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Honey the paradisiacal panacea - A Review

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ABSTRACT

In folk medicine natural products have been used since ancient times. Honey has been used as a source of nutrient as well as a medicine. It shows an extensive range of biological effects such as antibacterial, antiallergic, antithrombotic, antiinflammatory action. The objective of this article is to provide an overview regarding the health benefits of honey and its uses in dentistry.

Key words: Honey, Antibacterial, Anti Inflammatory, Antithrombotic.

INTRODUCTION

Honey is one of the most appreciated and valued natural substances since ancient times. It is used for its medicinal properties in many cultures. Honey has a long history of human consumption and is used in various food and beverages as a sweetener and flavouring agent.^[1]

Honey is produced by bees from the nectar they collect from flowers. When a bee collects nectar from flowers, it secretes enzymes from its pharyngeal gland. There are two varieties of honey: monofloral and polyfloral.

Monofloral is sourced from one species of flora. Polyfloral honey is produced from the pollen and nectar from several species of flora.^[2]

Honey, a part of traditional medicine, has recently become the focus of attention for treating certain

diseases as well as promoting overall health and well being. Several honey types from different floral sources and geographical regions have been reported to contain many phenolic compounds, which act as antioxidants and exhibit anti-carcinogenic, anti-inflammatory, anti-microbial, anti-atherogenic, anti-thrombotic, immune modulating and analgesic properties. In the oral health setting, honey has been found to be effective for the treatment of radiation-induced oral mucositis, stomatitis, reducing plaque and periodontal diseases.^[3]

Religious Significance

Hindus consider honey as one of the five elixirs of immortality (Panchamrita). In temples, honey is poured over the deities in a ritual called Madhu Abhisheka. The Vedas describe honey as a great medicinal and health food. In Buddhism, honey plays an important role in the festival of Madhu Purnima, celebrated in India and Bangladesh. On Madhu Purnima, Buddhists remember this act by giving honey to monks. Prophet Mohammad strongly recommended honey for healing purpose and Quran promotes it as a nutritious and healthy food. It is said that Goliath and Hercules of ancient times and Ramamurthi the great Indian Sandow, were in the habit of taking daily honey in their diet.^[4]

Synonyms of Honey

Madhu, Kshoudra, Makshika, Madhvika, Kusumasava, Pushpasava, Saragha, Makshikavanta, Bhrungavanta,

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Vartivanta, Makshikavita, Pushparasodbhava, Pavitra, Pitrya, Mel.^[4,5]

History

Archaeological records from the predynastic age of upper Egypt have allowed to ascertain that nomadic tribes of the Tasian culture (around 4500 BC) mixed malachite, copper, spar, oil, fat and honey for eye cosmetics. Ancient skin care uses of honey are also reported in a Sumerian tablet, dating back to about 3000 BC, and in the Egyptian Ebers Papyrus (around 1500 BC). Egyptian women used honey together with sodium bicarbonate for vaginal irrigations, probably due to its antibacterial properties. They also chewed scented pills made of honey and spices to sweeten their breath. A semisolid paste called "honey-mint" was used centuries later for a similar scope in ancient Rome. Other ancient reports about honey in cosmetics include writings from Aristotle, Dioscorides, and Pliny, as well as prophetic books of main cultural traditions, such as the Bible, Koran, Torah, and Talmud.^[6]

Scientific classification of honey bee

'Honey bee' belongs to Animal Kingdom, Phylum - Arthropoda, Class - Insecta, Order - Hymenoptera, Family - Apidae, Genus - Apis, Species - millifera, cerana with Binomial name - Apismellifera, Apiscerana.^[4]

Collection

Honey bees live in swarms which are gathered into hives. A hive contains;

1. A single queen bee
2. The males or drones and
3. The worker bees which are undeveloped females.

The Worker bees possess a long hollow tube to insert into the nectaries of the flowers. The tube is formed from the maxillae and labium. They take nectar from the flowers and pass it through the oesophagus into the honey sac or crop. The nectar, which is an aqueous solution of sucrose (25%), mixed with salivary secretion containing the enzyme invertase and is then hydrolyzed into the invert sugar. On

returning at the hive, the worker bees deposit the contents of the honey sac in the previously prepared cell of the honey comb. The filled cell is sealed by wax. For collecting the honey, the honey comb is smoked to remove bees, the comb is cut and honey is collected either by drainage or by expression.^[4]

Chemical composition of honey

The composition of honey varies according to the plant source, season, production method and storage conditions.^[5] (Table 1)

Table 1: Chemical composition of honey

Component	Percentage
Water	18-22%
Sugars	75-80%
a) Glucose/dextrose	30%
b) Laevulose/fructose	40%
c) Sucrose	2-5%
d) Maltose	7-8%
Acid	0.57%
Lipids	0.10%
Proteins	0.26%
Minerals	0.17%

Qualities of good honey^[5]

1. It settles down when put in water.
2. Bees do not get stuck in this honey.
3. When put on a vertical portion on cloth, it does not get absorbed but trickles down.
4. It burns like oil.
5. When applied in eyes causes burning sensation.

Properties and therapeutic uses of different types of honey

Honey is of eight types.^[1,4,5] (Table 2)

Table 2: Properties and therapeutic uses of different types of honey

Type of Honey	Source	Properties	Therapeutic use
Pauttika honey	Small black bee resembling a gnat	Ghee like colour, dry and hot because of its association with poison, produces heart burn and intoxication.	--
Bhramara honey	Bhramara type of bee.	White in color, not easily digested because of its slimy and excessively sweet properties.	--
Kshaudra honey	Small brown bee	Brown colour, cold ,easy to digest.	Diabetes.
Makshika honey	Big brown bees	Oil like colour. It is lighter than Kshaudra, dry, best in qualities	Asthma, jaundice, piles, phithis, and cough.
Chhatra honey	Yellowish brown bees which makes umbrella shaped hives in forests.	Brown yellow in color. It is sweet after digestion, heavy to digest, cold, and slimy.	Bleeding disorders, leucoderma, diabetes and worm-infestations

Aarghya honey	Madhuka (Madhuka indica) trees	White in color. It is astringent in taste, pungent after digestion	Strengthening and beneficial for eyes.
Auddalaka honey	Small brown insects which store honey inside ant hills.	Yellowish brown in color, astringent and sour, pungent after digestion.	Skin diseases
Dala honey	Unprepared honey, found in flowers	Pink in color, dry, sweet, sour and astringent in taste.	vomiting and diabetes mellitus

THERAPEUTIC ACTION OF HONEY

Antibacterial effect

Honey is known to contrast the growth of various microorganisms. This kind of effect has been a main attractive feature for honey application in clinical medicine.^[7]

The antibacterial factors in honey include the hyperosmolarity effect (>80% sugar content), acidic pH, hydrogen peroxide, methylglyoxal, bee defensin-1, various proteinaceous compounds, flavonoids, and phenolic compounds. It is known that these compounds may affect the growth and metabolism of bacteria, what leads to the disruption of cell wall integrity, blocking ion channels and inhibiting adenosine triphosphate (ATP) synthesis.^[8]

The antimicrobial activity of most honeys is due to hydrogenperoxide. Medical-grade manuka honey, derived from the shrub *Leptospermum scoparium* (native to New Zealand and Australia), contains unusually high concentrations of methylglyoxal and only trace amounts of hydrogen peroxide. Nonperoxide antibacterial activity (NPA) (commercially registered as Unique Manuka Factor [UMF]) indicates the antibacterial efficacy against

Staphylococcus aureus, expressed as the equivalent phenol concentration. The antimicrobial activity of honey varies depending on botanical, geographical and seasonal conditions.^[8]

Antioxidant activity

The antioxidant activity of honey is attributed mainly because of its polyphenols (e.g., flavonoids and phenolic acids), antioxidant enzymes (catalase and peroxidase), vitamins C), maillard reaction products (melanoidins) and carotenoids and amino acids (proline).^[9,10]

Wound healing

The active mechanisms of honey that are involved in the healing of are its antioxidant, antibacterial, and anti-inflammatory properties.^[11]

Honey can accelerate wound healing by debridement and it hastens absorption of oedema. It creates deodorization of infected wounds, promotes granulation tissue formation and accelerates epithelialization.^[12]

Anti inflammatory action

Gallic acid (GA) or 3,4,5-trihydroxybenzoic acid, consisting of trihydroxylated phenolic structure, is an intermediate of secondary plant metabolism in higher plants found to be commonly present in honey. GA provides its anti-inflammatory actions by suppressing proinflammatory cytokines and chemokines such as COX-2.^[13]

Anticancer Activity

Most of the therapeutic agents exert their action through apoptosis, cell cycle arrest and inhibition of cell growth. Most of the phenolic compounds isolated from honey also use one of the same pathways for the induction of anticancer effect. Caffeic acid (CA) is a representative phenolic compound that is found in many different natural resources such as fruits, vegetables, herbs and honey. CA possess numerous biological activities including antioxidative, anti-cancer, anti-diabetic effects and also inhibits human immunodeficiency virus (HIV) replication. CA and its derivative caffeic acid phenethyl ester (CAPE) inhibit

the enzymatic action of MMP-9 (matrix metalloproteinase-9) which has a role in cancer invasion and metastasis.^[13]

Honey in dermatology and skin care

Honey has been used as one of the oldest used remedies in skin care and management. The dermatological characteristics of honey are mainly due to the presence of hydrogen peroxide and methylglyoxal.^[14] Keratinocytes and excised skin fragments has shown that acacia honey induces the expression of cytokines (TNF-a, IL1-b, and TGF-b), and of matrix metalloproteinase 9 (MMP-9). This latter enzyme is able to degrade collagen IV and is involved in basal membrane disorganization during the re-epithelialization process of wound repair. Moreover, the release of cytokines (TNF-a) from monocytes seems involved in honey immunomodulatory effects.^[6]

Cardiovascular protective effect

A wide range of phenolic constituents is present in honey like quercetin, caffeic acid phenethyl ester (CAPE), acacetin, kaempferol, galangin which have promising effect in the treatment of cardiovascular diseases. Regular intake of phenolic compounds is associated with reduced risk of heart diseases. In coronary heart disease, the protective effects of phenolic compounds include mainly antithrombotic, anti-ischemic, anti-oxidant, and vasorelaxant. It is suggested that flavonoids decrease the risk of coronary heart disease by three major actions: improving coronary vasodilatation, decreasing the ability of platelets in the blood to clot, and preventing low-density lipoproteins (LDLs) from oxidizing.^[14]

Antidiabetic properties

The use of honey in Type I and Type II diabetes was associated with significantly lower glycemic index than with glucose or sucrose. Due to low glycemic index of honey it helps to reduce the absorption of digested food.

Fructose and glucose, the prominent monosaccharides in honey. Gastric emptying is prolonged by fructose intake, which may slow the rate

of intestinal absorption. Besides delaying absorption, fructose consumption lowers food intake, which is also attributed to the delayed gastric emptying. The slow absorption of fructose in the intestine might prolong the duration of contact and interaction between fructose and intestinal receptors that play a key role in satiety. This might allow more macronutrients (including carbohydrates) to be passed into the large intestine, thereby limiting their intestinal absorption. Moreover, fructose reduces food intake, there is a possibility for reduced weight gain (Figure 1).^[13,15]

Dietary fructose is known to activate glucokinase (GKA) which is a key enzyme involved in the intracellular metabolism of glucose. GKA catalyzes the conversion of glucose to glucose-6-phosphate thereby decreasing blood glucose.

Glucose is the second major constituent in most varieties of honey and intestinal absorption of fructose is enhanced in the presence of glucose.^[13]

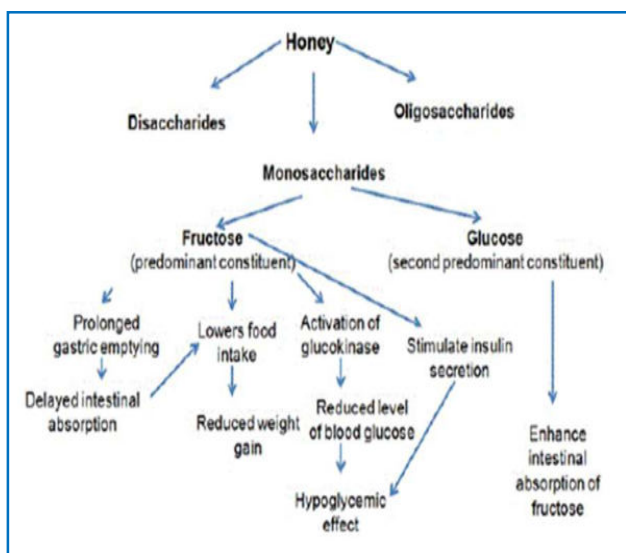


Figure 1: Action of fructose and glucose in honey

Upper respiratory infections

Honey can be seen as a potential alternative treatment of cough and illness of the upper respiratory tract in children. In adults, the treatment of persistent post-infectious cough with honey combined with caffeine seemed to be more effective than systemic steroid. The effect of honey was enhanced by the addition of caffeine.^[15] Honey has a

possible beneficial effect in the treatment of mucositis, childhood cough, persistent post-infectious cough, as well as post-tonsillectomy wound healing and the prevention of Acute otitis media.^[16]

Dental applications of Honey

Radiation induced oral mucositis

Pediatric patients develop mucositis when receiving treatments such as chemotherapy and radiation; the most common and sensitive is oral mucositis. Mouth rinses containing antimicrobial, antihistamine and analgesic medications are the mainstay for pediatric patients; however, patients often refuse these rinses due to the taste or texture.^[17]

Honey has been known for its properties such as tissue repair, wound healing and therapeutic properties in the treatment of various gingival diseases. It has excellent antimicrobial properties, low pH, high osmolality and generates high level of noncytotoxic hydrogen peroxide through the enzyme glucose oxidase. Honey decreases prostaglandin concentration, increases nitric oxide concentration in lesions, has anti-inflammatory and antioxidant properties, thus reducing mucosal irritation.^[18,19]

Honey as mouthwash

Low PH of plaque leads to shift in the microbial flora from commensal to pathogenic leading to the development of caries and periodontal diseases. The use of mechanical and chemical plaque control agents have played a suitable adjunct in tackling this problem.^[19] Honey contains an enzyme glucose oxidase that produces hydrogen peroxide when diluted which is a potent antibacterial substance. Honey mouthwash formulation can be safely used twice daily, even during the night when the salivary flow rate is less as it has shown to have negligible effect on enamel microhardness due to its components such as Ca, phosphate and other ions, as well as the buffering capacity.^[20,21]

Honey used in aphthous ulcers

Aphthous Stomatitis affects 10–20% of the ulcer population. The clinical manifestations range from mild ulceration that heals within a few days to deep and painful ulcers that persist for as longer time.

Recurrent aphthous ulcer is characterized by the periodic appearance of the painful small crateriform ulceration on the mucosa of oral cavity i.e. vestibule, cheeks, lips, tongue, palate, floor of the mouth and pharynx. In addition to its valuable nutritional constituents, honey has anti-inflammatory and antioxidant activities, its broad spectrum antibacterial action, high acidity that inhibit microorganism, high sugar content, high viscosity and immunomodulatory action makes it a suitable natural subject for healing oral ulcers.^[22,23,24]

Honey as a cariostatic agent

Honey has an antibacterial effect on *Streptococcus mutans*, which is considered the main causative organism of dental caries. *S. mutans* along with other oral bacteria forms a microbial community on the tooth surface surrounded by extra cellular matrix and salivary proteins, collectively known as dental biofilm. Cariogenic bacteria within this biofilm utilize dietary sugars and produce lactic acid as a by-product. This acid attacks and demineralizes the tooth structure, leading to decay.^[25] *S. mutans* adhere to dextran causing them to cohere which is an important feature in the colonization of this organism on the teeth.^[26] Honey not only aids in inhibiting the growth of dental plaque bacteria but also reduces the amount of acid produced and hinders the bacteria from producing dextran which helps bacteria to colonise.^[25]

Beena JP *et al* conducted a study to test the antibacterial activity of manuka honey and to compare its efficacy with Dabur honey on the cariogenic bacteria (*Streptococcus mutans* and *Lactobacillus*). They concluded that manuka honey had more antibacterial activity than dabur honey on *S. Mutans* and *Lactobacillus* bacteria and the effect was dependent on the concentration of honey used.^[2]

Rupesh *et al* reported that manuka honey with UMF (Unique Manuka Factor) 19.5 is an effective adjunctive oral hygiene measure for reducing colony counts in children.^[27]

Precautions before using Honey^[4]

- Do not eat honey in excess quantity due to its heavy, rough, astringent and cold properties. If

taken in excessive quantity, produced a condition called *Madhvama* (a situation called indigestion of honey in Ayurveda) no other kind of indigestion is more difficult to treat than that caused by honey because of the need of opposite kinds of treatment. Hence it is very severe and kills immediately like poison.

- Honey should not be heated, or mixed with hot foods. Also should not be consumed when you are working in hot environment, where you are exposed to more heat or during hot seasons. Honey includes nectar of various flowers of which some may be poisonous. Poison has hot or *Ushna* qualities. When honey is mixed with hot and spicy foods the poisonous properties get enhanced and cause imbalance of *Doshas*.
- Honey should never be mixed with rain water, spicy foods and fermented beverages.
- Store honey in glass or china containers only. Never store in metallic containers.
- Avoid giving honey to infants under 12 months to avoid the risk of botulism (a type of bacterial food poisoning). Honey sometimes contains dormant endospores of the bacterium *Clostridium botulinum*, which can be dangerous to infants, as the endospores can transform into toxin-producing bacteria in the infant's immature intestinal tract, leading to illness and even death.
- Allergic reactions to honey have also been reported in individuals allergic to pollen.

CONCLUSION

Honey is a natural product with many attributes that are useful for humans. The consumption of honey is increasing because of its antioxidant, antibacterial, anti-inflammatory and wound healing properties. Children should be given 1-2 spoons of honey daily. The best way to give honey is to mix 15 gram with a glass of warm milk, that is very effective for curing constipation, anemia, night incontinence. Due to less number of research activities regarding honey in dentistry more clinical trials are required for its use in dentistry.

REFERENCES

1. Bagde A.B, Sawanth R.S, BingareS.D, Sawai.R.V, Nikumbh MB. Therapeutic and nutritional values of honey(madhu). International Journal of pharmacy 2013;4(3).
2. Javaregowda P Beena, Punyatoya Sahoo, Sapna Konde, N Sunil Raj, Narayana C Kumar, Manisha Agarwal. Manuka Honey: A Potent Cariostatic Agent— An in vitro Study. International Journal of Clinical Pediatric Dentistry, March-April 2018;11(2):105-109
3. Abdulmlik A Ghashm, Nor H Othman, Mohammed N Khattak, Noorliza M Ismail, Rajan Saini. Antiproliferative effect of Tualang honey on oral squamous cell carcinoma and osteosarcoma cell lines, BMC Complementary and Alternative Medicine 2010; 10:49.
4. Sharma khemchand, Goyal chinky, Prajapati Deepchand. Critical review on madhu w.s.r. to honey . International Journal of Ayurveda and Pharma Research, September 2015, Vol 3, Issue 9.
5. Bulusu Sitaram, Bhavaprakasha of Bhavamis; Chaukambha orientalia 2012.
6. Bruno Burlando & Laura Cornara. Honey in dermatology and skin care: a review, Journal of Cosmetic Dermatology, 12, 306-313.
7. Laura cornara, Marco Biagi, Jianbo Xiao, Bruno Burlando. Therapeutic properties of bioactive compounds from different honeybee products; Journal Frontiers in pharmacology, June 2017, Vol 8.
8. Syarida H.Safii, Geoffrey R.Tompkins and WarwickJ. Duncan Periodontal Application of Manuka Honey: Antimicrobial and Demineralising Effects In Vitro; International Journal of Dentistry, Volume 2017.
9. Duran Ozkok and Sibel Silici . Antioxidant activities of honey bee products and their mixtures . Food Science and Biotechnology 26(1), 201-206.
10. Dimitrios Stagos, Nikolaos Soultisiotis, Christina Tsadila, Stamatina Papaconomou, Charalampos Arvanitis, Alexandros Ntontos, Fani karkanta, Sultana Adamou-Androulaki, Konstantinos Petrotos, Demetrios A. Spandidos, Demetrios Kouretas and Dimitris Mossialos; Antibacterial and Antioxidant activity of different types of honey derived from mount Olympus in Greece; International Journal of Molecular Medicine 42: 726-734, 2018.
11. Mohd Azri Abd Jalil , Abdul Razak Kasmuri, Hazrina Hadi; Stingless Bee Honey, the Natural Wound Healer: A Review ,Skin Pharmacology and Physiology 2017,30; 66-75.
12. Winit Phuapradit and Nopadol Saropala; Topical Application of Honey in Treatment of Abdominal Wound Disruption. Aust NZ J Obstet Gynaecol 1992; 32: 4: 381.
13. Afroz, Tanvir, Zheng W and Little PJ; Molecular Pharmacology of Honey, Journal of Clinical and Experimental Pharmacology. 2016, 6:3.
14. Rifat Ullah Khan & Shabana Naz & Alaeldein M. Abudabos. Towards a better understanding of the therapeutic applications and corresponding mechanisms of action of honey; Environ Sci Pollut Res. November 2017.
15. Omotayo O. Erejuwa , Siti A. Sulaiman, Mohd S. Ab Wahab, Review Honey - A Novel Antidiabetic Agent ; International journal of biomedical science.2012; 8(6):913-934.
16. Henatsch, D., Wesseling, F., Kross, K.W. & Stokroos, R.J. Honey and beehive products in otorhinolaryngology: a narrative review; Clinical Otolaryngology; 28 September 2016.
17. Ferne T. Elsass. A Sweet Solution: The Use of Medical grade Honey on Oral Mucositis in the Pediatric Oncology Patient; Wounds 2017;29(12):115-117
18. Soad K. Al Jaouni, Mohammad S. Al Muhayawi, Abear Hussein, Iman El fiki, Rajaa Al Raddadi, Saad M. Al Muhayawi, Saad Almasaudi, Mohammad Amjad Kamal, and Steve Harakeh; Effects of Honey on Oral Mucositis among Pediatric Cancer Patients Undergoing Chemo/Radiotherapy Treatment at King Abdulaziz University Hospital in Jeddah, KSA. Evidence-Based Complementary and Alternative Medicine Volume 2017, 1-7.
19. Nahid Dehghan Nayeri , Shiva Sadat Bassampour ,Mahboobeh Khajeh; Parvaneh Asgari. Honey and Radiation-Induced Stomatitis in Patients With Head and Neck Cancer ;Iran Red Crescent Med J. 2015 October; 17(10).
20. Richa Singhal, Mahantesh Siddibhavi, Roopali Sankeshwari, Prathiba patil, Sagar Jalihal ,Anil Ankola ;

Effectiveness of three mouth washes – Manuka Honey, Raw Honey, and Chlorhexidine on Plaque and gingival scores of 12- 15 year old school children .A Randomized controlled trial; Journal of Indian society of Periodontology, Jan-Feb 2018, 22(1); 34-39.

21. Ankita Jain, Dara John Bhaskar, Devand Gupta, Chandan Agali, Vipul Gupta , Rajendra Kumar Gupta, Priyanka Yadav, Akash B Lavate, Mudita Chaturvedi. Comparative Evaluation of Honey Chlorhexidine Gluconate (0.2%) and combination of xylitol, and Chlorhexidine mouth wash (0.2%) on the clinical level of dental plaque; A 30 days RCT, J. Perspectives In Clinical Research, Mar 6(1); 53-57.
22. Nergiz Yılmaz, Özlem Nisbe, Cevat Nisbet, Gözlem Ceylan, Fatih Hoşgör, Ö.Doğu Dede; Biochemical Evaluation of the Therapeutic Effectiveness of Honey in oral mucosal ulcers, Bosnian Journal of Basic Medical Sciences 2009; 9 (4): 290-295.
23. Supriya Vijay Gupta, Vidya krushnarao Lohe, Rahul Raghunath Bhowate. Comparison of efficacy of Natural honey and Triamcinolone acetone (0.1%) in the healing of oral ulcers–A clinical study; Journal Of Apitherapy, 2018 ,3(1):1-8.

24. Sally A El-Haddad and Maysara D. Al-Shawaf; Effect of honey for treatment of some common oral lesions: Follow up of 50 cases. Journal of Dentistry and Oral Hygiene May 2013.
25. Hani M. Nassar, Mingyun and Richard L.Gregorya. Effect of Honey on Streptococcus mutans Growth and Biofilm Formation; Applied and Environmental Microbiology 2011, 536–540.
26. J. Kelstrup and T.D Funder-Nielsen. Adhesion of Dextran to Streptococcus mutans; Journal of General Microbiology 1974,485-489.
27. Rupesh S, Winnier JJ, Nayak UA, Rao AP, Reddy NV, Peter J. Evaluation of the effects of Manuka honey on salivary levels of mutans streptococci in children: a pilot study. J Indian Soc Pedod prev Dent 2014 Jul-Sep;32(3):212-219.

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