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NUTRITIONAL AND MEDICINAL IMPORTANCE OF MADHU (HONEY)

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ABSTRACT

Honey is one of the most valued and appreciated natural product known to mankind since time immemorial. It is a natural substance produced by honeybees. Honey has used in Ayurveda for nutritional and therapeutic purpose since many centuries. It is a common *Anupaan* in the Ayurvedic clinical practice. Ayurveda as well as contemporary science described different varieties of honey. Due to the variation of botanical origin honey differs in appearance, sensory perception and composition. Its composition and quality vary greatly with the botanical source of nectar as well as environmental and climatic conditions. The main nutritional and health relevant components are carbohydrates, mainly fructose and glucose but also about twenty five different oligosaccharides. Although honey is a high carbohydrate food, its glycemic index varies within a wide range from 32 to 85, depending on the botanical source. It contains small amount of proteins, enzymes, amino acids, minerals, trace elements, vitamins, aroma compounds and polyphenols. Therefore, honey can be used for nutritional as well as therapeutic purpose. The present review foccused on nutritional and medicinal importance of honey, its different varieties and traditional uses of honey in Ayurvedic system of medicine.

KEYWORDS: Madhu, Honey, Anupaan, Yogwahi, Ayurveda.

INTRODUCTION

Natural products based traditional systems of medicines are playing important role in providing health care to large section of population, especially in developing countries. Ayurveda is one of the oldest systems of traditional medicine. Honey has used as a food and

medicine in Ayurveda since the time immemorial. Hnoey is used as Anupaan with principal drug in Ayurvedic clinical practice. Honey is described as best *Yogvahi* in Ayurvedic literature.[1] Principle of Yogvahi is more or less similar to the concept of bio-enhancers in contemporary science. Therefore, it can be stated that honey has used as *Anupaan* to increase palatability as well as bioavailability of principal drug.

Definition of honey according to Codex Alimentarius

Honey is the natural sweet substance, produced by honeybees from the nectar of plants or from secretions of living parts of plants, or excretions of plant-sucking insects on the living parts of plants, which the bees collect, transform by combining with specific substances of their own, deposit, dehydrate, store and leave in honeycombs to ripen and mature.[2]

Honey is a natural substance produced, when the nectar and sweet deposits from plants are gathered, modified and stored in the honeycombs by honeybees of the genera Apis and Meliponini.[3] Honey is healing and its bee products straight from the hive also have healing powers, the practice of which is known as "apitherapy''.[4]

In the long human tradition honey has been used not only as a nutrient but also as a medicine.[5] The first recorded reference to honey for therapeutic purpose dates back to 2100-2000 BC in the form of Sumerian tablet.[6]

NUTRITIONAL AND MEDICINAL IMPORTANCE

In most ancient cultures honey has been used for both nutritional and medical purposes. Ayurvedic system of medicine is one of the most ancient traditional systems of medicine. Ayurveda described different aspects of honey including its different varieties, pharmacological properties, nutritional and therapeutic importance.

General properties

According to Ayurvedic system of medicine it is *Madhur* (sweet) and *Kashaya* (astringent) in *Rasa* (*Madhur* is predominat *Rasa* and *Kashaya* is less predominant *Rasa*), *Ruksha* in *Guna* (property), *Sheet* in *Veerya* (potency). Immature honey leads to aggravations of *Tridosha* (three physical body humors) and mature honey restore these three doshas in its equilibrium state. Newly formed honey increases the body weight and old honey decreases the body fat and thus body weight.[7]

Pharmacological properties

Madhu is *Agnideepaka* (increases digestive power), *Vajikarana* (aphrodiasic), help to maintain complexion, promote physical and mental strength, beneficial to heart and eyes, help in bio-purification, possess *Sukshma* property i.e. get entered into small body channels and thus help to maintain their patency.[7]

Traditional therapeutic uses in Ayurveda

Traditionally in Ayurveda it has used therapeutically in wide range of disorders which include obesity, diabetes mellitus and related disorders, hiccough, *Kasa* (cough), *Shwas* (asthamatic disease), diarrhea, vomiting, worm infestation, in poison, etc.[7]

Varieties of honey

Acharya Sushruta described eight varieties of honey which as follows.[7]

Pauttika : It is formed from poisonous flowers. It is *Ruksha* in *Guna* and *Ushna* in *Veerya*. It leads to vitiation of *Vata, Pitta* and *Rakta*.

Bhramara : It is *Guru* (heavy) being excess *Madhur*.

Kshaudra : It is especially *Sheet* (cold in potency) and having *Laghu* (light) property.

Makshika : It is best honey and especially used for the management of *Kasa* and *Shwas*.

Chhatra : It is especially used for the management of *Raktapitta* (bleeding disorders), *Shwitra* (vitiligo), diabetes mellitus and related disorders and worm infestation.

Ardhya : It is best for eyes and to alleviate *Kapha* and *Pitta*.

Auddalaka : It is beneficial for voice and used for the management of dermatological disorders, anorexia, etc.

Dala : It vitiate *Pitta* and used for the management of vomiting and diabetes mellitus & related disorders.

Honeys can also be classified, based on the source of nectar. These include floral and non floral honeys. Honeys can either be unifloral or multifloral, depending whether the honey collected is from the nectar of the same flower or from nectar of flowers of various types.

Non floral honey (honey dew) is made by bees that extract sugars from the living tissues of plants or fruits, and/or scavenge the excretions of insects (aphids) that tap the veins of higher plants.[8]

In contemporary science following types of honey are described [9]. These varieties of honey depends on sources of flower.[10]

- Manuka honey
- Pasture honey
- Jelly bush honey
- Jungle honey
- Chestnut honey
- Rhododendron honey
- Blossom honey.

Chemical composition

Chemical composition of honey depends on a number of environmental factors during production such as weather and humidity inside the hive, nectar conditions and treatment of honey during extraction and storage. As a result, the nutritional value and profile vary accordingly and can thus influence the value of a specific honey for health promoting purposes.[11]

Fructose and glucose are the most predominant sugars present and are responsible for most of the physical and nutritional characteristics of honey. Water is quantitatively the second most important component of honey. The enzymes found in honey (amylase and invertase) are helpful in judging its quality and freshness.[12] The antioxidant activity of honey is also due to the presence of these enzymes.[13]

Table : showing average composition of honey.[14,15,16]

Constituents	Average percentage
Water	17.2
Fructose	38.19
Glucose	31.28
Sucrose	1.31
Diasacharides (usually maltose)	7.31
Higher sugars	1.5
Free acid as gluconic	0.43
Gluconolactone	0.14

Total acid as gluconic	0.57
Ash	0.169
Nitrogen	0.041
Minerals	0.20
Proteins	0.30
pH value	3.9

HMF (Hydroxymethylfufural)

HMF is a breakdown product of fructose (one of the main sugars in honey) that formed slowly and naturally during the storage of honey, and much more quickly when honey is heated. The amount of HMF present in honey is the reference used as a guide to the amount of heating that has taken place. the higher the HMF value, the lower the quality of the honey is considered to be. Some countries set an HMF limit for imported honey (sometimes 40 miligrams per kilogram), and honey with an HMF value higher than this limit will not be accepted. However, some honeys have a naturally high HMF level. [17]

Granulated honey

When honey crystallizes and become solid, it is known as granulated honey. Glucose is one of the major constituents of honey responsible for granulation. Granulation is a natural process and there is no difference in nutritional value between solid and liquid honey. This process may be likened to ice and water – liquid honey and granulated honey is the same substance but in a different form.[17]

Some honeys are much more prone to granulation than others, and almost all honey will granulate if its temperature gets reduced. As with the color of honey, different people favor different qualities, some prefer granulated honey while others choose liquid honey. If a jar of granulated honey is required in the liquid form, stand it up to its neck in a container of warm water (60 °C) – it should soon liquefy. However, heating honey always reduces its quality by destroying its enzymes, evaporating volatile compounds and therefore reducing the flavor.

The following factors are important for rapid granulation.[17]

- temperature below 15 °C
- high concentration of glucose and
- Availability of nuclei to act as seeds to start the process of crystallisation (e.g. pollen or existing crystals).

Nutritional and medicinal importance of honey can be summarized as follows.[18]

1. About 95% of the honey dry matter is composed of carbohydrates, mainly fructose and glucose. 5-10 % of the total carbohydrates are oligosaccharides.
2. The glycemic index (GI) of honey varies from 32 to 85, depending on the botanical source which is lower than sucrose (60 to 110). Fructose-rich honeys such as acacia honey have a low GI.
3. Besides, honey contains small amounts of proteins, enzymes, amino acids, minerals, trace elements, vitamins, aroma compounds and polyphenols.
4. Honey has been shown to possess antimicrobial, antiviral, anti-inflammatory, antioxidant, antimutagenic, antitumor and immunomodulatory effect.
5. Due to its high carbohydrate content and functional properties honey is an excellent source of energy for athletes.
6. Most of the health promoting properties of honey is only achieved by application of rather high doses of honey such as 50 to 80 g per intake.

CONCLUSION

Honey is widely accepted as food and medicine by all generations, traditions and civilizations, both ancient and modern. Honey is invaluable natural product with wide range of application. Honey is made up of a vast amount of different compounds and thus can be used as nutrition as well as medicine. Nutritional values and researches suggest that honey strengthen the immune system. Therefore, its regular use as nutrition will help in the prevention from wide range of disorders. Thus, intake of honey as food and medicine resulted in high nutritional benefit and therapeutic promise.

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