ORALIS

Dental gel for the daily, brush-free oral hygiene in cats and dogs

ORALIS<O-RA-LIS
The name is inspired by the Latin word « oralis », which means « oral »
A Small Lexicon of Modern Latin: English-Latin Fundatio Melissa; 1988.

Dental disease is a common problem in dogs and cats. A study of North American pets showed a 20% incidence of calculus and/or gingivitis in dogs of all ages, while 24% and 13% of cats of all ages appeared with calculus and gingivitis, respectively[1]. Dental disease in older pets is more common, and during aging, the incidence of dental disease increases. One study identified periodontitis in 82% of dogs aged 6 -8 years and in 96% at the ages of 12- 14 years[2]. Dental plaque consists of salivary glycoproteins, food debris, and bacteria. As plaque ages and thickens, salivary calcium salts are deposited on the plaque layer, causing it to mineralize and become calculus, which allows further bacterial attachment. Production of bacterial toxins results in an inflammatory response (gingivitis and periodontitis). If allowed to become chronic, this process leads to local tissue destruction, including gingival recession and bone loss, and in severe cases root abscess, tooth loss, and even jaw fracture. In addition, entry of oral bacteria into the bloodstream can have negative consequences for the heart, liver, and kidneys[3].and their functions.

There are two methods of preserving oral health, mechanical and chemical. For the latter, ingredients in products intended for oral health are mostly used either for reducing bacterial numbers (antimicrobials) or for impeding the formation of calculus (calcium chelators). Micronized silver exerts a natural, long-lasting antimicrobial effect, due to its unique high surface area and porous structure. Grapefruit seed extract contains large quantities of polyphenolic compounds and has a well-studied anti-biofilm effect. Silver has been known for its significant broad-spectrum antimicrobial activity and has widely been used as an antimicrobial agent in different fields of medicine. Sodium phosphate is used in a wide variety of pharmaceutical formulations as a buffering agent and a calcium chelating agent.

Micronized silver (MicroSilver BG™)

Silver and its compounds have long been used, in one form or another, as antimicrobial agents[4]. Silver has been proven effective against streptococci of the human oral cavity and periodontal pathogens[5]. The microparticulate form has a high specific surface area capable of releasing reasonable amounts of silver. The *in vitro* antibacterial potential of a silver additive in resin composite materials was evaluated and the assessed materials with low concentrated microparticulate silver additives

(0.3% and 0.6%) revealed anti-adherence activity and bactericidal effects against the oral pathogen *S. mutans*[6], considered as a major etiological agent of human dental caries[7]. *S. mutans* is also one of the primary colonizers in biofilm creation in cats and dogs, although caries in dogs have an occurrence of 5%[8] and in cats they are even more rare and not causing cavities[9]. From systemic exposure indicators (Ag in blood results), together with Ag in tissue data, it has been measured that the relative oral bioavailability of the various forms of silver evaluated was silver acetate = silver nitrate > nanosilver > > microparticulate silver, which confirms that micronized or bigger silver forms exhibit low toxicity potential[10].

MicroSilver BG™ is a trademarked pure elemental dry silver powder consisting of highly porous & micro-sized particles of pure silver, produced by physical process using highly refined medical grade pure silver (99.99%). It provides a pure silver deposit which liberates a continuous and lasting flow of silver ions over time even in complex environments (sweat, blood, wound drainage fluid, urine). It provides sustainable antimicrobial action on the surface of the skin or the mucosa against unwanted germs and without harming the resident skin flora (good resident bacteria). As a secondary benefit, it acts as a preservative booster in products. It has been used extensively since 2005 in cosmetics, skincare, oral & personal care, wound care, bone cement, dental fillers[11].

Grapefruit seed extract *(Citrus × paradisi)*

The antibacterial effect of GSE has been attributed to the citrus flavonoids, such as naringenin and hesperidin[12]. In an *in vitro* study aimed at comparing the effects of aqueous and ethanolic extracts of GS and to compare those effects to those of orally used antiseptics solutions of chlorhexidine gluconate (CHX) in 0.12% and 0.2% concentrations, aqueous GSE has a good antimicrobial effect against all the tested bacteria and yeast, albeit inferior to CHX solutions[13]. In a study evaluating the antifungal activity of grapefruit seed extract (GSE) against Candida species causing oral candidiasis, GSE showed high effectiveness against all tested Candida species and a fungicidal activity against *C. albicans* and non-albicans Candida species (NACS) and its activity was superior to miconazole[14]. Furthermore, the histopathological observation in the oral mucosa of rabbits treated with GSE showed no significant histopathological changes even at 1%[14]. In a previous study in rats, GSE exhibited an intense inflammatory response in the first few days after contact with conjunctive tissue even at 0,1%[15], so concentrations <0,1% are used for safety purposes.

References

1. Lund EM, Armstrong PJ, Kirk CA, Kolar LM, Klausner JS. 1999. Health status and population characteristics of dogs and cats examined at private veterinary practices in the United States. *J Am Vet Med Assoc.* 214(9):1336–41
2. Hamp S-E, Olsson S-E, Farsø-Madsen K, Viklands P, Fornell J. 1984. A

macroscopic and radiologic investigation of dental diseases of the dog. *Vet Radiol*. 25(2):86–92
3. Larsen JA. 2010. Oral products and dental disease. *Compendium*. 32 9:E4
4. Russell AD, Hugo WB. 1994. 7 Antimicrobial Activity and Action of Silver. In *Progress in Medicinal Chemistry*. 31:351–70. Elsevier
5. Spacciapoli P, Buxton D, Rothstein D, Friden P. 2001. Antimicrobial activity of silver nitrate against periodontal pathogens. *J Periodont Res*. 36(2):108–13
6. Bürgers R, Eidt A, Frankenberger R, Rosentritt M, Schweikl H, et al. 2009. The anti-adherence activity and bactericidal effect of microparticulate silver additives in composite resin materials. *Arch Oral Biol*. 54(6):595–601
7. Loesche WJ. 1986. Role of *Streptococcus mutans* in human dental decay. *Microbiol Rev*. 50(4):353–80
8. Hale FA. 1998. Dental Caries in the Dog. *J Vet Dent*. 15(2):79–83
9. Percival S, Knottenbelt D, Cochrane C, eds. 2011. *Biofilms and Veterinary Medicine*, Vol. 6. Berlin, Heidelberg: Springer Berlin Heidelberg
10. Mertens J, Alami A, Arijs K. 2023. Comparative in vivo toxicokinetics of silver powder, nanosilver and soluble silver compounds after oral administration to rats. *Arch Toxicol*. 97(7):1859–72
11. *Technologies*. Bio-Gate AG. www.bio-gate.de
12. Cvetnić Z, Vladimir-Knezević S. 2004. Antimicrobial activity of grapefruit seed and pulp ethanolic extract. *Acta Pharm*. 54(3):243–50
13. Al–Âni W, Tawfik N, Shehab E. 2011. Antimicrobial Activity of Grapefruit Seeds Extracts *(In vitro* Study). *Al-Rafidain Dent J*. 11(2):341–45
14. Tsutsumi-Arai C, Terada-Ito C, Tatehara S, Imamura T, Takebe Y, et al. 2021. Fungicidal activity of grapefruit seed extract against the pathogenic *Candida* species causing oral candidiasis. *J Oral Maxillofac Surg, Med, Pathol*. 33(6):626–32
15. Martins MD. 2013. *In vitro* and *in vivo* toxicity of grapefruit seed extract. *Med Sci Tech*. 54:65–69