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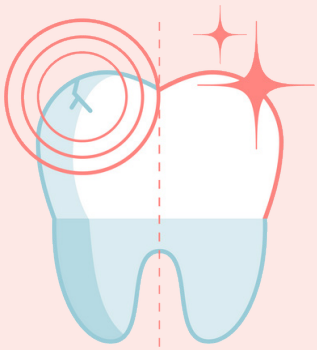
Demand for fluoride-free oral care is rising.
EvaGlo offers nano-hydroxyapatite (n-Ha) toothpaste as an effective remineralising alternative.

What is nano-hydroxyapatite and why are we using it in toothpaste?

$Ca_{10}(PO_4)_6(OH)_2$

Hydroxyapatite is included...

in toothpaste as a remineralising agent – a compound that promotes the reintegration of calcium and phosphate ions into the tooth. Hydroxyapatite has recently gained popularity worldwide due to its biocompatibility with the structure of the tooth, its non-toxicity and safety for use in children, and the added benefits of naturally whitening teeth and reducing dentine sensitivity [1,2]. There are two forms of hydroxyapatite that are used in toothpaste, micro and nano, the difference between the two is the size of the crystallites. The hydroxyapatite crystals in the tooth enamel are 20 to 40 nm in size, therefore nano-hydroxyapatite has proved to be highly effective as a remineralising agent due to its structural and chemical similarity to the tooth [3].



Particle size and safety

Micro versus Nano

Both micro and nano-hydroxyapatite are capable of remineralisation of the teeth, however, there are some differences in their capabilities. The research suggests that n-Ha offers several advantages: superior remineralisation [4–6], enhanced enamel microhardness recovery [4,7], improved biofilm management [1] and relief of dentine sensitivity [8,9].

Approved by SCCS

Studies show no cytotoxicity (harm to cells) [10,11] and no risk of intestinal absorption if accidentally swallowed [12]. Additionally, the European Union's Scientific Committee of Consumer Safety has approved n-Ha for use in toothpaste with specific regulations regarding concentration, particle shape, and surface modifications. Based on these findings, EvaGlo has chosen to utilise n-Ha to create a toothpaste that is both effective and safe to use.

Keep your smile for a lifetime.

How it works

The mode of action

Remineralisation Booster

n-Ha remineralises initial caries lesions below the surface. This makes n-Ha highly effective at repairing the enamel and preventing cavities from forming.

Prevents Plaque Build-up

n-Ha becomes incorporated into the microbial biofilm. In doing so, plaque-forming bacteria adhere to free n-Ha particles instead of the tooth.

Calcium Reservoir

During an acid attack, n-Ha that is stored in the biofilm dissolves and releases calcium ions. Higher calcium concentrations enable a shift in the chemical equilibrium and raises the pH. This prevents demineralisation - the dissolution of tooth minerals.

Protective Barrier

n-Ha in toothpaste adheres to n-Ha in the tooth structure. In doing so it creates a new protective layer that protects the underlying tooth from acid attacks.

Clinical trials using hydroxyapatite

A randomised controlled 6-month trial that included 147 patients between the ages of 11 and 25 years.	Caries active patients that used 10% hydroxyapatite toothpaste had reduced incidence of caries. There was no significant difference in caries progression between the hydroxyapatite group and the 1400 ppm F- group [13].
A double-blinded, randomised, active-controlled trial that included children between the ages of 3 and 7 years.	The study found that daily use of a hydroxyapatite toothpaste was equivocal to the standard fluoride control toothpaste (500 ppm F-) in preventing caries development in primary teeth [14].

According to a recent meta-analysis, these studies were found to have a low risk of bias and were considered to be some of the most reliable evidence on hydroxyapatite in caries prevention [9]. EvaGlo's nano-hydroxyapatite is of the same origin as the hydroxyapatite used in these studies.

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Improved patient outcomes

	Key Findings	Patient Benefit
Remineralisation (restoring tooth minerals)	Due to its smaller particle size, n-Ha has a high surface area and a strong tendency to absorb and bind to the tooth [5].	This strong adhesion creates more sites for essential minerals, like calcium and phosphate, to be deposited back into weakened enamel, reversing early signs of decay.
	In vitro experiments, with fluctuating acidity levels (pH-cycling), showed that n-Ha may be equally or even more successful than fluoride in reversing initial caries lesions [15–17].	Repairs the early stages of tooth decay before it progresses into a cavity that requires a filling. This saves patients the discomfort of more invasive dental procedures and prevents tooth loss.
	An in vitro study found that n-Ha promoted enamel remineralisation around the edges (margins) of dental fillings [18].	n-Ha could make the enamel around dental fillings more resistant to new cavities and thus extend the lifespan of the fillings.
Repairs micro scratches	Using a scanning electron microscope it has been found that a toothpaste with 10% n-Ha filled enamel porosities and created a smoother enamel surface. In contrast, fluoride toothpaste in the same study resulted in a rougher enamel surface [7].	Reduced Plaque Adhesion: bacteria in plaque are more likely to adhere to a rough, uneven surface. A smoother enamel surface, created by n-Ha, can make it more difficult for plaque to accumulate, potentially reducing the risk of cavities and gum disease.
Microhardness recovery	At 10% inclusion level, n-Ha was as effective as 2200ppm sodium monofluoride [7].	Microhardness recovery with n-Ha helps the enamel regain its strength, making it more resistant to wear and tear, potentially extending the lifespan of healthy teeth.

Builds a new protective layer of enamel	Forms a new homogenous surface layer [4].	The new layer might act as a physical barrier against harmful substances like acids produced by plaque bacteria.
Biofilm management	n-Ha can adsorb to the bacterial cell wall and prevent bacteria from attaching to the tooth surface [1].	Offers several patient benefits: reduced plaque formation, improved gum health, fresher breath, potential for reduced cavities.
Dentine hypersensitivity	Due to nano size, n-Ha can occlude open dentine tubules. Reduces fluid flow in the tubules and blocks pain signals [9].	Open dentine tubules are tiny channels that connect the inner pulp of the tooth to the outer surface. When exposed due to gum recession, worn enamel, or other factors, these tubules can allow hot, cold, sweet, or acidic stimuli to reach the tooth's sensitive nerves, causing discomfort known as dentin hypersensitivity. By occluding these tubules, n-Ha can significantly reduce the transmission of these stimuli, leading to less pain and improved quality of life.

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Additional active ingredients

Ingredient	Active Compounds	Key Findings	Patient Benefit
Zinc citrate	Zinc ions	Has been shown to limit bacterial growth and inhibit plaque formation [19]. Zinc, incorporated alongside citrate, demonstrates anti-calculus action [20].	**Therapeutic**: Reduces plaque formation. **Cosmetic**: Prevents calculus formation.
Xylitol		Xylitol has an active role in disrupting the energy production pathways of cariogenic bacteria, leading to a subsequent reduction in acid production, and benefiting the remineralisation process [21].	**Reduced Risk of Cavities**: Cariogenic bacteria, such as S. mutans, are primary contributors to the formation of cavities. **Enhanced remineralisation**: Xylitol may facilitate remineralisation by raising the pH of the oral cavity above 5.5.
Aloe vera (Aloe Barbadensis)	Aloesin, aloin, aloeride, naftoquinones, methylchromes, flavonoids, saponin, sterols.	Aloe vera has been shown to improve plaque, gingival and gingival bleeding indices [22]. Aloe vera has a significant anti-inflammatory property and it has been shown to be particularly beneficial in reducing gingival inflammation [23].	**Improved Gum Health**: Chronic inflammation releases enzymes that break down collagen, the main protein that provides structure and support to the gum tissue. This breakdown weakens the gums, making them more susceptible to damage and recession. It also increases the permeability of blood vessels in the gums, allowing more fluids and inflammatory cells to leak into the gum tissue causing swelling and redness.

Green Tea Extract (Cammelia Sinensis)	Polyphenol compounds (catechins): Epigalloccatechin-3 gallate (EGCG) and epicatechin-3-gallate (ECG).	A study examined green tea's ability to influence biofilm formation by S. mutans bacteria. The results showed green tea extract inhibited biofilm formation at various concentrations, suggesting its potential to modulate biofilm development [24].	**Reduced Risk of Cavities**: Biofilms, especially those dominated by S. mutans bacteria, are a major contributor to the formation of cavities. **Improved Gum Health:** Biofilms can also contribute to gum disease (gingivitis and periodontitis) by irritating the gums and creating an environment for harmful bacteria to thrive.
Clove Bud Essential Oil (Eugenia Caryophyllata)	Eugonol, acetyleugenol, gallic acid, sesquiterpenes, furfural and vanillin.	E. Caryophyllata has demonstrated antibacterial activity against cariogenic and periodontopathogenic bacteria, which may suggest that it acts as a natural antibacterial agent [25].	**Reduced Risk of Cavities**: Cariogenic bacteria, such as S. mutans, are primary contributors to the formation of cavities.
Cinnamon Bark Essential Oil (Cinnamomum Zeylanicum)	Cinnamaldehyde, eugenol, phenol, linolool.	C. Zeylanicum expressed the strongest inhibitory effect against S. mutans bacteria [26–28].	**Reduced Risk of Cavities**: S. mutans is a primary contributor to the formation of cavities.
Tea Tree Essential Oil (Melaleuca Alternifolia)	Terpinen-4-ol, 1,8-cineole, α-terpinene, γ-terpinene, α-pinene, β-pinene, α-terpineol, p-cymene, and sesquiterpene alcohols.	M. Alternifolia concentration has been shown to have an inverse relationship with plaque scores and the gingival bleeding index. With an increasing concentration, there was a continuous improvement in these scores [29].	**Reduced Plaque Formation and Improved Gum Health**
Cranberry Extract (Vaccinium macrocarpon)	Phenolic acids, anthocyanins, flavonols, flavan-3-ols and procyanidins [30].	Due to the proanthocyanidin content in the cranberry extract, it was found to promote remineralisation on the superficial layer of initial caries lesions in primary teeth. This was accompanied by an effective reduction in bacterial count and an increase in microhardness [31].	**Enhanced remineralisation**: Cranberry extract may be an effective plant-based remineralisation agent that can be used in conjunction with fluoride or n-Ha to support remineralisation.

Why Choose EvaGlo Nano-Hydroxyapatite Toothpaste?

EvaGlo stands out for its commitment to optimal effectiveness and transparency. Our toothpaste is designed to deliver comprehensive oral care with a focus on natural ingredients and scientifically-backed benefits. Here's what sets us apart:

- **Effective Concentration:** EvaGlo n-Ha toothpaste utilises a proven 10% w/w concentration of n-Ha. This specific concentration is supported by multiple scientific studies demonstrating its efficacy in remineralisation, enamel strengthening, and reducing dentine sensitivity.
- **Natural Ingredients with Targeted Benefits:** EvaGlo incorporates additional natural ingredients alongside n-Ha to promote oral health.
- **Transparency in Formulation:** We prioritise transparency with our ingredients. We clearly list all ingredients and specify the 10% w/w n-Ha concentration on our packaging, allowing you and your patients to make informed decisions.
- **Safety:** All ingredients are food grade and are safe if swallowed.

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