

Propolis - A natural remedy

Rathod S*, Brahmkar R*, Kolte A*

* Dept. of Periodontics, SPM's Dental College & Research Centre, Dihdoh Hills, Hingna

ARTICLE INFO

Keywords:

Mouth rinse, Periodontal treatment, Propolis.

Corresponding Author:

Dr. Surekha Rathod.
Professor,
Dept. of Periodontics,
VSPM's Dental College & Research Centre,
Dihdoh Hills, Hingna, Nagpur- 440019
Contact: +91 9011071477
Email: drsurekhar@gmail.com

ABSTRACT

Propolis is one of the few natural remedies that has maintained its popularity over a long period of time. Propolis, a natural anti biotic 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 a degree of anti microbial action against fungi such as *Candida Albicans* and some bacteria including a range of oral micro organisms and viruses and may be as effective as acyclovir against herpes simplex virus. It also has immuno modulatory activity with augmentation of non specific anti tumor resistance. In dentistry, 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.

Introduction

Nowadays, there is a great trend to use natural materials as a cure for a variety of diseases. The health field has also always aimed to use natural products as an alternative to the conventional allopathic formulations. Propolis is one such natural substance, which has gone unnoticed inspite of its potential uses in curing a large array of diseases. The word propolis is derived from the Greek word "pro" before, "polis" city or defender of the city. The Egyptian and Greek civilizations recognized the healing qualities of propolis. Propolis was also used for healing sores and ulcers by Hippocrates, the founder of Modern Medicine.

During the last 10 years, considerable research has been conducted on propolis in America, Australia, United Kingdom and Europe and especially in Eastern Europe. Propolis is available in the world markets in different forms as capsules, lozenges, tincture, and cream and recently added to the list are mouthrinses and toothpastes. The aim of this article is to draw attention of general dentists from the conventional and newly emerging products and utilizing the "back to nature" approach and using propolis as a natural remedy in the treatment of dental diseases.

Chemical Composition

Propolis is a resinous material that honeybees (*Apis mellifera* L.) collected from various plant species and mix with wax and other substances.[1] Propolis is used as a sealant for unwanted open spaces in the hive. Propolis is composed of resin and balsams (50-60%), pollen (5-10%) and other constituents which are amino acids, minerals, Vitamins A, B complex and the highly active biochemical

substance known as bioflavonoid (Vitamin P), phenols and aromatic compounds.[2] It is commonly brown in colour, but it varies depending on the botanical source. Flavenoids are well known plant compounds which have antibacterial, antifungal, antiviral, antioxidant, and anti-inflammatory properties. Flavonoids are the most common group of polyphenolic compounds in the human diet and are found ubiquitously in plants. They are divided into four subgroups: Flavones, Flavonol, Flavonones, Flavononol. Cinnamic acid ($C_6H_5CHCHOH$) is a white crystalline acid, which is slightly soluble in water and is obtained from oil of cinnamon, or from balsams. In biological chemistry, cinnamic acid is a key intermediate in phenylpropanoid pathway. Phenylpropanoid are a class of plant metabolites based on phenylalanine.[3,4]

Uses of Propolis

Propolis has been found to be very effective against gram positive and gram negative bacterial.

Scientific research has revealed its antioxidant, antibacterial, antifungal, and antiviral, anti inflammatory, anti tumor and immunomodulating properties. In dentistry, current research involving propolis, highlights its antimicrobial and anti inflammatory properties particularly in cariology, oral surgery, pathology, periodontitis and endodontics.[4]

Clinical Significance of Propolis in Dentistry

There are numerous applications of propolis in dentistry. These include relief from denture ulcerations, stomatitis, halitosis, mouth freshener, periodontal pocket/abscess, mouthwash; cervical, dentinal



Figure 1. Raw Propolis

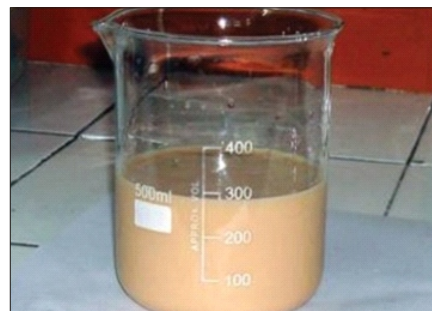


Figure 2. Processed Propolis extract

and root caries sensitivity. Treatment of lichen planus, candidal infections, angular chilitis, xerostomia, orthodontic, traumatic ulcers, erupting teeth, pulp capping, temporary restorations and dressings, covering tooth preparations, mummifying caries, dry socket, pre anesthetic, pericoronitis etc.[5-8] Propolis also has clinical applications in medicine/surgery.[9-11]

As already stated, propolis possesses antimicrobial activity and hence the extract might be used as an alternative measure to prevent dental caries. Propolis has also shown promising results in the treatment of gingivitis and oral ulcers in several short term research projects.

The propolis extract is also used as mouthrinse possesses antimicrobial activity against *S. mutans* present in the oral cavity. [12]

Discussion

According to test tube studies, Propolis has antibiotic activities that help the hive block out viruses, bacteria, and other organisms. Commercial preparations of propolis appear to retain these antibiotic properties.[11,13] Test tube and animal studies have also shown that propolis exerts some antioxidant,[14] liver protecting,[15] anti-inflammatory,[11,16,17] and anticancer properties.[18]

Murray investigated the effectiveness of a propolis containing mouthrinse in the inhibition of plaque formation concluded that propolis containing mouthrinse was marginally better than negative control.[19]

Mahmoud et al concluded in his study that the effect of propolis on dentinal hypersensitivity, they reported that propolis has a positive effect in the control of dentinal hypersensitivity.[20]

A study by Koo et al to evaluate the effect of a mouthrinse containing propolis on 3 day plaque accumulation concluded that propolis containing mouthrinse was efficient in reducing supragingival plaque formation.[21]

Al-Qathami and Al-Madi compared the antimicrobial efficacy of Propolis, sodium hypochlorite and saline as an intracanal irrigants. The results of this study indicated that the propolis has antimicrobial activity equal to that of sodium hypochlorite.[22]

Al-Shaher et al examined the tolerance of fibroblasts of the periodontal ligament (PDL) and dental pulp to propolis and compared with that of calcium hydroxide in vitro. They concluded

that propolis can be recommended as a suitable transport medium for avulsed teeth.[23]

Martin and Pileggi conducted a study and compared various storage media and it appeared that propolis may be a better alternative to HBSS, milk, or saline in terms of maintaining PDL cell viability after avulsion and storage.[24]

Hayacibara et al evaluated the influence of propolis on streptococci mutans viability, glucosyltransferases (GTFs) activity and caries development in rats. They suggested that propolis is a potentially novel anti-caries agent.[25]

Ozan et al determined the ability of propolis to serve as a temporary storage medium for the maintenance of periodontal ligament (PDL) cell viability of avulsed teeth. The results showed that 10% propolis was a more effective storage medium than other groups.[26]

Ozan et al performed a study to compare the effects of four different mouthrinse containing Propolis solutions and mouth rinse containing 0.2% chlorhexidine (CHX) on oral microorganisms and human gingival fibroblasts.[27]

Toker et al analyzed the morphometric and histopathologic changes associated with experimental periodontitis in rats in response to the systemic administration of propolis. They concluded that systemically healthy administered propolis significantly reduced the periodontitis related bone loss.[28]

Oncag et al compared the antibacterial efficacy of three commonly used intracanal medicaments with propolis against *Enterococcus faecalis*. They concluded that propolis had good in vitro antibacterial activity against *E. faecalis* in the root canals, suggesting that it could be used as an alternative intracanal medicament.[29]

Hidaka et al have also suggested that propolis may have potential as anti calculus agents in toothpaste and mouthwashes.[30] Dodwad V et al showed that propolis is not better than chlorhexidine in reducing plaque formation, but it may be marginally better for reducing gingival inflammation.[33]

Conclusion

Propolis can be termed as a "natural antibiotic" as it shows inhibitory effect on a variety of pathogenic organisms. However, as propolis is a subject of recent dental research. There is limited evidence that propolis may actively protect against oral diseases, the extract can be used as an alternative measure to prevent periodontal and gingival

problems, and because propolis is a gift from Mother Nature, it is non toxic and safe for most people.

References

1. Santos FA. Antibacterial activity of Brazilian propolis and actions against oral anaerobic bacteria. *J Ethnopharmacol* 2002;80:1-7.
2. Park YK, Alencar SM, Aguiar CL. Botanical origin and chemical composition of Brazilian propolis. *J Agric Food Chem* 2002;50:2502-6.
3. Bankova V. Recent trends and important developments in propolis research. *eCAM* 2005;2:29-32
4. Da Silva FB, De Almeida JM, De Sousa SMG. Natural medicaments in endodontics - a comparative study of the anti-inflammatory action. *Braz Oral Res* 2004;18:174-9.
5. Park YK, Koo MH, Ikegaki M, Cury JA, Rosalen PL. Effects of Propolis on *Streptococcus mutans*, *actinomyces naeslundii*, *Staphylococcus aureus*. *Rev Microbial* 1998;29:143-8.
6. Ikeno K, Ikeno T, Miyazawa C. Effects of Propolis on dental caries in rats. *Caries Res* 1991;25:347-51.
7. Koo H, Rosalen PL, Cury JA, Park YK, Ikegaki M, Sattler A. Effects of *Apis mellifera* Propolis from Brazilian regions on caries development in desalivated rats. *Caries res* 1999;33:393-400.
8. Bretz WA, Chiego DJ, Marcucci MC, Cunha I, Custodia A, Shneider LG. Preliminary report on the effects of Propolis on wound healing in the dental pulp. *Z Naturforsch C* 1998;53:1054-8.
9. Brumfitt W, Hamilton- Miller JM, Franklin I. Antibiotic activity of natural products: 1. Propolis *Microbios* 1990;62:19-22.
10. Dimov V, Ivanovska N, Manolova N, Bankova V, Niklov N, Popov S. Immunomodulatory action of Propolis. Influence on anti- infectious protection and macrophage function. *Apidologie* 1991;22:155-62.
11. Dobrowolski JW, Vohora SB, Sharma K, Shah SA, Naqvi SA, Dandiya PC. Antibacterial, antifungal, antiamebic, anti-inflammatory and antipyretic studies on Propolis bee products. *J Ethnopharmacol* 1991;35:77-82.
12. De Carvalho Duailibe SA, Goncalves AG, Ahid FJM. Effects of a propolis extract on streptococcus mutans counts in vivo. *J Appl Oral Sci* 2007;15:420-3.
13. Tosi B, Donini A, Romagnoli C, Bruni A. Antimicrobial activity of some commercial extracts of Propolis prepared with different solvents. *Phytother Res* 1996;10:336-6.
14. Pascual C, Gonzalez R, Torricella RG. Scavenging action of Propolis extract against oxygen radicals. *J Ethnopharmacol* 1994;41:9-13.
15. Lin Sc, Lin YH, Chen CF, Chung CY, Hsu SH. The hepatoprotective and therapeutic effects of Propolis ethanol extract on chronic alcohol induced liver injuries.
16. Khayyal MT, El-Ghazaly MA, El Khatib AS. Mechanisms involved in the anti-inflammatory effect of Propolis extract. *Drugs Exp Clin Res* 1993;29:197-203.
17. Miroeva OK, Calder PC. The effect of propolis and its components on eicosanoid production during the inflammatory response. *Prostaglandins leukot Essent Fatty Acids* 1996;55:441-9.
18. Choi YH, Lee WY, Nam SY, Choi KC, Park YE. Apoptosis induced by Propolis in hepatocellular carcinoma cell line. *Int J Mol Med* 1999;4:29-32.
19. Murray MC, Worthington HV, Blinkhom AS. A study to investigate the effect of a propolis-containing mouthrinse on the inhibition of de novo plaque formation. *J Clin Periodontol* 1997;24:796-8.
20. Mahmoud AS, Almas K, Dahlan AA. The effect of Propolis on dentinal hypersensitivity and level of satisfaction among patients from a university hospital, Riyadh, Saudi Arabia. *Indian J Dent Res* 1999;10:130-7.
21. Koo H, Cury JA, Rosalen PL, Ambrosano GM, Ikegaki M, Park YK. Effect of a mouth rinse containing selected propolis on 3-day dental plaque accumulation and polysaccharide formation. *Caries Res* 2002;36:445-8.
22. Al-Qathami H, Al-Madi E. Comparison of sodium hypochlorite, propolis and saline as root canal irrigants: A pilot study. *Saudi Dental J* 2003;5:100-2.
23. Al-Shaher A, Wallace J, Agarwal S, Bretz W, Baugh D. Effect of propolis on human fibroblasts from the pulp and periodontal ligament. *J Endod* 2004;30:359-61.
24. Martin MP, Pileggi R. A quantitative analysis of Propolis: a promising new storage media following avulsion. *Dental traumatol* 2004;20: 85-9.
25. Hayacibara MF, Koo H, Rosalen PL, Duarte S, Franco EM, Bowen WH, Ikegaki M, Cury JA. In vitro and in vivo effects of isolated fractions of Brazilian propolis on caries development. *J Ethnopharmacol* 2005;101:110-5.
26. Ozan F, Polat ZA, Er K, Ozan U, Deger O. Effect of propolis on survival of periodontal ligament cells: new storage media for avulsed teeth. *J Endod* 2007;33:570-3.
27. Ozan F, Sümer Z, Polat ZA, Ozan U, Deger O. Effect of mouth rinse containing propolis on oral microorganisms and human gingival fibroblast. *Eur J dentistry* 2007;11:195-200.
28. Toker H, Ozan F, Ozer H, Ozdemir H, Eren K, Yeler HJ. A morphometric and histopathologic evaluation of the effects of propolis on alveolar bone loss in experimental periodontitis in rats. *Periodontol* 2008;79:1089-94.
29. Oncag O, Cogulu D, Uzel A, Sorkun K. Efficacy of propolis as an intracanal medicament against *Enterococcus faecalis*. *General Dentistry* 2008;54:319-22.
30. Hidaka S, Okamoto Y, Ishiyama K, Hashimoto K. Inhibition of the formation of oral calcium phosphate precipitates: the possible effects of certain honeybee products. *J Periodontal Res* 2008; 43:450-8.
31. Dodwad V, Kukreja BJ. Propolis Mouthwash : A new beginning. *J Indian Soc Periodontol* 2011;15:121-5.

Source of Support: Nil. Conflict of Interest: None