# β-caryophyllene: Alternative to Chlorhexidine?

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### In the Literature

Pieri FA, Souza MC de C, Vermelho LLR, et al. Use of β-caryophyllene to combat bacterial dental plaque formation in dogs. *BMC Vet Res*. 2016;12(1):216. doi:10.1186/s12917-016-0842-1

## FROM THE PAGE ...

β-caryophyllene, a compound found in various plant sources, has shown potential in multiple medical applications, including as an antimicrobial. Its value as an alternative to chlorhexidine was explored because of that compound's adverse events.

In vitro testing was divided into 2 parts. Minimum inhibitory concentration (MIC) testing revealed 75% of 32 isolates tested were sensitive to β-caryophyllene concentrations of ≤100 mg/mL. Bacterial adherence testing revealed 33.33% of 24 isolates tested were inhibited against adherence to the culture plate by β-caryophyllene concentrations lower than the MIC. This ability was proposed to mimic inhibition of biofilm formation or decrease in plaque formation. Of note, 3 of 24 of bacterial isolates were actually stimulated to adhere.

In vivo testing involved 18 dogs equally divided into 3 groups: a control group (negative control), a group treated with 0.12% chlorhexidine solution (positive control), and a group treated with 50 mg/mL β-caryophyllene solution (test group). All dogs received an ultrasonic dental cleaning and were treated q12h with the respective solution. After 15 days, the positive and test groups showed significantly lower average plaque accumulation as compared with the negative control group.

The conclusions of this study are potentially promising. However, the short time frame of the in vivo study is one limitation, and larger, longer clinical trials are warranted. Also, future antimicrobial resistance could develop, as was recently determined with chlorhexidine.[1]

## ... TO YOUR PATIENTS

Key pearls to put into practice:

1. Prevalence of periodontal disease in dogs >4 years of age is 85%.[2] Gingivitis is the mildest form of the disease and is reversible with proper treatment, but more advanced disease can affect underlying tissues and results in bone loss.[3] No single product will be effective in controlling periodontal disease.
2. In-hospital activities (ie, awake and anesthetized oral examinations, dental radiographs, dental cleanings, treatment for diseased teeth), in conjunction with vigilant daily at-home tooth brushing (started at an early age), is the most effective way to target and control progression of periodontal disease.
3. The Veterinary Oral Health Council (vohc.org) is a resource for further information on periodontal disease, the importance of tooth brushing, and products that have been tested and shown to reduce plaque and tartar.

## References

1. Kampf G. Acquired resistance to chlorhexidine—is it time to establish an 'antiseptic stewardship' initiative? *J Hosp Infect*. 2016;94(3):213-227.
2. Kyllar M, Witter K. Prevalence of dental disorders in pet dogs. *Vet Med-Czech*. 2005;50(11):496-505.
3. Pihlstrom BL, Michalowicz BS, Johnson NW. Periodontal diseases. *Lancet*. 2005;366(9499):1809-1820.