



Efficacy of honey to promote oral wellness

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Abstract

Honey activity that rapidly clears infection from wounds when applied topically, which may make it suitable for treatment of periodontal disease as well as for clearing infection in oral ulcers and wounds following surgery. The anti-inflammatory activity of honey along with its antioxidant content has been used as a medicine throughout the ages, and in more recent times, it has been rediscovered that it is effective in treatment of burns, infected wounds and skin ulcers. It possesses potent antibacterial may be beneficial in preventing erosion of periodontal tissues that occur as collateral damage from free radicals released as an inflammatory response to infection.

Introduction

In ancient times, honey was considered the food of gods and the symbol of wealth and happiness. It is a sweet syrupy substance produced by honeybee from the nectar of flowers and used by humans as a sweetener. Although very well known as food, it is one of the oldest medicines and has continued to be used as such throughout the ages [1]. Honey was used to treat the infected wounds as long ago as 2000 years before the bacteria were discovered to be the cause of infection. In 50 AD, Dioscorides described honey as being “good for all rotten and hollow ulcers” [2]. More recently, honey has been reported to have an

inhibitory effect to around 60 species of bacteria including aerobes and anaerobes, gram-positives and gram-negative microorganisms [3] . An anti-fungal action has also been observed for some yeasts and species of aspergillus and penicillium, as well as all the common dermatophytes [4] . Large volume of literature appearing on the effectiveness of honey in treating the infected wounds and skin ulcers describes the features that indicate that honey has potential for the therapy of periodontal disease, oral ulcers, and other problems of oral health. One of the most important features that may be particularly beneficial in promotion of oral wellness is its antibacterial activity. The purpose of this article is to review the effectiveness of honey in promoting oral wellness.

Composition[5] :

Major portion of honey is comprised of carbohydrates. It contains many enzymes and free amino acids, of which most abundant is proline. Traces of vitamin B, minerals, and antioxidants like flavonoids and vitamin C are also present.

Antibacterial potential [3,6] :

The antibacterial property of honey was first recognized in 1892 by van Ketel [7] . Important factors influencing the antibacterial effectiveness of honey are as follow:

Osmotic effect:

Honey because of its high osmotic properties can extract water from bacterial cells thus leading to cell death. It has an osmolarity sufficient to inhibit microbial growth[8] .

Acidic pH:

Honey is quite acidic, its pH being between 3.2 and 4.5, which is low enough to be inhibitory to many animal pathogens. The optimum pH for growth of these species normally falls between 7.2 and 7.4[9,10] .

Hydrogen peroxide:

Majority of anti-bacterial potential in honey is found to be due to hydrogen peroxide produced enzymatically in honey[9] .

For processing of the nectar during ripening into honey, bees add some enzymes. One of them is glucose oxidase, which results in formation of gluconic acid and hydrogen peroxide from the glucose.

This enzyme is inactive in ripened honey but is reactivated when honey is diluted. On dilution of honey the activity of enzymes increases, giving rise to an antiseptic action at a level which is anti-bacterial but not tissue damaging.

Clinical significance in dentistry:

The therapeutic features of honey seen in its usage in wound care elsewhere on the body indicate that it has the potential to be useful for prevention or treatment of infected wounds following tooth extraction or surgery, and for treating other oral infections. Elbagoury and Fayed in 1985 conducted a study describing a small clinical trial of placing honey in sockets before closure of wound, after surgical removal of impacted third molar and concluded that there was less pain, less incidence of postoperative complications and less swelling in honey treated group than in the untreated control group. The effectiveness of honey in such an application is likely to be limited as it has a tendency to dissolve quickly in saliva and thus does not have a longer therapeutic effect [11] . A novel wound dressing material consisting of gelled honey that has been developed (PCT patent application by the University of Waikato, December 2000) may be useful for this, and for the treatment of oral ulcers, as it adheres to the oral mucosa and is slow to dissolve in saliva. Clinical trials of this are yet to be run, but reports of its use indicate that it is likely to prove to be successful: additional to any antimicrobial effect, the honey gave a rapid soothing effect from pain as has been observed with wounds and burns elsewhere on the body. A similar 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 non- responsive to any

conventional treatment for more than six months. In this case, the gelled honey was moulded into the infected area and held in place by wearing a mouth guard over it. The infection cleared and the wound healed up within a month after starting the application of the gelled honey. 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 extragent 70% and 15% of honey is determined; and the preparation is called propomel [12] .

Honey, having an anti-inflammatory activity raises the possibility of it being useful as a therapeutic agent for periodontitis; the anti- inflammatory activity would block the direct cause of the erosion of the connective tissues and bone. In a study, eight honeys and three types of propolis were tested and the result proved them effective as an anticalculus agent in toothpastes and mouthwashes [13] . Ozan et al conducted a study in which a mouthrinse containing propolis was prepared at four different concentrations as 10%, 5%, 2.5%, and 1%. Besides, CHX was used as control group. The antibacterial effects of five solutions on oral microorganisms were tested and their cytotoxic effects on human gingival fibroblasts were evaluated by agar diffusion test. At these concentrations, effectiveness of mouthrinse containing propolis samples on oral microorganisms was not found as effective as chlorhexidine. On the contrary, samples found less cytotoxic effects on human gingival fibroblasts than chlorhexidine; the administration of propolis at appropriate concentrations might be effective on oral microorganisms and non- cytotoxic to gingival fibroblasts [14] .

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. Chiba et al in 1985 has also published report on using honey to ease the pain of stomatitis during radiotherapy[15] .

Candy made with honey may also be useful for prevention of halitosis, as according to Molan honey has been observed to give rapid removal of malodour from infected wounds [16] . It would not be just the antibacterial action of honey involved, but Nychas, Dillon, and Board concluded that as bacteria would use the glucose in honey in preference to amino acids, and thus would produce lactic acid instead of bad-smelling amines and sulphur compounds [17] .

There has been much debate in the past about whether honey is harmful to the teeth or not. More recently, research has been carried out to find the minimum inhibitory concentration of honey for species of bacteria believed to cause caries, using honeys with standardised antibacterial activity. It was found that the minimum inhibitory concentrations of honey for *Strep. mitis*, *Strep. sobrinus* and *Lactobacillus casei* were 7%, 7.5–8.5% and 8–12% respectively. The production of acid by these bacteria was also inhibited. It can be concluded therefore that although honey may be cariogenic because of its high content of fermentable sugars, with selected honeys that have higher levels of antibacterial activity, they have the potential to inhibit the growth of cariogenic bacteria. But the degree to which this occurs in the oral cavity would have to be determined by feeding experiments [18] .

Conclusion:

The therapeutic properties of honey is evident in its usage in wound care which clearly give it potential for therapeutic use in field of dentistry, but there is need for the trials to be carried out before its usefulness is known. Risk of caries is reduced by selecting honey having a high level of antibacterial activity, 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

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