

Honey: An Emerging Therapeutic Modality for Oral Diseases

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ABSTRACT

Background: Natural products have been used for several years in folk medicine. One such natural medicine is Apitherapy which is the medical use of honey, propolis, pollen, royal jelly, bee venom etc. Honey has an effective antibacterial potential to combat oral pathogens and holds promise for the treatment of periodontal diseases, mouth ulcers, and other diseases of the oral cavity. As people are realizing that modern medicine is not the soul remedy for infections today. So, many of us are looking back to the past for the alternative approaches with least possible side effects like apitherapy. This review article throws a light on the evolution of apitherapy and its clinical importance in dentistry.

Keywords: Apitherapy, Honey, Phytotherapy, Plant Origin.

INTRODUCTION

Natural products have been used since ancient times in folk medicine. In dentistry, phytomedicines have been widely used. Herbs with medicinal properties are useful and effective source for treatment of various disease processes¹. The herbal products are also being increasingly used as sedatives, or plaque reduction and healthy gums.

a. Phytotherapeutic substances are generally classified into three groups²

- Plant products
- Animal products
- Mineral origin.

b. In dentistry, they are used as³

- Antimicrobial agents
- Anti-inflammatory agents
- Sedative and anxiolytics.

One of such phytotherapy is apitherapy and it is emerging as a new therapeutic modality in

dentistry and especially in treating oral diseases. Apitherapy is the use of honey bee products such as honey, bee venom, propolis and royal jelly for medicinal purposes. According to Dr Stefan Stangaciu, apitherapy, or 'bee therapy' (from the Latin word 'apis' which means bee) is defined as, 'the art and science of treatment and holistic healing through the honey bee and her products for the benefit of mankind and all the animal kingdom⁴.

Honey is defined as a sweet liquid substance produced by bees from the nectar gathered from flowers and stores by them for food. The color and flavor are determined by the flowers used. It was the early man's source of sugar. About 80% of honey is levulose and dextrose, the remainder mostly water. It is dextrose and levulose that give honey its high-energy content because they can be put to use immediately. Athletes can use honey diluted with orange juice to give them a boost of energy. Honey can be used as a health food because of its high content of energy giving sugars⁵.

Received: Jan. 23, 2016: Accepted: Mar. 15, 2016

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HISTORICAL OVERVIEW^{6, 7, 8}:

- Honey is the most ancient wound dressing known, mentioned by the Greek philosopher Aristotle and it has continued to be used throughout the ages.
- Dioscorides (c 50 AD) wrote of honey being 'good for sunburn' and 'for all rotten and hollow ulcers'.
- The history of apitherapy can be traced back to the ancient Egyptians the first known prescription using honey was written on a clay tablet, found in the Euphrates valley and dating from somewhere between 2100 and 2000 BC.

- Hippocrates listed the physical effects of honey: 'It causes heat, cleans sores and ulcers, softens hard ulcers of the lips, and heals carbuncles and running sores'.
- Ancient Greeks athletes even drank honey for an energy boost. Pliny, a Roman scholar, swore that a glass of honey and cider vinegar would clean the system and bring good health.
- In the 19th century bacteria was found to be the cause of infection. In 1919 a study confirmed that honey had antibiotic powers.

COMPOSITION OF HONEY⁹: the following table: 1 enlisted the composition of honey.

Table 1: Composition of Honey.

Composition	Percentage
Water	22.0
Carbohydrates	79.7
Protein	0.2
Ester extract	0.0
Ash	0.1
Fiber	0.0
Carbohydrates	Fructose, glucose, sucrose
Enzymes	Invertase, amylase, glucose oxidase, catalase, acid phosphorylase
Free amino acids	Lysine, histidine, arginine, aspartic acid, threonine, serine, glutamic acid, proline, glycine, alanine, cystine, valine, methionine, isoleucine, leucine, tyrosine, phenylalanine
Minerals	K, Na, Ca, Mg, Fe
Vitamins	Riboflavin, niacin, folic acid, pantothenic acid, vitamin B6, vitamin C
Antioxidants	Flavonoids, vitamin C, catalase, selenium

TYPES OF HONEY¹⁰: it is available in 4 forms.

1) Comb Honey (*honeycomb*)

Is section of the waxen comb filled with honey just as the bees stored it naturally.

2) Extracted Honey (*Liquid*)

It is the honey which is separated from the comb. It is prepared by cutting off the wax cappings and whirling the comb in a honey extractor, where

centrifugal force moves the honey out of the cells. This type is most readily available and used.

3) Chunk Honey

Consist of a chunk of honey filled in a jar with liquid honey poured around it.

4) Creamed Honey (*granulated*)

Is extracted honey whipped into a semisolid state similar to the consistency of butter. It is very easy to spread on toast or rolls.

THERAPEUTIC USES IN DENTISTRY

1) Oral infections: A rapid alleviation of pain was observed when the gelled honey was used in a case of erosion of the gum and jaw bone due to infection following surgery with bone grafting to repair damage to the jaw from traumatic injury that had been nonresponsive to any conventional treatment for more than 6 months. The infection cleared and the wound healed up within a month after starting the application of the gelled honey¹¹. It has been reported in a study¹² that natural honey showed antibacterial action against anaerobic bacteroides present in dental abscess and osteomyelitis.

2) Radiation mucositis: A study was conducted to evaluate the effect of pure natural honey on radiation mucositis. Forty patients were advised to take 20 ml of pure honey 15 minutes before, 15 minutes after and 6 hours post radiation therapy and were evaluated every week for the development of radiation mucositis using the RTOG grading system. There is significant reduction in the symptomatic mucositis among honey-treated patients compared to controls¹³. The anti-inflammatory action and stimulating effect on tissue repair of honey could possibly be of benefit for the relief of oral conditions resulting from radiotherapy and chemotherapy of cancer.

3) Mouth ulcers: Topical application in the form of spray (from bee products), can be also be used for mouth and upper respiratory tract disease treatment and prevention. The optimal technology of spray is prepared, and concentration of ethanol as extra gent 70% and 15% of honey is determined; and the preparation is called propomel¹⁴.

4) Prevention of halitosis: Candy made with honey may also be useful for prevention of halitosis, as honey has been observed to give rapid removal of malodor from infected wounds. It is due to the antibacterial action of honey and also bacteria use the glucose in honey in preference to amino acids, and thus would produce lactic acid instead of bad-smelling amines and sulphur compounds¹¹.

5) Periodontal diseases: anti-inflammatory property of honey blocks the direct cause of the erosion of the connective tissues and bone. Its effect on leukocytes could be beneficial, as some periodontitis is due to immune cell hypo-function

allowing pathogens to grow unchecked and cause direct tissue damage¹⁵. The initial inflammatory response is elicited by bacterial cell wall components, but reactive oxygen species released from the activated phagocytes feedback as signals to elicit further inflammatory response.

It has also been proposed that antioxidants be used to protect the periodontal tissues from the damaging free radicals formed in the inflammatory response. Honey contains a substantial level of antioxidants (Frankel, Robinson, and Berenbaum 1998)¹⁶, and has an anti-inflammatory action that has been clearly demonstrated to be direct and not secondary to the clearance of infection (Molan 2001)¹¹.

Recent studies by Gribel and Pashinskii indicated that honey possessed moderate antitumor and pronounced anti-metastatic effects in five different strains of rat and mouse tumors. Furthermore, honey potentiated the antitumor activity of chemotherapeutic drugs such as 5-fluorouracil and cyclophosphamide¹⁷. One study suggested that chewing "honey leather" can reduce inflammation of the gingiva¹⁸.

6) Against dental plaque & gingivitis: Atwa et al¹⁹ evaluated the effect of honey on plaque formation in orthodontic patients. The effects of honey were compared to treatment with either 10% sucrose or 10% sorbitol that served as positive and negative controls, respectively. They concluded that topical application of honey can modify the pH, reduce bacterial counts, and inhibit bacterial growth. These data suggested that topical application/chewing of honey might help prevent gingivitis and caries in patients undergoing orthodontic treatment.

Nayak et al²⁰ studied the effect of manuka honey, chlorhexidine gluconate and xylitol on the clinical levels of dental plaque and concluded that manuka honey reduced plaque formation significantly better than xylitol chewing gum.

CONCLUSION

The curative properties of honey bees and their products have been seen with an eye of speculation since ancient times. In its ancient usage there was no recognition of its antibacterial properties - it was just known to be an effective

remedy. Now it can be seen that the effectiveness of honey in many of its medical uses is probably due to its antibacterial activity. It is well established that honey inhibits a broad spectrum of bacterial species. But literature is sparse as far as the field of dentistry is concerned. Studies are on to measure the antimicrobial efficacy of honey in oral cavity, but trials need to be carried out to determine to what extent this is true.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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