Honey: Nature's Golden Nectar

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Honey might make a sweet addition to your tea, but it's not just a tasty treat: honey also brings hefty medical benefits. Indeed, the Holy Qur'an explicitly says, "Therein is cure for men" in Chapter 16. In the first part of a three-part series to be published in the coming months, we explore what honey is, its place in history, and our emerging knowledge of the benefits of this golden nectar. This article is based upon a lecture given at the Review of Religions Research Canada (RORRC) Symposium held at Peel Village, Brampton, Canada in February 2017. This is the first article in a three-part series.

What is honey

Honey is a sweet substance made from nectar of flowers by the honey bees.[1] The foraging honey bees visit thousands of flowers during the day, collecting their nectar, which is carried back to the hive in the honey stomach (as opposed to the food stomach) of the honey bee. Honey bees in the hive process this nectar by adding their own enzymes to it while also reducing its water content by continuously exposing it to the air via their mouth-parts. Once the nectar is sufficiently processed and thickened it is deposited in the cells of the hive as honey and capped by a covering of beeswax.[2]

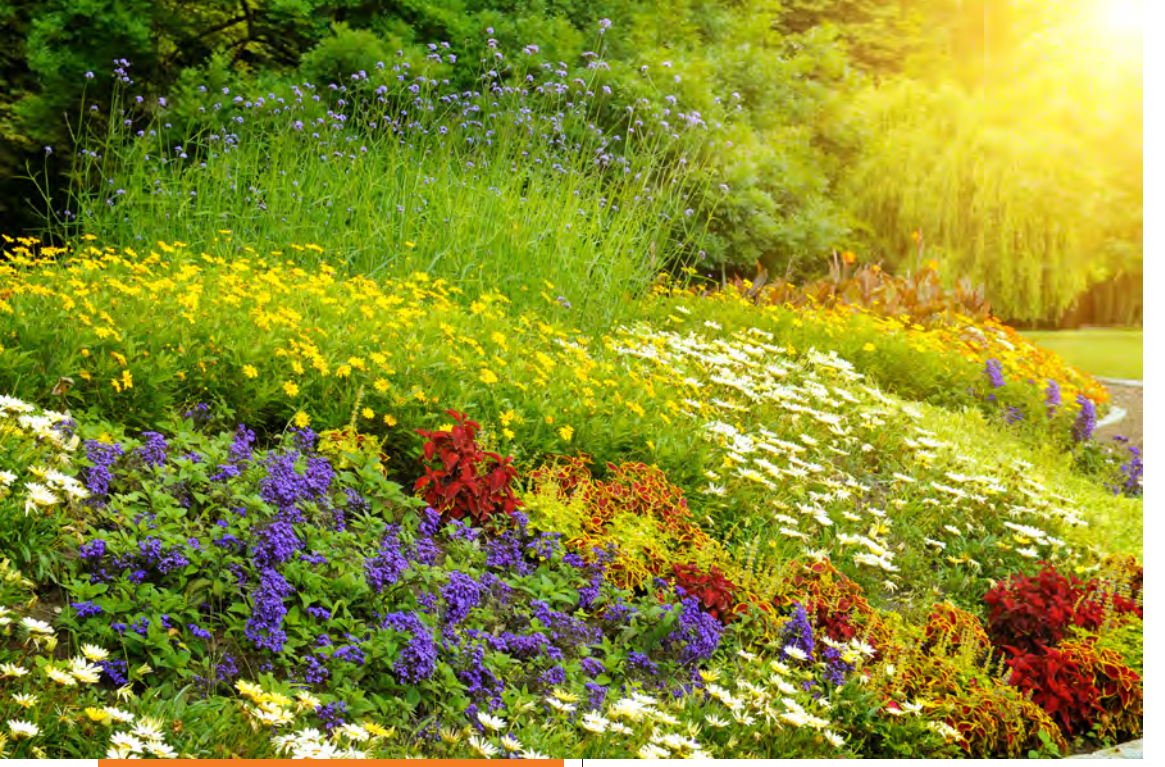
Honey is stored by the honey bees to be used as an energy store in times of need especially during winter when bees


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don't forage. The good news is that bees produce more honey than they need so humans can extract this honey without harming the honey bee colony. Honey is extracted by taking out the frames from the honey bee colony in a centrifugal extractor or by squeezing the combs full of honey using a cloth as a sieve — this latter method is commonly employed in developing countries. Alternately, cut combs of honey can be directly eaten.

Honey is one of the last remaining natural foods sold today. The food codes of both the World Health Organization and the Food and Agriculture Organization of the United Nations have standardized honey quality, as has the EU council directive. Both stipulate that nothing can be added to honey, and that neither

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Honey varies in aroma, taste and colour, and these differences depend largely on the flowers from which nectar is obtained. Honey obtained mostly from one flower is called monofloral or unifloral, and there are over 100 different monofloral honeys.

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pollen nor any constituent particular to honey may be removed except 'where this is unavoidable in removal of foreign matter'. Honey cannot be heated or processed to such an extent that its composition is changed or its quality is impaired.[3]

Many different types of honey are available, all differing in their colour, flavor, aroma, physical and chemical properties – this difference is primarily due to the flower from which the nectar of honey is obtained.[4] Honey obtained predominantly from one flower is known as monofloral (or unifloral) honey. For example, Manuka honey comes from nectar collected by honey bees from flowers of the tea tree *Leptospermum Scoparium*, found primarily in New Zealand and Australia. Similarly, there are hundreds of other monofloral honey types including acacia, citrus, heather, eucalyptus, thyme, buckwheat, alfalfa, clover, chestnut, rape, sidr, blackseed honey, et cetera. In fact, more than 100 different monofloral honeys have been described in Europe, North America, Australia and other countries.[5]



Historical Use of Honey

Honey was an important sweetener and healing agent used by mankind for thousands of years. The first evidence of its human use is from an 8,000 years-old cave painting in Bicorp in the region of Valencia, Spain. It depicts a man climbing lianas while ascending a cliff face and gathering honey from wild honey bees.[6] The sheer number of such paintings of raids on bees' nests indicate that honey was highly valued and considered an important food source by early humans.

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The first written reference to honey was found in a Sumerian tablet dating back 6,200 BCE which mentions the use of honey as a drug and ointment.[7] Honey was also extensively used by the Egyptians as it features frequently in hieroglyphics dating back at least 3,000 years. In fact, they were arguably the first people to domesticate the honey bee using clay or stone hives.[8] The Egyptians used honey as a sweetener, a healing ointment, and for other domestic uses such as mummifying, boat- and ship-building, and as a binding agent in paint and in metal castings. Egyptians also offered honeycombs overflowing with honey as valuable gifts to their gods in a show of devotion and worship – in fact, in the 12th century BC, Rameses III offered 15 tons of honey to the god of the Nile, Hapi. Egyptians also buried jars of honey with the dead, believing it to be sustenance for the afterlife. Archeologists have found clay pots filled with honey in the tomb of Pharaoh in city of Thebes and also in the tomb of Tutankhamen. The pharaohs also used honey in their wedding celebrations in which newlyweds drank honey wine or mead for a month after the wedding ceremony for good luck and happiness. This custom passed on to Greco-Roman culture and then to medieval Europe and gave rise to the word honeymoon.

The Greeks also viewed honey as an important food and a healing agent.[9] Pythagoras is said to have lived largely on honey and bread. At times Greeks

also used honey to preserve the bodies of those who had died at some distance from their homes. Alexander the Great is rumored to have been buried in honey.

In ancient Rome, honey was used in a wide range of dishes and as an ingredient in many sauces.[10] The Romans used it in their wine and meat, fruit and vegetables were sometimes preserved through immersion in honey. One famous Roman cookery book by Apicius used honey as an ingredient in nearly half of the 468-odd recipes. In ancient China, honey production was low and so the Chinese were known to import it. Ironically, China is now the largest producer of honey in the world.

Honey and Ancient Religions

In almost all religions, honey was endorsed as pure, nutritious and used as a healing agent – commonly used for wound healing, burns, cataracts, ulcers and general nutrition.[11]

Honey is also mentioned in the Talmud, the Old and the New Testament. The children of Israel were promised that their destination was to be 'a land flowing with milk and honey.'[12] In fact, honey was so important that it has been mentioned



This cave painting in Bicorp, near Valencia, Spain, shows that humans had already started to seek out honey as early as 8000-6000 BCE.

fifty-four times in the Old Testament. King Solomon[as] said: 'My son, eat thou honey, because it is good; and the honeycomb, which is sweet to thy taste. So



In Exodus 33:3, the Children of Israel were promised that their destination was to be a 'land flowing with milk and honey'.

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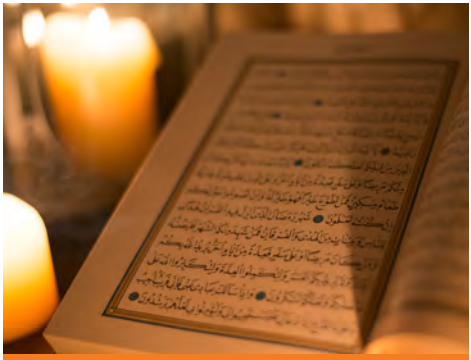
shall the knowledge of wisdom be unto thy soul: when thou hast found it, then there shall be a reward, and thy expectation shall not be cut off.'[13] This is why Jews believed that eating honey led to mental keenness.

In the New Testament, Jesus[as] reappeared before his 11 disciples in the flesh following the crucifixion and after coming out of the sepulcher, having survived the cross. The disciples were joyous and amazed but they thought he was perhaps a spirit; he showed them his hands and feet which bore wounds. Jesus[as] then asked them to touch him as he was flesh and demonstrated his very human body by demonstrating his need to eat. Jesus[as] asked them if they had anything to eat; 'they gave him a piece of a broiled fish, and of an honeycomb. And he took it, and did eat before them.'[14]

Honey is also mentioned in the ancient Chinese book of songs, Shi Jing, compiled by Confucius in the 6th century BC. In the holy book of Hinduism, the Vedas, honey is mentioned several times as a substance of reverence.

Honey in Islam

Similarly, in Islam honey found a very special place as it is mentioned in



The Holy Qur'an mentions honey as a cure and the traditions of the Holy Prophet[sa] also mention the curative properties of honey. Thus, honey holds a special place in Islam.

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the Holy Qur'an and since the Holy Prophet[sa] of Islam himself used to love it. Chapter 16 of the Holy Qur'an is named Al-Nahl, or 'The Bee'. In this chapter, the Holy Qur'an states:

'And thy Lord has inspired the bee, saying, "Make thou houses in the hills and in the trees and in the trellises which they build.

"Then eat of every kind of fruit, and then pursue submissively the paths prescribed by your Lord." There comes forth from their bellies a drink of varying hues. Therein is cure for mankind. Surely, in that is a Sign for a people who reflect.'[15]

In this verse, the word *shifa* or cure means cure for physical ailments as in other places in the Holy Qur'an this word has been used for the Holy Book itself (for example, in 10:58, 17:83, 41:45) as a cure for spiritual ailments. For example, in Chapter 10 it states:

'O mankind! there has indeed come to you an exhortation from your Lord and a cure for whatever disease there is in the hearts, and a guidance and a mercy to the believers.'[16]

The Holy Prophet Muhammad[sa] has also advised Muslims to use honey as a cure when he said, 'Make use of the two cures: honey and the Qur'an.'[17]

Indeed, the Holy Prophet Muhammad[sa] is known to have used it as a cure. Narrated Abu Sa`id Al-Khudri:

'A man came to Holy Prophet Muhammad[sa] and said, "My brother has some abdominal trouble." The Prophet[sa] said to him "Let him drink honey." The man came for the second time and the Prophet[sa] said to him, "Let him drink

honey." He came for the third time and the Prophet[sa] said, "Let him drink honey." He returned again and said, "I have done that." The Prophet[sa] then said, "Allah has said the truth, but your brother's abdomen has told a lie. Let him drink honey." So he made him drink honey and he was cured.'[18]

The Decline of Honey

Honey was the major sweetener used by people till the nineteenth century, but then its use declined when cheaper industrial cane sugar became more widely available from the new European colonies.[19] Despite its decline as a sweetener, honey maintained its use as a healing agent for some time. Poultices with honey were used to heal soldiers' wounds in the first two world wars with good success rates.[20] But honey could not compete with the fast progress of modern medicine and the wide introduction of almost 'miraculous' antibiotics in the 1950s, which could treat almost any bacterial infection, and which slowly ended the use of honey as a common household and hospital remedy.

However, recently honey has been making a comeback as a cure – almost half-a-century later – as the unchecked



After the rise of antibiotics in the 1950s, honey was less frequently used as a remedy for diseases. However, the overuse of antibiotics and the subsequent bacterial resistance have led to renewed interest in honey's antibacterial properties.

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'And thy Lord has inspired the bee, saying, "Make thou houses in the hills and in the trees and in the trellises which they build.



Honey comes in a wide variety of colours and flavours. In some markets, different monofloral varieties are blended together to get a certain consistency in colour and in flavour.

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and liberal use of antibiotics has led to increasing bacterial resistance to antibiotics and an interest in honey as an antibiotic and healing agent has rekindled among an increasing number of medical practitioners.[21]

Presently the annual world production of honey is around 1.6 million tons which is less than 1% of total sugar production. The US, Canada, and the European Union are both large producers and consumers of honey. However, the major honey-exporting countries such as China and Argentina consume little honey themselves.[22] The vast majority of honey produced in the world comes from the most ubiquitous species of the honey bee known as the Western honey bee or *Apis Mellifera;* though there are six other species of honey bee that produce honey, they are only of regional importance.[23]

Composition of honey

Honey typically contains 79 percent sugar, 18 percent water, 0.3 percent protein, 0.5 percent organic acids and trace phenolic compounds, vitamins and minerals.[24] The sugar component of honey is a complex combination of various sugars. The main sugars in honey are the monosaccharides fructose (38%) and glucose (31%) and up to ten percent are other disaccharides, trisaccharides and oligosaccharides.[25] So far, 25 different oligosaccharides have been detected in honey. Many of these sugars are not present in nectar and are formed by the action of bee enzymes.[26]

Nutrition and Honey

Honey is highly nutritious: one teaspoon of honey typically contains 7 grams of honey that will provide around 20 kilocalories of energy or 1 percent of daily required energy. During digestion the two main sugars, fructose and glucose, are quickly transported in the blood to

be utilised for energy, while the oligosaccharides are primarily digested by the gut microbes making honey a prebiotic – that is, good for the growth of commensal microbes of the gut.[27]

Honey contains roughly 0.3 to 0.5 percent proteins, mainly enzymes and free amino acids.[28] Three major enzymes are added to honey by the honey bee, which are i) diastase, which decomposes starch or glycogen into simple sugar, ii) invertase, which converts sucrose into fructose and glucose and iii) glucose oxidase, which turns glucose into gluconic acid and hydrogen peroxide.[29]

Different unifloral honeys contain varying amounts of minerals and trace elements ranging from 0.2 to 0.4 percent.[30] These include potassium, sodium, calcium, magnesium, chromium, manganese, selenium and many other trace elements. Among vitamins honey contains vitamin B1, B2, B6, niacin, vitamin K, and vitamin C. The main free amino acids found in honey are proline, phenylalanine, tyrosine and lysine. Lower but also important amounts of arginine, glutamic acid, histidine and valine are also present. It should be noted that the protein, vitamins and minerals in honey are in very low quantities and as such their contribution to human daily requirement is negligible. In addition, monofloral honey types from different flowers will contain varying amounts of sugars, enzymes, minerals, amino acids, and trace elements, thus, honey obtained from one flower will not be similar to one from another.[31] This makes honey unique and that has thousands of varieties with different physico-chemical properties and consequently largely similar but also divergent physiological effects.

The wide variety in the aromas, flavours and colours of honey also depend upon their botanical origin.[32] Honey with high fructose content (e.g. acacia) are sweeter than those with high glucose content (e.g. canola). The aroma and taste also depends on acids (honey is acidic with a pH of 3.9), amino acids and aroma compounds within honey. More than 600 such aroma compounds, which are present in very low concentrations as complex mixtures of organic volatile compounds, have been discovered in different types of honey.[33] Honey colour, aroma and flavour are important qualities in the food industry and most supermarket honey in UK and Canada is a blend of many types of honeys in order to create a certain golden colour, consistency

and flavor. The original monofloral honey types from flowers are of vastly different colours, aroma, and taste and in countries where consumers demand such monofloral honeys (e.g. Spain, Germany, and Italy), they are commonly available in supermarkets and command higher prices.

Polyphenols, which are derived from the plant nectar, constitute less than one percent of honey but are possibly one of the most important groups of compounds in honey.[34] They determine a vast array of the functional properties of honey including its antioxidant and anti-inflammatory activities.[35] The major polyphenols in honey are flavonoids, phenolic acids and phenolic acid derivatives.[36]

Honey might appear to be just sugar water but in reality, it is a complex mixture of a vast variety of compounds that determine its wide-ranging properties. It is surprising that simple molecules (sugars) and very low quantities of purported active ingredients (polyphenols, enzymes, proteins) determine the extensive physiological and medicinal properties of honey. The composition of honey depends largely on its botanical origin (lesser by honey bee type and geography), a fact that has rarely been considered in nutritional, physiological and health effects of honey.

In the next two articles in this series we shall discuss the health benefits of honey, the current research on this marvel of nature, and the future directions that can prove promising. We shall also discuss the commonly asked questions about giving honey to children, its usefulness in diabetic patients, the benefits of raw honey and testing for honey purity.

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ENDNOTES

1. E. Crane, *A Book of Honey* (1980). cabdirect.org

2. E. Crane, *Honey: A Comprehensive Survey* (William Heinemann, 1975).

3. Stefan Bogdanov and Peter Martin, "Honey Authenticity : A Review," *Mitteilungen aus dem Gebiete der Lebensmitteluntersuchung und Hygiene* 93, 6 (2002): 232-254.

4. Stefan Bogdanov, et al., "Honey for Nutrition and Health: A Review," *J. Am. Coll. Nutr.* 27, 6 (2008): 677-689.

5. Crane, *Honey: A Comprehensive Survey.*

L. Oddo, et al., "Main European Unifloral Honeys: Descriptive Sheets," *Apidologie* 35, 1 (2004): S38-S81.

M.M. Ozcan and C. Olmez, "Some Qualitative Properties of Different Monofloral Honeys," *Food Chem*. 163, (2014): 212-218.

6. E. Crane, *The Archaeology of Beekeeping*, (Duckworth, 1983): 360.

7. Crane, *Honey: A Comprehensive Survey.*

8. Crane, *Honey: A Comprehensive Survey.*

E. Crane, *The World History of Beekeeping and Honey Hunting* (Taylor & Francis, 1999), 682.

9. L. Boukraâ, *Honey in Traditional and Modern Medicine*, Traditional Herbal Medicines for Modern Times (CRC Press, 2013), 470.

10. S. Style, *Honey from Hive to Honeypot*. (Pavilion, 1992).

11. Crane, *Honey: A Comprehensive Survey.*

Crane, *The World History of Beekeeping and Honey Hunting.*

12. The Bible, Exodus 33:3.

13. Old Testament, Proverbs 24:13-14.

14. The Bible, Luke 24:42.

15. The Holy Qur'an, 16:69-70.

16. The Holy Qur'an, 10:58.

17. Ibn Majah, Kitabul-tibb, Babul-asal.

18. Sahih Bukhari, Kitabul-tibb, Babul-dua-ul-asal.

19. Crane, *A Book of Honey.*

20. S. Bogdanov, *The Honey Book* (2016).

21. S. E. Maddocks, and R.E. Jenkins, "Honey: A Sweet Solution to the Growing Problem of Antimicrobial Resistance?" *Future Microbiol.* 11, 8 (2013): 1419-1429.

22. Bogdanov, *The Honey Book.*

23. Stefan Bogdanov and Peter Martin, "Honey Authenticity : A Review."

24. Stefan Bogdanov, et al., "Honey for Nutrition and Health: A Review."

D. W. Ball, "The Chemical Composition of Honey," *J. Chem. Educ.* 84, 10 (2007): 1643.

P.M. da Silva, et al., "Honey: Chemical Composition, Stability and Authenticity," *Food Chem.* 196, (2016): 309-323.

25. E. De La Fuente, et al., "Carbohydrate Composition of Spanish Unifloral Honeys," *Food Chemistry* 129, 4 (2011): 1483-1489.

26. L. W. Doner, "The Sugars of Honey—A Review," *J. Sci. Food Agric.* 28, 5 (1977): 443-456.

27. M. L. Sanz, et al., "In Vitro Investigation into the Potential Prebiotic Activity of Honey Oligosaccharides," *J. Agric. Food Chem.* 53, 8 (2005): 2914-2921.

28. J. W. White, Jr., "Honey," in *Advances in Food Research*, ed. C.O. Chichester (Academic Press, 1978), 287-374.

29. P.M. da Silva, et al., "Honey: Chemical Composition, Stability and Authenticity," *Food Chem.* 196, (2016): 309-323.

30. D. W. Ball, "The Chemical Composition of Honey," *J. Chem. Educ.* 84, 10 (2007): 1643.

31. Stefan Bogdanov, et al., "Honey for Nutrition and Health: A Review."

32. Stefan Bogdanov, K. Ruoff, and L. Persano Oddo, "Physico-Chemical Methods for the Characterisation of Unifloral Honeys: A Review," *Apidologie* 35, 1 (2004): S4-S17.

33. C.E. Manyi-Loh, R.N. Ndip, and A.M. Clarke, Volatile Compounds in Honey: A Review on Their Involvement in Aroma, Botanical Origin Determination and Potential Biomedical Activities, *Int. J. Mol. Sci.* 12, 12 (2011): 9514-9532.

V. Kaškonienė, and P.R. Venskutonis, "Floral Markers in Honey of Various Botanical and Geographic Origins: A Review," *Compr. Rev. Food Sci. Food Saf.* 9, 6 (2010): 620-634.

34. M. Al-Mamary, A. Al-Meeri, and M. Al-Habori, "Antioxidant Activities And Total Phenolics Of Different Types Of Honey," *Nutr.*

Res. 22, 9 (2002): 1041-1047.

35. N. Gheldof, and N.J. Engeseth, "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" *J. Agric. Food Chem.* 50, 10 (2002): 3050-3055.

D. D. Schramm, et al., "Honey with High Levels of Antioxidants Can Provide Protection to Healthy Human Subjects," *J. Agric. Food Chem.* 51, 6 (2003): 1732-1735.

A. Bean, *Investigating the Anti-inflammatory Activity of Honey* (2012).

36. J. M. Alvarez-Suarez, F. Giampieri, and M. Battino, "Honey as a Source of Dietary Antioxidants: Structures, Bioavailability and Evidence of Protective Effects Against Human Chronic Diseases" *Curr. Med. Chem.* 20, 5 (2013): 621-638.



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