

# A Review On Chemical Composition And Uses Of Honey

A.P.Mitake<sup>1\*</sup>, S.P. Wartale<sup>2</sup>

<sup>1</sup>Department of Chemistry G.S.Gawande Mahavidyalay, Umarkhed

<sup>2</sup>Department of Chemistry Yeshwant Mahavidyalay, Nanded

\*Corresponding Author: A.P.Mitake

E-mail :- mitake@gsgcollege.edu.in

## Abstract:

Honey is a naturally occurring organic substance that has a sweet, tasty liquid consistency and is made from the nectar of flowers, specifically *Apis mellifera*. It is among the most widely used natural sweeteners. Chemically speaking, it can be described as a naturally occurring food that is mostly made up of sugars and water, with trace amounts of minerals, vitamins, amino acids, organic acids, flavonoids, and other phenolic and aromatic chemicals. Depending on its botanical and geographic origins, its composition varies greatly. In the winter, bees are fed with honey. Honey has been used for thousands of years as food and natural medicine, recommended by healers from many ancient civilizations to treat a wide range of illnesses.

## Introduction:

The natural substance known as honey is created by honeybees (*Apis mellifera*) from the sweet, flavorful, and viscous liquid known as floral nectar [1]. Since ancient times, it has been utilized as a culinary and medicinal commodity. Due to its geographical and botanical origins, honey is a complex mixture with wide variations in composition and characteristics; its primary qualities rely on the type of flower or nectar that bees forage [2]. A number of environmental factors, including weather and humidity within the hive, conditions around the nectar, and the handling of the honey during extraction and storage, also affect the composition and quality of honey during production. The way the bees are fed affects the content of honey. Honey is regarded as a key component of traditional medicine and has been found to contain over 180 chemicals. Honey is used in food systems, religious and magical rites, and human and veterinary medicine, among many other functional applications, all over the world [3]. It is a vital nutrient for energy and is utilized as an component used in hundreds of processed foods, mostly cereal-based goods, for its flavor, color, and sweetness viscosity, pumpability, and caramelization [4].



## 2. Chemical Composition of Honey

Honey's composition largely depends on the source of the flowers, although processing circumstances, the season, and the environment all have a role.

### 2.1. Carbohydrates

Carbohydrates in honey are represented by monosaccharides such as glucose and fructose followed by disaccharides such as sucrose, maltose, turanose, isomaltose, maltulose, trehalose, nigerose, and kojibiose and trisaccharides such as maltotriose and melezitose. Generally, honey is classified by the floral source of the nectar from which it was made. Monofloral honey is made primarily from the nectar of one type of flower.

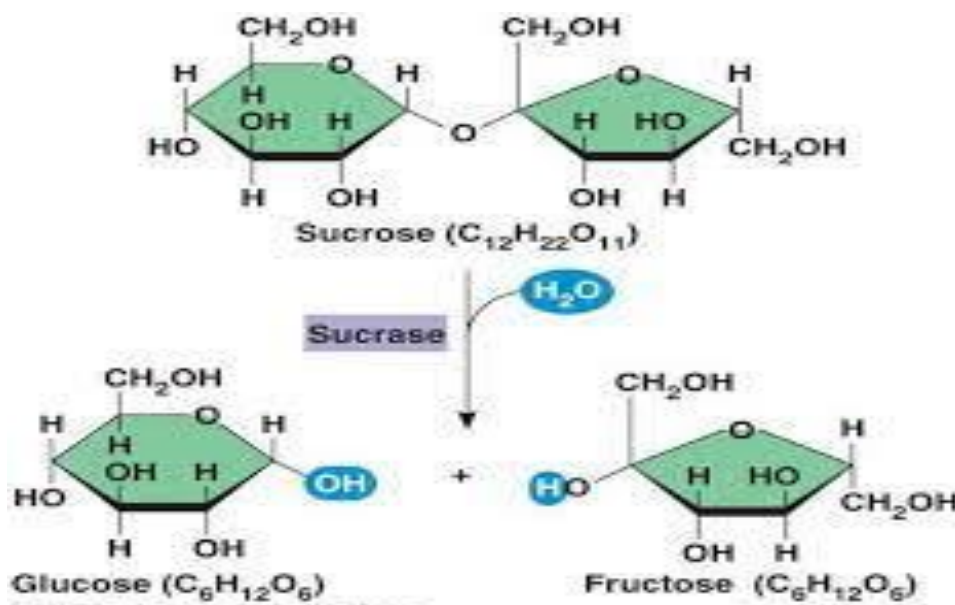


Figure 2: Chemical structure of three kinds of sugar

### 2.2 Amino acids and proteins

Proteins come in honey from nectar and dust as a basic pieces of plants. Proteins in honey might be as an extremely complicated structure or as straightforward mixtures, i.e., amino acids [7]. The substance of amino acids and proteins is somewhat little, and no more

0.7 %. Honey contains practically all physiologically significant amino acids. Proline, the main amino acid, is a sign of honey's ripeness. The proline content of ordinary honeys ought to be in excess of 200 mg/kg. Values under 180 mg/kg imply that the honey is presumably corrupted by sugar expansion [8].

### 2.3 Aroma mixtures and phenolics

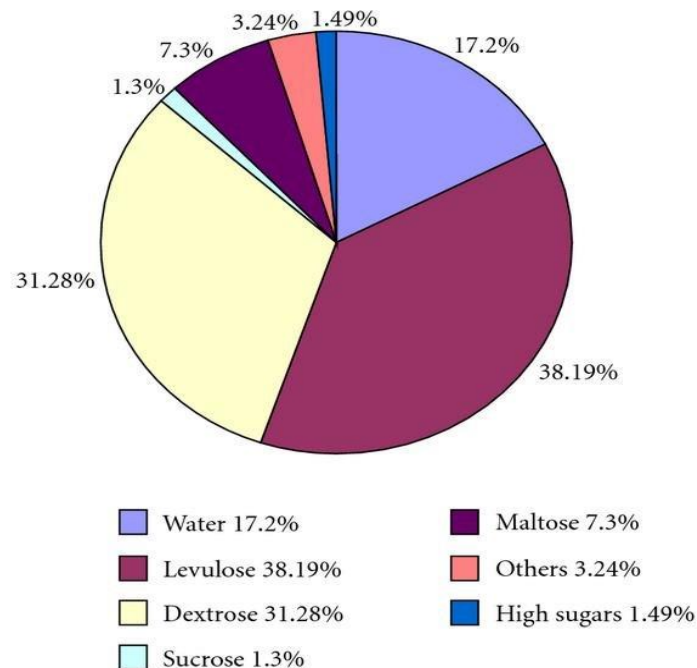
Honey volatiles are the substances liable for the honey fragrance. Research on honey volatiles began in the mid 1960s. The majority of volatile compounds probably come from the plant, but some are added by bees, according to research on honey-isolated volatiles [9]. Until now about 600 mixtures have been described in various honeys. Phenolic acids and polyphenols are plant-inferred optional metabolites. In plant systematics, these compounds have been utilized as chemotaxonomic markers. They have been suggested as potential indicators for determining honey's botanical origin [10]. Dim hued honeys are accounted for to contain more phenolic corrosive subordinates yet less flavonoids than light-shaded ones [11].

### 2.5 Minerals and trace elements:

Honey is made up of a variety of minerals. The primary component found in honey is potassium, other than numerous different components (as displayed in table 1). The primary mineral element is potassium, which accounts for approximately one third of the total, but honey contains a wide range of trace elements. Several studies have demonstrated that honey's trace element content is primarily influenced by its botanical origin. Minerals have around 3.68 percent [12]. Minerals in honey increase the value of honey for human consumption, despite the fact that this portion of the honey does not produce a lot. Honey contains a large portion of the minerals: potassium, chlorine, sulfur, calcium, sodium, phosphorus, magnesium, silicon, iron, manganese and copper [13]. At the point when the noticed mean worth, dim kinds of honey are more extravagant in minerals than lighter. Obviously, singles can find a more obscure animal groups that are less fortunate than a few lighter animal types [14].

Minerals	Unit	Average amount in 100g honey	Recommended daily intake
Calcium	mg	3-30	1000
Chlorine	mg	3-20	
Copper	mg	0.01-0.1	2
Iron	mg	1-3.5	18
Magnesium	mg	0.7-12	400
Phosphorous	mg	2-70	1000
Potassium	mg	10-490	-
Sodium	mg	0.7-42	-
Zinc	mg	0.2-0.6	15

**Table: 1 Minerals in honey in relation to human requirements**



**Fig: 2 Pie Chart of Honey Composition indication the percentage of various sugars, water and other minor constituents.**

**2.6 Acidity and pH:**

Honey also contains acids. Before it was accepted that honey bees by stomach embedded honey bee toxin into the cell honeycomb with honey and make it so monitored. Considering that one of the primary parts of honey bee toxin is formic corrosive, it was believed that the honey has a formic corrosive [15]. Indeed, even certain individuals asked to other not to utilize honey therefore. Studies have shown that they are totally various acids that are made in honey, generally apple and lemon corrosive. Honey is a support, that implies that that its pH doesn't change by the expansion of little amounts of acids and bases. The presence of phosphates, carbonates, and other mineral salts is the cause of the buffer capacity [16].

**2.7 Water**

The water content of honey (water-in-honey) is the quality perspective that decides the capacity of honey to stay new and to keep away from waste by yeast fermentation. It is possible for raw honey to contain less than 14 percent water, and the lower the water content, the greater the perceived value of the honey [17]. It is globally perceived that great quality honey ought to be handled at under 20% water content. Low water content is alluring in light of the fact that honey might start to age and lose its new quality assuming the water-in-honey is more prominent than 20%. Unpasteurized honey ages since it contains wild yeast. Notwithstanding, because of honey's high sugar fixation these yeasts are more averse to cause maturation in honey with low water content [18].

**3. Uses Og Honey**

**3.1 For Bees**

Honey bees produce honey to go about as a food store for the state for periods when there are no blossoms, or the environment is unfriendly. For instance, during the winters of northern, mild nations, not many plants are bee colonies require honey stores to survive during this flowering dearth and when it may be too cold to leave the nest [19], which occurs between October and March. Bees need to survive in tropical countries during periods of drought, when there are no flowers, or when rain or other bad weather prevents them from foraging.

**3.2 Other uses**

Honey is broadly utilized as a wellspring of sugars for making honey wines and lagers, and in the assembling of numerous optional items: breakfast grains, bread shop merchandise, and a large number of other worth added items. Traditionally, honey is used in the treatment of eye diseases, bronchial asthma, throat infections, tuberculosis, thirst, hiccups, fatigue, dizziness, hepatitis, constipation, worm infestation, piles, eczema, healing of ulcers, and wounds and used as a nutritious supplement.

**4. Conclusion:**

Excellent honey has an assortment of positive wholesome and wellbeing impacts. Honey's chemical composition and floral origin determine its quality. Honey has been constantly occurred in diet wholesome viewpoints as well as for wellbeing properties. The principal sustenance and wellbeing pertinent parts are the sugars, which make it a phenomenal energy source, particularly for kids and athletes. Honey is an extremely unique, nutritious, useful, and healthy food. But nutritious worth, it represses some food waste life forms as well. It is preferred as a supporting or preservative in foods as well as for direct consumption due to its high antioxidant activity. To utilize the wonders of honey, the stunts of honey ought to be kept away from. Quality honey creation and utilization ought to be expanded. Corruption of honey diminishes pay of fair makers and it additionally adversely affects purchasers' nourishment and wellbeing.

**References**

1. White Jr JW. Honey. *Advances in food research* 24 (1978): 287-374.
2. Machado De-Melo AA, Almeida-Muradian LBD, Sancho MT et al. Composition and properties of *Apis mellifera* honey: A review. *Journal of Apicultural Research* 57 (2018): 5-37.
3. Ajibola A, Chamunorwa JP, Erlwanger KH Nutraceutical values of natural honey and its contribution to human health and wealth. *Nutrition & metabolism* 9 (2012): 1-12.
4. Nigussie K, Subramanian PA, Mebrahtu G Physicochemical analysis of Tigray honey: An attempt to determine major quality markers of honey. *Bulletin of the Chemical Society of Ethiopia* 26 (2012).
5. Cummings JH, Stephen AM. Carbohydrate terminology and classification. *European journal of clinical nutrition* 61 (2007): S5-S18.
6. Di Pasquale G, Salignon M, Le Conte Y et al. Influence of pollen nutrition on honey bee health: do pollen quality and diversity matter? *PloS one* 8 (2013): e72016.
7. Alvarez-Suarez J, Giampieri F, Battino M. Honey as a source of dietary antioxidants: structures, bioavailability and evidence of protective effects against human chronic diseases. *Current medicinalchemistry* 20 (2013): 621-638.
8. Bogdanov S. Honey composition. *The honey book* (2009): 27-36.
9. Bogdanov S, Martin P. Honey authenticity. *Mitteilungen aus Lebensmitteluntersuchung und Hygiene* 93 (2002): 232-254.
10. Bogdanov S, Ruoff K, Oddo LP. Physico- chemical methods for the characterisation of unifloralhoney: a review. *Apidologie* 35 (2004): S4-S17.
11. Gheldof N, Engeseth NJ. Antioxidant capacity of honeys from various floral sources based on the determination of oxygen radical absorbance capacity and inhibition of in vitro lipoprotein oxidation in human serum samples. *Journal of agricultural and food chemistry* 50 (2002): 3050- 3055.
12. Mattoon WR. *The southern cypress* (No. 272). US Department of Agriculture (1915).
13. Aili SR, Touchard A, Escoubas P, et al. Diversity of peptide toxins from stinging ant venoms. *Toxicon* 92 (2014): 166-178.
14. Ensminger ME, Ensminger AH. *Foods & Nutrition Encyclopedia, Two Volume Set.* CRC press.
15. Machado De-Melo AA, Almeida-Muradian LBD, Sancho MT, et al. Composition and properties of *Apis mellifera* honey: A review. *Journal of Apicultural Research* 57 (2018): 5-37.
16. Molan PC Authenticity of honey. In *Food authentication.* Springer, Boston, MA (2006): 259- 303.
17. Hatjina F, Costa C, Büchler R, et al. Population dynamics of European honey bee genotypes under different environmental conditions. *Journal of Apicultural Research* 53 (2014): 233-247.
18. Maughan R. The athlete's diet: nutritional goals and dietary strategies. *Proceedings of the nutrition Society* 61 (2002): 87-96.
19. Basson NJ, Grobler SR. Antimicrobial activity of two South African honeys produced from indigenous *Leucospermum cordifolium* and *Erica* species on selected micro-organisms. *BMC Complementary and Alternative Medicine* 8 (2008): 1-4.