honey- for purifying of liver and digestive tract it can be used.
- Neem honey- Its advantage in diabetes and beneficial in high blood strain.
- Manuka honey- works as an antibiotic for wounds also used as healing agent.
- Buckwheat honey- Having property of antioxidants and dark in colour.

### **Physical properties and chemical composition of honey:**

Flavour, physicochemical characteristics and composition of honey depends on different type of the floral supply used by the bees (such as black seed, apple, almond, aster, avocado, basswood, acacia,). [18][19]

Honey consists of approximately 200 materials and is a nutrient together with materials along with water, carbohydrates, amino acids, enzymes, vital minerals, phenolic compounds, vitamins, volatile compounds (benzene derivatives, monoterpenes) and a few different substances. Specifically fructose and glucose monosaccharides type of carbohydrate are present in honey, as well as disaccharides and trisaccharides also present. Several enzymes such as glucose oxidase, peroxidase, invertase, catalase and their concentration vary from 0.1% -3.3% and its amount depends on kind of honey. It consists of critical and non-crucial amino acids; however the most commonplace amino acid in honey is proline, which contributes the 1% of honey composition [20, 21].

Due to approximately 0.57% natural acids honey has a mild acid reaction. Antimicrobial characteristics of honey and aroma is due to presence of acids. The principal acid in honey is gluconic acid and other acids are a-hydroxyglutaric, galacturonic, aspartic acid, acetoglutamic, citric, formic, fumaric, oxalic acid, malonic, formic, acetic, glutamic, butyric, tartaric, succinic acid [23]. 0.2% mineral present in darkish honey while 0.4% in mild honey. Although the important bioactive molecules obtained in honey is polyphenols. The quantity and type of polyphenols in large part relies upon at the flower supply or the sort of honey. [23].

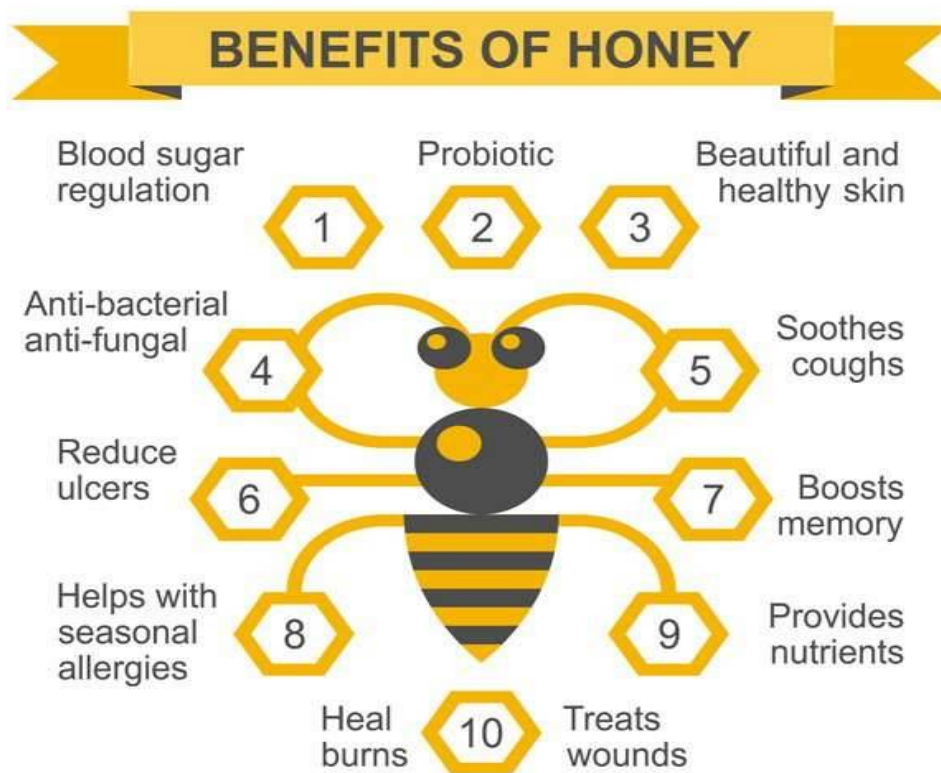
### **Antimicrobial property**

Honey has validated antimicrobial pastime [24]. Honey inhibits a large spectrum of bacterial species [25]. It has effective antimicrobial results in opposition to disease causing and non-disease causing microbes (fungi and yeasts), even those microbes who have properties to resist to several antibiotics. The antimicrobial property of honey depends on the amount of honey used [26].

### Honey as antioxidant

Honey is getting used on the grounds that long term each in clinical and domestic wishes, however most effective currently its antioxidant assets has come to limelight [26]. Phenols is main antioxidants in honey which includes quercetin, chrysin and hesperidin. Once phenol quercetin binds to and inhibits strongly transcription cell elements' activities [27].

Fig: 1 Health benefits of honey [28].



### Therapeutic uses of Honey

As topical antibacterial agent and treatment of infection honey is commonly used in wide range. These consist of:

- Ulcers of leg
- Ulcers of Diabetic foot
- Due surgery or injury Inflamed wound
- Burns.

Generally when honey is used for antibacterial treatment with different antiseptics and antibiotics are not much effective. Several research proves that difficulty in depends on honey properties. Dressing of honey remove the swelling, ache and irritation unexpectedly subside, unpleasant odours stop and also remove dead tissue cells without pain and without doing any harm to the new growing tissue cells. It enhances the healing process of wound with minimal scarring. Honey effective anti-inflammatory property and also used as emergency treatment in burns [28].

### Nutraceutical Effects

In keeping with latest findings shows nutraceutical results. Similarly its principal content is carbohydrate and also contains polyphenols and behaves as antioxidants. Moreover, a few studies suggest that honey which help fortify the immune gadget and also effective in growth of probiotic microbes in the intestine, in improving digestion, decrease cholesterol level and save colon most cancers [29].

### CONCLUSION

Honey is a thick sweet fluid synthesised by honeybees from the flowers nectar .honey contains about 75 to 80% sugar as well as combination of minerals like calcium, phosphorous, calcium, magnesium, potassium, iron sodium etc.) and water. Today's researchers also believe that honey has complete effective remedy property for all types of infections. Honey does not show any kind of harmful effects on any type of illness. It has been recognised for its antibacterial, antimicrobial,anti-oxidant, anti-inflammatory , anti-diabetic, anti-cancers , anti-viral, anti-fungal and wound recuperation efficiency and

other properties of H<sub>2</sub>O<sub>2</sub> content, osmolality phenolic acid degrees, low pH, and flavonoids as well as some phytochemical factors, which includes peroxides, tetracycline, amylase, phenols, fatty acids, terpenes, ascorbic acid and benzoic acid and benzyl alcohols which make honey reactive in disease causing microorganism. Honey incorporates extra than 180 exceptional materials inclusive of nutrients, amino acids, important minerals, organic acids, enzymes and bioactive compounds including phenolic compounds and additionally honey have medicinal properties, healing homes, uses and diverse varieties of fitness benefits.

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