

Save the Bees, They Prevent Caries

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Research Question

Does the use of natural product based dental products containing propolis provide a decreased risk of caries compared to dental products that are not natural product based?

Abstract

Propolis is a product that is created from bees that is commonly found in a wide variety of natural dental products. Propolis has many beneficial effects; antiviral, antibacterial, antifungal, anticancer, and anti-inflammatory. Dental caries are prominent in children worldwide. Propolis containing products were shown to be as effective in reducing plaque-biofilm as non-natural products.

Introduction

- According to World Health Organization, more than 530 million children suffer from early childhood caries. Dental caries are caused from a combination of the food a person eats, and the bacteria that is present in their mouth.²
- Propolis is a natural product that is produced from bees that acts as an adhesive to help build hives and protect it from pathogens and environmental factors.³
- Antibacterial, antifungal, antiviral, anticancer, and anti-inflammatory properties.⁴
- Substance produced by bee's that is used as a preservative to protect their hives and from other environmental factors.⁴ Propolis has more than 200 different chemical composition due to its origin.⁴
- Chemical composition is determined from the vegetation of where the bee's produced the propolis.⁵
- Varies on the climate of the location.⁵
- 50-55% resins and balsams, 30% wax, 10% volatile, 5% pollen, 5% other substances.⁵

Review of Literature

Effects on Streptococcus Mutans

- Propolis is nontoxic to the host and interferes with the development of caries.⁵
- Has an antimicrobial effect against *S. Mutans* by preventing enzyme activity and cell division.⁵
- Works well together with drugs that inhibit protein synthesis of RNA polymerase.⁵
- The fatty acid component of Propolis works by decreasing the tolerance of microbes by lowering the pH and and slowing down acid production.³
- Propolis inhibits enzyme activity and cell division of *S. mutans*.⁶

Efficacy

- Enamel samples showed a reduction of plaque and biofilm accumulation when tested with products containing propolis seen in Figure 1.⁷
- TMR showed enamel samples that used propolis had decreased lesion depths.⁷
- Propolis showed antimicrobial effects due to there being less microbial colonies after testing.^{7,8}

Figure 1: Confocal images of biofilm samples from each treatment group A(toothpastes) and B (Mouth rinses)

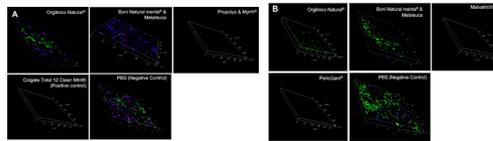


Figure 1: The colored specs represent plaque that was left on the teeth after each toothpaste and mouthwash intervention was completed, or the negative control groups (left).⁷ Data From Informa Biofouling.

Discussion

- Enough evidence to prove that propolis has a decreased cavity risk in children.³⁻⁹
- Propolis proved to have antiplaque effects and inhibited activity against *S. mutans* seen in Figure 2.^{6,9}
- Limitations of the research:
 - Chemical composition of where the propolis was taken from.⁵
 - Length of the studies performed.^{3,5,7-9}
- Strengths of the research:
 - Propolis was tested in a variety of forms.⁷⁻⁹
 - Results from different studies revealed similar effects of propolis.⁶⁻⁹

Conclusion

The current research and studies conclude that propolis is both safe and effective to use in the oral cavity for health benefits. The natural product propolis had the same outcome in reducing plaque-biofilm accumulation than the unnatural products and was shown to reduce bacteria associated with cavities. Propolis proves to be effective in reducing caries development in children as well as adults. While current research and studies on propolis show promising results, more research needs to be done to determine the longer term effects of propolis and other possible benefits in caries prevention specifically in children.

Figure 2: Bacterial cultures before and after Intervention

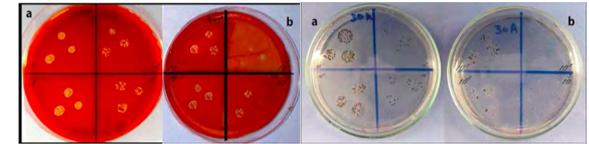


Figure 2: A bacterial culture of plaque on blood agar media before (a) and after (b) intervention (left) and a culture of *S. mutans* on a mitis salivarius agar media before (a) and after (b) intervention (right).⁹ Data from *The Journal of Clinical Pediatric Dentistry*.

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