



PROPOLIS IN ORAL HEALTH: A NATURAL REMEDY

Dr. Sambhav Jain¹, Dr. Rohit Rai¹, Dr. Vandana Sharma¹, Dr. Manu Batra²

¹Department of Periodontology & Implantology and ²Department of Public Health Dentistry, Teerthanker Mahaveer Dental College & Research Centre, Moradabad, India

Received: 30-11-2013 / Revised: 09-12-2013 / Accepted: 21-12-2013

ABSTRACT

Propolis, a natural antibiotic is a resinous yellow brown to dark brown substance that honey bees collect from tree buds, sap flow, shrubs or other botanic sources. The pharmacologically active molecules in the Propolis are flavanoids and phenolic acids and their esters. Propolis has been used in dentifrices, as a storage medium for teeth that have avulsed, in periodontal therapy and in endodontic treatment. Propolis extract used as mouth rinse possesses anti microbial activity against streptococcus mutans present in the oral cavity. Subgingival irrigation with Propolis extract as an adjunct to periodontal treatment may also be more effective than scaling and root planning alone. It has promising role in future medicine as well as dentistry. Thus, switching back to natural resources, Propolis seems to be a promising alternative for the control of oral diseases in terms of anti microbial response and lower associated risk.

Key words: Propolis, Periodontitis, Periodontal Treatment, Dental Caries, Natural Remedy



INTRODUCTION

Propolis is the resinous substance collected by bees from the leaf buds and bark of trees, especially poplar and conifer trees (*Fig. 1*). Propolis is a golden-dark brown resinous substance that worker bees gather and pack on their hind legs from the sap of trees, shrubs and flower blossoms, the resinous substance of Propolis is then carried back to their colony combined with beeswax then used by the bees as a sealant and sterilant in and around the hive. Propolis, is derived from the Greek pro – ‘for or in defence of’ and polis – ‘the city’, hence, ‘defender of the city/hive’. Propolis is a naturally-occurring bee product. Bees use the propolis along with beeswax to construct their hives [1-3]. Propolis has antibiotic activities that help the hive block out viruses, bacteria, and other organisms. It plays a role in the bee colony as protection against invasion and infection, providing the bees with an ‘immune system’ and is used to seal the hive. Besides showing antimicrobial activity against periodontopathic bacteria, the propolis extract does not demonstrate selection of superinfectant organisms. Propolis mechanism of antimicrobial action, though not completely understood, seems to be complex and may vary according to its composition [4].

As an anti-inflammatory agent, propolis is shown to inhibit synthesis of prostaglandins, activate the thymus gland, aid the immune system by promoting phagocytic activity, stimulate cellular immunity, and augment healing effects on epithelial tissues [5]. Some people use propolis as a general nutritional supplement, although it would take large amounts of propolis to supply meaningful amounts of these nutrients. Propolis may stimulate the body’s immune system, according to preliminary human studies, and a controlled trial found propolis containing mouthwash effective in healing surgical wounds in the mouth. In test tube studies, propolis has shown considerable activity against bacteria and yeast associated with dental cavities, gingivitis, and periodontal disease, but one human study showed that propolis was no better than a placebo in inhibiting dental plaque formation. Propolis changes its consistency with fluctuation of temperature, should temperatures fall below 15^o C it becomes hard and brittle, but with temperature raising to 25^o-45^o C the substance will become elastic and sticky. Propolis was first used as a medicine by the Egyptians and use of it was continued by the Greeks and Romans. The major constituents of propolis are flavones, flavanones,

and flavanols. It is used in homeopathic and herbal practice as an antiseptic, anti-inflammatory, antimycotic, and bacteriostatic agent. Ancient Greek texts refer to this substance as a cure for bruises and suppurating wounds whereas history reveals during the 12th century Europe prescribe Propolis for treatment of mouth and throat infections as well as dental caries. The development of modern pharmaceutical medicine has seen Propolis and many other natural remedies have been forgotten, however, over the last 30 years, scientific and medical research has rediscovered the diverse properties of Propolis [6].

COMPOSITION

The chemical composition of Propolis is complex. The most important pharmacologically active constituents in propolis are flavonoids, phenolics and aromatics. It is believed that flavonoids account for much of the biologic activity in propolis. Additionally, propolis contains elements, such as iron and zinc that are important for the synthesis of collagen. Propolis contains protein, amino acids, vitamins, minerals [7].

PRODUCTION

Propolis is collected commercially by beekeepers, either scraping the substance from wooden hive parts or utilizing specially constructed collection mats. The raw product is then secondary processed to remove beeswax and other impurities prior being utilized in a variety of natural health care products. Propolis is a creation of 55% resins, 30% wax, 10% aromatic oils and 5% pollen [6].

PROPERTIES OF PROPOLIS

Antioxidant Effects: The flavonoids concentrated in propolis are powerful antioxidants. Antioxidants have been shown to be capable of scavenging free radicals and thereby protecting lipids and other amalgam such as Vitamin C from being oxidized or destroyed. It is probable that active free radicals, together with other factors are responsible for cellular aging and degradation in such conditions as cardiovascular diseases, arthritis, cancer, diabetes, Parkinson disease and Alzheimer disease. Oxidative damage may also result in poor liver function. Studies on rats *in vitro* show that propolis extracts protect against damage to liver cells.

Anti-inflammatory effect: As anti-inflammatory agent, propolis is shown to inhibit synthesis of prostaglandins, activate the thymus gland, aid the immune system by promoting phagocytic activity, stimulate cellular immunity, and augment healing effects on epithelial tissues. Additionally, propolis

contains elements, such as iron and zinc that are important for the synthesis of collagen.

Dental Care Effects: In rats inoculated with a *S. sobrinus*, about half of their fissures were carious, while dental canes were significantly less in rats given water containing propolis extract. Propolis has also been shown to be effective as a subsidiary treatment for gingivitis (gum infections) and plaque. A 50% propolis extract was found to be antiseptic against pulp gangrene (Gafar, et al, 1986). Propolis has also been shown to inhibit the growth of a range of bacterial organisms found in dental caries [6] (Figure 2).

Propolis in periodontal disease: Dental plaque, a film of microorganisms on the tooth surface, plays an important part in the development of caries and periodontal diseases. Some of the oral commensal bacteria such as the mutans streptococci can colonize the tooth surface and initiate plaque formation by their ability to synthesize extracellular polysaccharides from sucrose, mainly water-insoluble glucan, using the enzyme glucosyltransferase. Inhibiting the colonization of mutans Streptococci on the tooth surface is believed to prevent the formation of dental plaque and development of dental caries. (Figure 3) Natural products have been used for folk medicine purposes throughout the world for thousands of years. Many of them have demonstrable pharmacological properties, such as antimicrobial, anti-inflammatory and cytostatic, among others and more recently propolis has been recognized as useful for human and veterinary medicine. The mechanism of antimicrobial activity of propolis is complex and could be attributed to the synergistic activity between phenolic and other compounds. Bee propolis in combination with chlorhexidine possess high antimicrobial activity against *Streptococcus mutans*. Ethanol extract of Propolis has synergistic activity with chlorhexidine in inhibiting the growth of *Strep mutans*. Propolis in combination with chlorhexidine can suppress the pathogenic potential of dental plaque by inhibiting the adherence and accumulation of cariogenic streptococci on the tooth surface [8].

Propolis for medical purpose: Raw propolis is collected by beekeepers and sold in bulk to companies that refine the product and turn it into usable extracts. Main commercial uses of propolis are as a dietary supplement and therapeutic. Propolis is sold in capsules (singularly, or in combination with other substances such as pollen, royal jelly and non-hive products). Multi-purpose liquid and lozenges are popular treatment for sore throats, and multi-purpose liquid are often used to treat Cuts, mouth sores and skin rashes. For

internal use, 1-3mL dosage three times daily of a 1:10 multi-purpose liquid are typical, but higher doses can be used if necessary. Multi-purpose propolis liquid is normally diluted in water which produces a cloudy liquid. For external use, the 1:10 tincture is diluted in water, and used as a lotion or gargle. Propolis is a stable product, but should nevertheless be stored in airtight containers in the dark, preferably away from excessive and direct heat. Propolis does not lose much of its antibiotic activity, even when stored for 12 months or longer. Propolis and its extract function as a mild preservative due to their antioxidant and antimicrobial activities and thus may actually prolong the shelf life of some products [6].

Propolis and aloe vera hand cream which helps to counteract frequent hand washing and wearing of latex gloves; eg. "Aloe propolis hand cream", "Aloe Propolis cream", "Aloe vera cream with propolis"[9]. Yaghoubi et al. studied the antimicrobial activity of ethanol extract of Iranian propolis on some microorganisms using disc diffusion method and concluded that the strong antimicrobial activity of Iranian propolis may be due to high levels of phenolic and flavonoid compounds [10]. Selvan.A et al. studied that antibacterial activity of bee propolis against clinical strains of streptococcus mutans and synergism with chlorhexidine and concluded that propolis exhibits synergistic activity with chlorhexidine in the inhibition of mutans streptococci [11]. Dawdad.V. et al. (2012) studied the effectiveness of a propolis-containing mouthrinse in inhibition of plaque formation and improvement of gingival health and concluded that propolis might be used as a natural mouthwash, an alternative to chemical mouthwashes, e.g., Chlorhexidine [12-13]. Propolis is a subject of recent dentistry research, since there is some evidence that propolis may actively protect against oral disease due to its antimicrobial properties. Propolis can also be used to treat canker sores. Its use in canal debridement for endodontic procedures has been explored. Because of its strong, anti-infective activity, propolis has often been called a "natural antibiotic." Many studies show its strong inhibitory effect on a wide variety of pathogenic organisms. It may be concluded from the above study that the propolis extract tested possesses anti-plaque activity and improves gingival health. The extract might be used as an alternative measure to prevent periodontal and gingival problems.

DISCUSSION

Bees and dentists have a few things in common- They are both hardworking, industrious and have a capacity to cause a great deal of discomfort and

pain!! However, the power and ability to heal is also something we dentists have in common with our little winged friends too!!! Propolis, is derived from the Greek pro – 'for or in defence of' and polis – 'the city', hence, 'defender of the city/hive'. Propolis is a naturally-occurring bee product. It is a hard resinous substance consisting chiefly of wax and plant extracts. It plays a role in the bee colony as protection against invasion and infection, providing the bees with an 'immune system' and is used to seal the hive. Propolis was first used as a medicine by the Egyptians and use of it was continued by the Greeks and Romans. The major constituents of propolis are flavones, flavanones, and flavanols. It is used in homeopathic and herbal practice as an antiseptic, anti-inflammatory, antimycotic, and bacteriostatic agent. There are many clinical applications of propolis in dentistry. To exemplify, a few are- relief from denture ulcerations and stomatitis, halitosis, mouth freshener, periodontal pocket / abscess, mouthwash, cervical, dentinal, and root caries sensitivity. Treatment of lichen planus, candidal infections, angular cheilitis, xerostomia, orthodontic traumatic ulcers, erupting teeth, pulp capping, temporary restorations and dressings, covering tooth preparations, mummifying caries deciduous teeth, Socket 'covering' after extraction, dry socket (similar to 'bone wax' and Whitehead's varnish), Pre-anesthetic (topical), Periocoronitis, etc. Propolis also has clinical applications in medicine/surgery, for e.g., antiasthmatic treatment in mouth sprays, support of pulmonary system, anti-rheumatic, inhibition of melanoma and carcinoma tumor cells, tissue regeneration, strengthening of capillaries, antidiabetic activity, phytoinhibitor, etc. Propolis extract is known to possess antimicrobial activity against *Streptococcus mutans*, a Grampositive cocci, facultative anaerobic bacterium commonly found in the human oral cavity and a significant contributor to tooth decay. The extract might be used as an alternative measure to prevent dental caries. Propolis has also been evaluated for antimicrobial activity as an intracanal medicament, and has shown promising results. Propolis has been found beneficial in the treatment of gingivitis and oral ulcers in several small case studies and pilot clinical studies [8]. In addition to the treatment of periodontopathies, preparations with propolis have been found to be antimicrobial, anti-inflammatory, have antiscar effects, and to be highly antimycotic.

CONCLUSION

Man is an optimist, and attempt to gain an upper hand over periodontal destruction, he has tried various indigenous and sometimes disarmingly simple sources. Good supragingival plaque control

in combination with mechanical instrumentation and supportive periodontal therapy can maintain periodontal health for more than 20 years and this can be considered as gold standard of periodontal

care. Alternative approaches to this gold standard should be easy to use, affordable, patient friendly, an accessible to large mass of people spread over countries and continents.

Fig. 1 :Leaf Buds and Bark of Trees Used By Bees to Produce Propolis



Fig. 2 Propolis Paste



Fig. 3 Propolis Mouth Wash



REFERENCES

1. Park Y.K et al. Chemical constituents in *Baccharis dracunculifolia* as the main botanical origin of southeastern Brazilian propolis. *J. Agric. Food Chem.* 2004; 52: 1100–1103.
2. Ikeno K, Ikeno T, Miya et al. Effect of Propolis on dental caries in rats. *Caries Res* 1991; 25(5):347-351.
3. Koo H et al. Effects of *Apis mellifera* propolis from Brazilian regions on caries development in desalivated rats. *Caries Res* 1999; 33:393-400.
4. Bankova V et al. Chemical composition and antibacterial activity of Brazilian propolis. *Z Naturforschung C* 1995;50:167-72.
5. Özana F, Sümerb Z, Polatc ZA, Erd K, Özane U, Deđerđ O. Effect of Mouthrinse Containing Propolis on Oral Microorganisms and Human Gingival Fibroblasts. *Eur J Dent* 2007;1:195-201.
6. Mahmoud Lotfy. Biological Activity of Bee Propolis in Health and Disease. *Asian Pac J Cancer Prev* 2006; 7: 22-31
7. Pujar.M. et al. Herbal usage in endodontics- a review. *Int. J Cont. Dent.* 2011; 2:34-37.
8. Dodwad.V. et al. Propolis mouth wash: A new beginning. *J Indian Soc Periodontol* 2012; 15:121-125.
9. Mohan.R. et al. Aloe vera in dentistry- The Herbal Penecca. *Ind. J Dent. Spec. Res.* 2011;29
10. Yaghoubi et al. Antimicrobial activity of Iranian propolis and its chemical composition. *DARU* 2007; 15:45-48.
11. Yaghoubi et al. Antimicrobial activity of Iranian propolis and its chemical composition. *DARU* 2007; 15:45-48.
12. Selvan.K. et al. Antibacterial activity of bee propolis against clinical strains of *Streptococcus mutans* and synergism with chlorhexidine. *Int. J Pharma. Stud. Res.* 2011; 2:85-90.
13. Rohit Rai. A comparative evaluation of the effect of chlorhexidine & chlorhexidine mouth wash in the management of chronic periodontitis as an adjunct to scaling and root planning-a clinicomicrobiological study. *IJPRD* 2013;5(09):60-66