

REVIEW ARTICLE

BEE PROPOLIS: NATURAL HEALING FROM THE HIVEPoorva Khullar¹, Neha Mehta², Purav Mehta³**ABSTRACT**

*Propolis (bee glue) has been used as a natural remedy since ancient times. Propolis is a Greek word meaning “defender of the city”. It is a glue that honey bees use to seal their hives. It is a natural antibiotic, yellow brown to dark brown substance that honey bees (*Apis mellifera*) collect from the tree buds, shrubs and other botanical sources. The main chemical classes present in propolis are flavonoids, phenolics and other various aromatic compounds. Propolis has been shown to have antimicrobial, anti-tumour, anaesthetic, anti-inflammatory, antiviral and healing properties. A research has shown that propolis can treat and control dental caries, accelerate healing of oral tissues, reduce pulp inflammation and tooth hypersensitivity. Different commercial propolis products are available in the market. Propolis has a promising role in future medicine. This piece of writing throws a light on propolis and its clinical importance in medicine and dentistry.*

Keywords: Propolis, Oral health, Endodontics

INTRODUCTION

“Look back into the nature and then you will understand everything better.” This quote by Albert Einstein clearly point towards the paradigm shift from costlier antibiotic therapies to the old tradition remedies with minimum side effects like apitherapy. Apitherapy is the medicinal use of products made by honeybees. Therapies involving the honeybee have existed for thousands of years and some may be as old as human medicine itself. This can include the use of honey, propolis, pollen, royal jelly, and bee venom¹.

The word propolis originates from Greek: «pro» = in front, «polis» = city. The meaning “in front of the city” suits well the protecting role of propolis for the bee colony. The Greek word propolis means also to glue

and describes also the role of propolis to cement openings of the bee hive. Another name of propolis is bee glue².

This non-toxic resinous substance was classified into 12 types according to physicochemical properties and related to geographic locations; however, the botanical origin of only three types were identified (Wander, 1995)³. A new type of propolis, named Brazilian red Propolis (BRP) because of its colour, it has attracted the attention of international business. Propolis has been used for treating different diseases and inflammatory conditions as both local and systemic applications. In nature, or when in room temperature, it is a sticky substance, but becomes hard and brittle at low temperature. It is composed of resin (55%), essential oils and wax (30%) mixed with bee glue “the salivary secretions of bees” and pollen (5%) and other constituents (10%) which are amino acids, minerals, ethanol (alcohol), vitamins A, B complex, E and the highly active bio-chemical substance known as bioflavonoid. It is a prime source of histamine and serotonin being substances needed to help the body cope with allergies^{4,5}. Flavonoids are well known plant compounds which have antibacterial, antifungal, antiviral, antioxidant and anti-inflammatory properties. Propolis has found to be very effective against gram positive bacteria (Seidel et al., 2008)⁶ especially against *Staphylococcus aureus* (Velazquez et al., 2007)⁷ and against gram negative bacteria against *Salmonella* (Orsi et al., 2005)⁸. The effect of propolis on growth and glucosyltransferase activity of *Streptococcus sorbinus*, *Streptococcus mutans* and *Streptococcus circuitus* was observed in vitro and in vivo (Ikeno et al., 1991)⁹ and found that the insoluble glycan synthesis and glucosyltransferase activity were inhibited by multiple actions of Propolis. Koru et al., 2007¹⁰ studied the antibacterial action against certain anaerobic oral pathogens and found to be very effective against *Peptostreptococcus anaerobius*, *Lactobacillus acidophilus*, *Actinomyces naeslundii*, *Prevotella oralis*, *Prevotella melaninogenica*, *Porphyromonas gingivalis*, *Fusobacterium nucleatum* and *Veillonella parvula*. They concluded that the antibacterial property of Propolis is due to the presence of Flavonoids and aromatic compounds such as caffeic acid. Kujumgiev et al. (1999)¹¹ evaluated antibacterial against (*S. aureus* and *Escherichia coli*), antifungal against (*Candida albicans*)

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and antiviral against (Avian influenza virus) properties of propolis and found to be very effective. Anti-oxidant property of propolis which is the protection against gamma radiation could be attributed to its radical scavenging ability (Krol et al., 1990)¹² which was better than anti-oxidant property of vitamin C (Velazquez et al., 2007)⁷. Anti-inflammatory property of propolis is due to the presence of caffeic acid phenethyl ester (CAPE) in propolis (Borrelli et al., 2002)¹³. Propolis is dispensed in various forms, such as tooth paste, mouthwash, lozenges, wine, cake, powder, jelly, tablets, soap and others.

POTENTIAL USES OF PROPOLIS IN ORAL HEALTH

WOUND HEALING

Mouth rinse containing Propolis in aqueous alcohol solution aids in repair of intra-buccal Surgical wounds and exerts a small pain killing and anti-inflammatory effect; With a minor irritant effect on infra-buccal surgical wounds; Propolis: A promising new storage media following avulsion Both length of extra-alveolar time and type of storage media are significant factors that can affect the long-term prognosis of replanted teeth. Martin and Pileggi (2004)¹⁴ 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. Data revealed that exposure of PDL cells or pulp fibroblasts to 4 mg/ml or lower concentrations of propolis resulted in > 75% viability of cells, therefore propolis can be recommended as a suitable transport medium for avulsed teeth. Other studies¹⁵ showed that 10% propolis was a more effective storage medium than other groups. As a pulp capping agent Paste with Propolis exerts effects similar to those of zinc eugenol. Study¹⁶ of the indirect capping showed that secondary dentin developed shortly after the application of the paste, and that it was followed by the development of pulpitis and sclerotic transformation of the pulp. In teeth with direct capping a protective film developed at the opening of the pulp chamber. In time, the pulpal wound underwent cicatrization by fibrosis with a trend to remineralisation. No areas of pulpal degeneration were found As an intracanal irrigant Al-Qathami and Al-Madi (2003)¹⁷ indicated that the propolis has antimicrobial activity equal to that of sodium hypochlorite. As a mouth rinse Koo et al. (2002)¹⁸ evaluated the effect of a mouth rinse containing propolis on 3-day dental plaque accumulation and showed that mouth rinse containing propolis SNB-RS was thus efficient in reducing supragingival plaque formation and insoluble polysaccharide formation under conditions of

high plaque accumulation. As a cariostatic agent Hayacibara et al. (2005)¹⁹ evaluated the influence of propolis on mutans streptococci viability, glucosyltransferases (GTFs) activity and caries development in rats. The data suggested that propolis is a potentially novel anti-caries agent. In dentinal hypersensitivity Mahmoud et al. [1999]²⁰ conducted a pioneer study on the effect of propolis on dentinal hypersensitivity in vivo. It was concluded that propolis had a positive effect in the control of dentinal hypersensitivity. In another in vitro study using Scanning Electron Microscopic (SEM), it was found that propolis occluded the dentinal tubules in both 60 and 120 s application on human dentin²¹. In treatment of periodontitis Propolis significantly reduced the periodontitis-related bone loss, the findings of the study²² provided morphologic and histologic evidence that propolis, when administered systemically, prevented alveolar bone loss in the rat model. Propolis reduced the rate of amorphous calcium phosphate transformation to hydroxyapatite by 12 - 35% and with a 2.5 - to 4.4-fold increase in the induction time. Propolis showed an inhibitory effect that was the same as or greater than 1-hydroxyethylidene- 1, 1- bisphosphonate. These results suggested that propolis may have potential as anticalculus agents in toothpastes and mouthwashes. Effect on *Candida albicans* Martins et al. (2002)²³ assessed the susceptibility of *C. albicans* strains, collected from HIV-positive patients with oral candidiasis. The propolis extract used in the study inhibited the in vitro growth of *C. Albicans* collected from HIV- seropositive. This fact suggested that commercial EPE could be an alternative medicine in the treatment of candidiasis from HIV-positive patients.

In treatment of denture stomatitis Denture stomatitis presents as a chronic disease in denture-bearing patients, especially under maxillary prosthesis. Despite the existence of a great number of antifungal agents, treatment failure is observed frequently. Propolis, a natural bee product, possesses well documented antifungal and anti-inflammatory activities. Santos et al. (2008)²⁴ evaluated the clinical efficacy of a new Brazilian propolis gel formulation in patients diagnosed with denture stomatitis. All patients treated with Brazilian propolis gel and Daktarin had complete clinical remission of palatal edema and erythema. They concluded this new Brazilian propolis gel formulation had efficacy comparable to Daktarin and could be an alternative topical choice for the treatment of denture stomatitis.

As an intra-canal medicament Oncag et al. (2008)²⁵ 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. Awawdeh et al. (2009)²⁶ evaluated the effectiveness of propolis and calcium hydroxide as a short-term intracanal medicament against *Enterococcus faecalis*. They concluded that propolis is very effective as intracanal medicament in rapidly eliminating *E. faecalis* ex vivo. Effect of propolis on recurrent aphthous stomatitis Recurrent aphthous stomatitis (RAS) is a common, painful, and ulcerative disorder of the oral cavity of unknown aetiology. No cure exists and medications aim to reduce pain associated with ulcers through topical applications or reduce outbreak frequency with systemic medications, many having serious side effects. Propolis is a bee product used in some cultures as treatment for mouth ulcers, it is effective in decreasing the number of recurrences and improve the quality of life in patients who suffer from RAS. Bee propolis - how safe is it? In general, propolis is safe. It is a non-toxic substance and for most people, will not cause irritation when used as supplements or applied to skin. However, like other honey bee products, there are people who are allergic to propolis. Allergic reaction due to this substance was first reported in beekeepers as an occupational effect but is now seen mainly in individuals who use propolis in cosmetics and supplement to treat various health conditions. It is believed that a substance called caffeic acids to be one of the causes of allergies to propolis²⁶. The symptoms of allergies If you are allergic to propolis, it may cause your skin to redden, develop rashes, swell, and itch and may even lead your skin to crack. Apart from that, it may also irritate the skin area where it is applied on, cause eczema, lesions, psoriasis or mouth sores.

WHO CAN BE ALLERGIC TO PROPOLIS?

Those already allergic to pollen: If you are already allergic to bee pollen or evergreens, you are advised not to use propolis. Pollens in propolis may come from any plants and not just plants in surrounding areas where you buy your product. Asthma patients If you have asthma, you should also avoid propolis because some chemicals or impurities in it may induce an attack. If you want to use it, ask your doctor's advice first. Allergic to bee stings Another group of people who may want to avoid propolis are those who are allergic to bee stings. Propolis could induce a side effect similar to a sting. Pregnant women There have not been many published clinical trials on the effect of propolis on pregnant women. Because the information in this area is limited, it has been advised to avoid using propolis during pregnancy and breastfeeding.

CONCLUSION

In conclusion, this paper reviews various clinical implications of propolis to improve the oral health. Propolis can be used in the management of dental caries, endodontic as well as periodontal infections, vital pulp therapy, in the treatment of oral lesions and repair of surgical wounds. Though propolis has shown very promising results but clinician should be cautious while using this material due to its allergic reactions shown in some patients. It is therefore comprehensible that we should now switch on to "back to nature approach" where propolis seems to be a promising alternative for the control of oral diseases in terms of antimicrobial response and lower associated risk.

SOURCE OF SUPPORT: NIL

CONFLICT OF INTEREST: NIL

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