



HONEY IN THE TREATMENT OF PERIODONTITIS

KANAKAM ELIZABETH THOMAS*

Lecturer, Dept. of Microbiology, SRM Dental College, Chennai 89

ABSTRACT

From ancient times, honey is being used as a therapeutic agent apart from its wide use as a sweetener. Honey is known to have antibacterial and anti-inflammatory property. Honey is used widely in the treatment of burns, to heal wounds, gastritis, ulcers and diarrhea and also in veterinary use. Today honey is available as candies as well as in gelled form. 90% of human population suffers from mild gingivitis to chronic periodontitis in their life time. As bacteria are becoming increasingly resistant to antibiotics newer generation drugs are being prescribed by the dentist. Hence research has turned in finding newer alternative therapy, which can be easily accessed and affordable to common man. Honey is a natural sweetener and can be used as an alternative in treatment of periodontal infections.

KEYWORDS: Honey, Periodontitis, Antibacterial activity of honey, Gingivitis, Alternative therapy



KANAKAM ELIZABETH THOMAS

Lecturer, Dept. of Microbiology, SRM Dental College, Chennai 89.

INTRODUCTION

From time immemorial honey is not only considered as a natural sweetener but is also used for its healing power. It is been used in traditional folk and tribal medicines. 93% of the consumers of honey use it for its medicinal value. Ancient scrolls, books, tables, stone paintings as old as 6000 BC, Vedas (Hindu scriptures), both old and New Testament in the Holy Bible depict honey has been used for treatment.¹ Honey is still used in the modern era in the treatment of cough and soar throat. During World War I, Russian soldiers used honey as a prophylactic measure to prevent infection of wounds and to heal quickly. Cod liver oil along with honey was used for treatment of ulcers. Honey is a saturated sugar solution containing 17% water. The predominant sugar that is present in honey is Fructose, followed by glucose. It also contains small amounts of protein, vitamins and minerals. Apart from these, natural honey is rich in amino acids- 18 essential and non essential amino acids. The property of honey depends on the floral source. Proline is the most important amino acid.²

Antibacterial property of honey

Honey was considered as an antimicrobial agent due to its high sugar content. Sugar is added in jams as a preservative. Due to the high sugar content, osmosis takes place between the bacterial cell and its environment, by drawing out water. Enzymatic glucose oxidation reaction of honey contributes to antimicrobial property. High osmotic pressure, low pH, high Carbon to Nitrogen ratio, reducing sugars, the viscous nature of honey which lowers the dissolved oxygen also add on to the antimicrobial activity of honey. Apart from low dissolved oxygen content, the supersaturated sugar solution has low water activity. Another important factor which contributes to the antimicrobial activity is Hydrogen peroxide. Honey generates hydrogen peroxide when diluted. Glucose oxidase gets activated when diluted and oxidizes glucose to gluconic acid and hydrogen peroxide. In the non peroxidase honey, catalase is present which exhibits antibacterial property. Other non-peroxidase activity are due to methyl syringate and methyl glyoxylate.³ Dold et al coined the term

“INHIBINE NUMBER” to indicate the antimicrobial property of honey. Inhibine number is the dilution until which honey shows antimicrobial property. After 26 years of research this was identified as Hydrogen peroxide. Catalase which is found in minute quantities in honey produces oxygen and water from hydrogen peroxide. This inverse relationship between hydrogen peroxide and catalase activity is used to determine the hydrogen peroxide level of honey, which was earlier known as the inhibine number.⁴

HONEY IN DENTISTRY

A study conducted by English H.K. in New Zealand showed that manuka honey had a statistically significant reduction in the plaque score.⁵ Studies have shown tat honey is effective against the bacteria which form biofilm. The best example of biofilm formation in human beings is plaque. A study by Merckoll showed that honey at half the concentration is effective on the biofilm forming bacteria.⁶ In a study done by Basson et al, honey showed Minimum Inhibitory Concentration against seven different species of Streptococci. The concentration of honey which showed antibacterial activity were 12% of honey for *Strep.oralis*, 17% for *Strep. anginosus*, 25% for *Strep. gordonii*, *Strep. mutans*, *Strep. salivarius* and *Strep. sanguis*. This shows honey has anti-streptococcal activity and can be effective against gingivitis as Streptococcus sp. is the main causative agent for caries formation.⁷

PERIODONTITIS

Periodontium is the connective tissue that surrounds and supports the teeth. Inflammation to the gingiva and into the periodontium is known as periodontitis. It is known from epidemiological studies that microbial plaque is the cause of gingivitis.⁸ Since bacterial plaque is the main cause of gingivitis, oral hygiene status of an individual will influence the prevalence of gingivitis. Another important factor for adult periodontitis is smoking. Even though there is a reduction in gingival bleeding among smokers, the plaque levels were greater when compared with non- smokers. In women hormonal fluctuation influences the microbial flora.⁸ The common types of

periodontitis are Aggressive periodontitis, Chronic periodontitis and Necrotizing periodontitis. When compared with male, the female counterpart are more prone to periodontitis, due to the hormonal variation taking place in her, from when she attains her puberty till she reaches her menopausal stage.⁹

Inflammatory process

Immune reaction and inflammatory response to oral microflora are the predominant characteristics of gingivitis and periodontitis. The immune reaction and the inflammatory response take place in the periodontium to attack the periodontal pathogens and prevent the invasion and spread of bacteria into the gingival tissues. But these defense reactions are harmful to the host in that it can destroy the cells and tissues surrounding the affected area. Inflammation is described as, when the tissue appears red, painful and swollen with loss of function at the specific site. Increased blood flow and vasodilatation will result in the redness of the gingiva during gingivitis. Due to the vascular changes there will be an accumulation of inflammatory cells. In the case of chronic and aggressive periodontitis pain is very less.

Proteinases

Periodontal disease causes tissue degradation. This is due to the proteases derived from the host and the bacteria. Collagenase, trypsin-like, serine cysteine proteinase are seen in the gingival cervical fluid. (GCF).

Polymorphonuclear leukocytes (PMN)

PMN is the most predominant leukocyte in the periodontal pockets both in the healthy individuals and the diseased. Elastase, is found in the primary granules of PMN and it causes breakdown of tissues. It is seen at sites of gingival inflammation. Lactoferrin is found in the secondary granules of PMN and activates PMN. Studies show that there is variation in the degrees of lactoferrin and elastase in accordance with the degree of gingival inflammation. There is an increase in the amount of lactoferrin and elastase from gingivitis to periodontitis.^{10,11,12}

ANTIBIOTIC RESISTANCE

Antiseptics and antibiotics have been developed against bacterial pathogens. In-turn the bacteria has developed resistance mechanisms to the antibacterial agents and pass on these resistance factors to one another and also to the other species.¹³ An increasing concern nowadays is about the antibiotic resistance shown by bacteria. Many awareness programs are conducted to decrease the indiscriminate use of antibiotics and bring light on the resistance developed by bacteria. Much research is going on in the field of alternative medicine. This makes honey as an alternative for the control of the oral pathogens.

HONEY IN PERIODONTITIS

Literature indicated that honey can be used in the treatment of periodontitis, dry socket and mouth ulcers. Honey has anti-inflammatory property. The anti-inflammatory action of honey gives the soothing effect on topical applications. The antioxidants present in honey along with the anti-inflammatory action prevents the deterioration of periodontal tissues.¹⁴ Certain periodontitis is due to the immune cells. Honey can activate leukocytes which is useful to prevent the rapid growth of periodontal bacteria. The next important property of honey in treatment of periodontal disease is that honey can stimulate the growth of granulated tissues and the epithelial cells, which will help in repairing periodontal tissues.¹⁵ Honey can be expected to be cariogenic. But studies reveal that honey has lesser cariogenicity than sucrose. According to Molan P.C., honey candies may prevent halitosis or oral bad breath, as honey is found to rapidly remove bad smell from infected wounds. Molan has suggested the use of soft gelled form of honey can be applied on the gingival margin periodically and prevent gingivitis or colonization of caries causing bacteria on the gingiva.¹⁶

CONCLUSION

Use of honey in the treatment of various diseases and ailments is well known from ancient times. But the use of honey in oral disease is not much in use. Research is still

going on in the application of honey against cariogenic bacteria. The main drawback is the practical difficulty of applying honey in the gingival margins. In the current era where technology has advanced, honey is available in the candy form and as well as in the gelled form. The soft gelled form of honey can be easily applied and will not easily get dissolved

in the saliva. As honey is a natural product, side effects and the danger of antibiotic resistance are minimized. The antioxidant property and anti-inflammatory action of honey will also prevent the erosion of periodontal tissues. Honey can be safely used to control the formation of biofilm which causes caries and other oral health problems.

CONFLICT OF INTEREST DECLARED NONE.

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