

BasicBites® –

A Revolutionary Oral Microbiome Approach to Boost Enamel Health

Tooth decay remains the most common prevalent disease in children and adults. The most critical contributing factor in the development of caries is a low pH which indicates the oral environment is acidic. Most conventional oral care technologies (e.g., fluoride), however, do not address this primary source of caries. They are mainly defensive measures designed to reduce demineralization and support remineralization which helps teeth fight off the effects of harmful, acid-producing bacteria. Although antimicrobial products such as certain mouthwashes claim to eradicate “bad” bacteria, they also may destroy virtually all the “good” bacteria necessary to maintain a balanced pH — the key to a healthy oral microbiome and essential for enamel health.

The breakthrough arginine bicarbonate, calcium carbonate microbiome technology of BasicBites® takes a different approach to supporting enamel health. By nurturing and activating the beneficial alkali generating bacteria discovered in biofilms, BasicBites creates an optimal oral environment that supports not only a pH-balanced microbial ecosystem, but also the protection and remineralization of tooth enamel. Unlike other oral care products, BasicBites plays both offense and defense in a prebiotic/postbiotic process that delivers immediate and sustained neutralization of plaque acids. This is accomplished without killing bacteria or adding new living microbes which may never adapt to the oral microbial ecosystem. Its unique technology also has been clinically shown to be effective in plugging and sealing open dentinal tubules to restrict movement of inter-tubular fluid that can adversely impact dentinal hypersensitivity.

The breakthrough arginine bicarbonate and calcium carbonate oral microbiome technology of BasisBites offers all-in-one enamel protection in a tasty, 15-calorie, sugar-free soft chew. Numerous clinical and research studies have validated the beneficial effects of this technology, including:

- A one-year, double-blind clinical investigation found that BasicBites reduced the progression of non-cavitated occlusal caries lesions in the first permanent molars of children by 42%.⁽¹⁾
- A study of the effects of a fluoride-free arginine bicarbonate/calcium carbonate in toothpaste used by 11 to 12-year-old children for two years found that it was significantly more effective in inhibiting caries initiation and progression than the fluoride toothpaste used by the control group.⁽²⁾
- The authors of one study noted that “breakthrough technology based upon arginine and calcium carbonate provides clinically proven benefits with respect to rapid and lasting relief of dentin hypersensitivity.”⁽³⁾
- In another clinical evaluation of an arginine bicarbonate/calcium carbonate complex in a sugar-free mint used by 200 10 to 11-year-old children, its authors concluded that this technology offers, **“a simple and economical means for reducing substantially one of the most prevalent diseases in these children.”**⁽⁴⁾

Our Origin Story

The revolutionary enamel-protecting microbiome technology in BasicBites was pioneered by Israel Kleinberg DDS, PhD, DSc, who is widely considered to be the “Grandfather” of modern oral biology. The oral microbiome harbors billions of microorganisms including hundreds of species of bacteria. For decades, it has been known that the main source of tooth decay is cariogenic oral bacteria which metabolize simple and complex sugars to produce acids that cause the dissolution of tooth enamel.

Kleinberg’s early research focusing on a mixed-bacterial/ecological approach to understand the role of bacteria in dental caries causation led to saliva fractionation studies that identified arginine, an amino acid, as a key component responsible for the pH-raising effect of saliva.(5) Continued studies in his lab led to the discovery of numerous commensal oral bacteria that could metabolize arginine and generate alkali as a byproduct.(6)

pH-raising Activity of Oral Micro-organisms Determined with Arginine or Arginine Peptide

(from Kleinberg I, et al., 1982)

pH-raising	Non-pH-raising	pH-raising	Non-pH-raising
<i>S. mutans</i> FA-1 (b) BHT (b) GF-71 (b) 130-P (b)	<i>S. mutans</i> OMZ-61 (a) E-49 (a) AHT (a)	<i>A. naeslundii</i> ATCC 19039	<i>A. viscosus</i> ATCC 15987
	<i>S. mutans</i> GS-5 (c) 10449 (c) Ingbritt (c)	<i>A. odontolyticus</i> ATCC 17982	<i>A. israelii</i> ATCC 27037
	<i>S. mutans</i> P-4 (e) AT-10 (e) LM-7 (e)	<i>L. cellobiosus</i> ATCC 11739 <i>L. brevis</i> ATCC 11577	<i>L. acidophilus</i> ATCC 4356 <i>L. salivarius</i> ATCC 11741
	<i>S. mutans</i> OMZ-175 (f) QP50-1 (f)	<i>L. fermentum</i> NCTC 6991	<i>L. casei</i> NCTC 6375
	<i>S. mutans</i> ATCC 27353 (d/g) OMZ-176 (d/g) B-13 (d/g) 6715 (d/g)		<i>N. sicca</i> ATCC 29256 <i>N. subflava</i> ATCC 10555
<i>S. sanguis</i> G9B (Type A) <i>S. milleri</i> <i>S. faecalis</i> ATCC 4082	<i>S. sanguis</i> ATCC 10557 (Type B) <i>S. mitior</i>		<i>B. catarrhalis</i> ATCC 23246

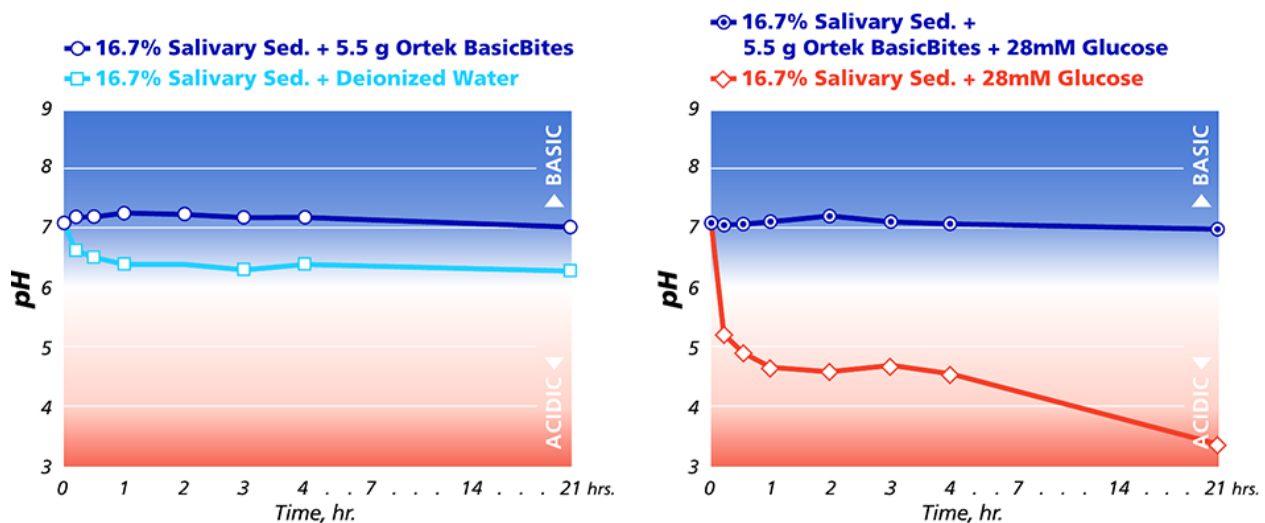
By combining arginine with calcium and carbonate/ bicarbonate anions, Kleinberg and his research team developed a multi-pronged approach to counter plaque acids, promote sustained alkali production and support remineralization and healthy microbial ecosystems on tooth surfaces. By combining these nutrients in a tasty sugar free soft chew, BasicBites mimics how saliva interacts with the oral microbiome to support enamel health.

Ingredients and Evidence of their Efficacy

Arginine

Numerous studies have clearly established that salivary arginine enables various commensal oral bacteria to readily produce acid-reducing alkali. Studies have shown that high levels of free arginine in saliva are associated with caries resistance.(7) These beneficial pH-raising bacteria contain a series of enzymes that constitute the arginine deiminase pathway (ADS), which is of critical importance in oral biofilm pH homeostasis and microbial ecology. Arginine metabolism by the ADS produces alkali in the form of ammonia that counteracts the effects of biofilm acidification. (8)

The many commensal arginolytic species known to express the ADS include *Streptococcus sanguinis*, *Streptococcus gordonii*, *Streptococcus parasanguis*, *Streptococcus mitis*, *Streptococcus oralis*, *Streptococcus rattus*, and certain *Lactobacillus* species.(9) Arginine metabolism has also been shown to significantly increase plaque pH in vitro and in vivo, even in the presence of carbohydrates.



In an in vitro study conducted at the Stony Brook University School of Dental Medicine, BasicBites performed significantly better than the control in sustaining dental plaque pH levels at or near neutrality, even after the introduction of sugar. (10)

It's been suggested that the anti-caries effect from novel arginine-based oral care technologies is due, in large part, to the ability of arginine to serve as an inducer of the ADS and a substrate for ammonia production by plaque bacteria. (11)

Arginine also has been shown to negatively impact the growth, pathogenic potential, and tolerance of environmental stresses in a way that likely compromises the ability of *S. mutans* to cause dental caries and infections.(12) Numerous studies indicate that arginine has other beneficial effects on the ecology of the oral microbiome. For example, an oft-cited study showed that treatment with an arginine-containing dentifrice normalized the oral microbiota of caries-active individuals. Its authors noted that, “**arginine has a favorable ecological effect on oral microbiome, and thus represents a promising approach to caries control.**” (13)

Calcium

This essential component in BasicBites is well-established as an effective way to inhibit enamel demineralization and support remineralization. It suppresses the solubilization of tooth enamel by mass action and reduces the release of calcium from tooth mineral when attacked by plaque acids.(14) Since calcium precedes the release of phosphate from enamel, dentine and cementum during demineralization,(15) it can be more effective than phosphate in inhibiting this process. Also, when pH levels in the oral microbiome are optimized by BasicBites, more calcium is available to support the remineralization process.

Bicarbonate, carbonate anions:

Arginine and calcium at the pH of the mouth have a positive charge. They are then able to form salts and salt complexes when combined preferably with negatively charged anions, such as bicarbonate and carbonate, that are also cariostatic. These two anions in BasicBites enhance or supplement the beneficial activities of calcium and arginine. For example, such anions act as tooth-protecting buffers while also providing a more favorable alkaline pH for base formation from arginine.(14)

Summary

Just two BasicBites a day deliver next-level oral care by:

- **Replenishing and coating enamel with a blend of vital nutrients**
- **Nourishing beneficial pH-raising bacteria discovered in dental plaque**
- **Activating the production of tooth protecting buffers**
- **Providing immediate and sustained neutralization of harmful plaque acids**
- **Enriching enamel and supporting its remineralization**
- **Helping maintain a pH-balanced microbial ecosystem that favors oral homeostasis**

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