TRIOLOGY® is a therapeutic dental system that disrupts biofilm, increases oral wound healing, and neutralizes free radical activity associated with oral disease, systemic diseases and cancer.

TRIOLOGY® Patented Synergistic Union of Antimicrobials and Antioxidants.
U.S. Patents No. 8,961,939, No. 9,339,453, and No. 9,668,962

Antimicrobial: carbamide peroxide Antioxidants: 20 bioactive antioxidants from organic plants

Effervescence of carbamide peroxide (CP) has been shown to be superior at disrupting oral biofilm, while CP balances the pH in the oral cavity.[1] The adverse effect of antimicrobial use in the oral cavity is its oxidative damage to oral cells.[13] By synergistically combining plant derived antioxidants with carbamide peroxide ROS and RNS oxidative damage is prevented.[2,13] Studies have reported the beneficial effects of antioxidants for oral wound healing,[14,15] treatment of inflammation and periodontal disease,[12] and reducing the risk of oral cancer.[3]

Ingredients: organic whole leaf wheat grass powder, organic aloe vera gel powder, organic sweet almond oil, organic vegetable glycerin, hardwood xylitol, pure peppermint oil, rosemary oil, xanthan gum, distilled water, carbamide peroxide.

1. Yao CS, Waterfield JD, Ya S, Haapasalo M, MacEntee MI. In vitro antibacterial effect of carbamide peroxide on oral biofilm. *Journal of Oral Microbiology* 2013, 5:20392 http://dx.doi.org/10.3402/jom.v5i0.20392
2. Bowen J, Cole C, McGlennen R. Comparison of Antimicrobial and Wound Healing Agents on Oral Fibroblast Viability and In-vivo Bacterial Load. *Dentistry* 2015, 5:6. http://dx.doi.org/10.4172/2161-1122.1000305

The Battle Against Biofilms Continue

Studies report a correlation between high inflammation and oxidative stress markers and low levels of naturally occurring salivary antioxidants. For example, Sculley and Langley-Evans[12] reported that periodontitis is associated with low salivary antioxidant status and increased oxidative damage within the oral cavity. A specific group of antioxidants (polyphenols) has been shown to neutralize free radical activity,[13] proliferate fibroblasts,[14] and increase wound healing.[15] By delivering the antioxidants locally, they work in concert with naturally occurring salivary antioxidants.[16] Polyphenols in the mouth have the ability, due to their chemical structure, to "stick" to oral cells, creating a time-release effect.[16]
Rebecca Wilder, RDH, MS. **Dimensions** OF DENTAL HYGIENE, Biofilm, p 32-36, January 2014

12. Sculley DV, Langley-Evans SC. Periodontal disease is associated with lower antioxidant capacity in whole saliva and evidence of increased protein oxidation. *Clin Sci.* 2003; 105: 167-172.
13. San Miguel SM, Opperman LA, Allen EP, Zielinski J, Svoboda KK. Bioactive polyphenol antioxidants protect oral fibroblasts from ROS-inducing agents. *Arch Oral Biol.*2012;57:1657-1667.
14. San Miguel SM, Opperman LA, Allen EP, Zielinski J, Svoboda KK. Bioactive antioxidant mixtures promote proliferation and migration on human oral fibroblasts. *Arch Oral Biol.* 2011;56:812-822.
15. San Miguel SM, Opperman LA, Allen EP, Zielinski J, Svoboda KK. Antioxidants counteract nicotine and promote migration via RacGTP in oral fibroblast cells. *J Periodontal.* 2010;81:1675-1690.
16. Ginsburg I, Kohen R, Shalish M, Varon D, Shai E, Koren E. The oxidant-scavenging abilities in the oral cavity may be regulated by a collaboration among antioxidants in saliva, microorganisms, blood cells and polyphenols: a chemiluminescence-based study. *PLoS One*. 2013;8:e63062.

Age-Related Changes in Salivary Antioxidant Profile: Possible Implications for Oral Cancer

This study found a significantly reduced total value of salivary antioxidant capacity in elderly persons (as measured by overall antioxidant capacity [ImAnOx] assay), (46% of healthy individuals, p ¼ .004), increased oxidative stress (86% increase in carbonyl concentrations—indicators of enhanced ROS attack, p ¼ .001), and increased salivary concentrations and total values of RNS (7-fold and 3-fold higher respectively, p ¼ .001), all contributing to increased DNA oxidation of oral epithelial cells. Salivary oxidative stress-related changes in the intimately related saliva and oral epithelium compounded with higher viscosity of saliva may explain the higher prevalence of oral cancer in the elderly population. Administration of local therapeutic agents (i.e., antioxidants) to the oral cavity should be considered.

3. Hershkovich O, Shafat I, and Nagler RM. Age-Related Changes in Salivary Antioxidant Profile: Possible Implications for Oral Cancer. *Journal of Gerontology*: BIOLOGICAL SCIENCES, 2007, Vol. 62A, No. 4, 361–366.