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Technical Brief: Sodium Hexametaphosphate and Dental Calculus in Dogs and Cats

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It is well known that oral disease is highly prevelent among dogs and cats[i]. Oral disease has been linked to histopathologic changes in the kidney, myocardium, and liver, therefore, the maintenance of oral health is important for the overall health of companion animals and the control of calculus is an important step[ii].

Traditionally, calculus prevention has occurred through: 1) the daily, mechanical removal of plaque before calcification (brushing, antimicrobials, etc), 2) the daily application of a crystal growth inhibitor that interferes with the binding of calcium to the plaque biofilm, 3) the use of a carboxylic acid to reduce or inhibit calculus, or 4) the use of a sequestering agent to block the mineralization of plaque. One such sequesterant is sodium hexametaphosphate (SHMP) - the technology behind Hartz® Dentashield™. Sodium hexametaphosphate [$(NaPO_3)_6$] has a wide variety of uses: water softening and detergents, food additives, antimicrobials, buffers, boiler water additives, cleaners, coagulants, dispersants, leavening agents, stabilizers, emulsifiers, texturizers, and sequestrants and is safe for animal consumption[iii,iv].

Dental calculus is formed by the deposition of salivary calcium in plaque. In contrast to crystal growth inhibitors, which bind to the growing calculus thereby temporarily inhibiting calcification, SHMP becomes incorporated into the plaque biofilm and forms soluble complexes with calcium that diffuse into the saliva thus preventing plaque mineralization[v,vi,vii]. Sequestrants are advantageous over crystal growth inhibitors because they are not buried under a newly deposited plaque layer each day but, instead, remain in the plaque biofilm to block calculus formation[6,7].

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