Cetylpyridinium Chloride, An innovative molecule

The use of physical and chemical components for oral hygiene dates back to approximately 3000 years before Christ. Throughout history, man has developed tools to take care of teeth and prevent bad odour. Later, with the emergence of microbiology, it was found that those responsible for bad breath and the most common oral diseases were bacteria, and removing them with antiseptics was proposed.

Until now, a series of compounds with the ability to eliminate microorganisms have been tested; however, it has been discovered that not all of them can be used in the oral cavity, because they can potentially damage soft tissues, mucosa or teeth, or cause they have an unpleasant taste or smell. These difficulties still exist today and should be resolved in order to come up with effective oral hygiene tools.

A series of compounds that are capable of combating dental plaque exist and have been classified as follows:

Antiseptic agents that prevent proliferation and/or eliminate microorganisms that form plaque.

Antibiotics capable of inhibiting or killing specific bacterial groups.

Enzymes or enzyme combinations that can break up or depolymerize the extracellular matrix of the biofilm or act upon the community physiology.

Non-enzymatic, dispersing, denaturating or modifying agents that can alter plaque structure or the metabolic activity of plaque.

Agents that can interfere with the adherence of the acquired pellicle.

Currently, a great number of mouthwashes and mouthwashes are available on the market that present as products that are efficient in maintaining oral health. Different antigingivitis and antiplaque products are formulated with active ingredients such as tricosan (toothpastes), stannous fluoride (toothpastes), a combination of essential oils (mouthwashes), alcohol (mouthwashes), chlorhexidine (CHX) (mouthwashes and toothpastes) and cetylpyridinium chloride (CPC) (mouthwashes and toothpastes).

Dentaid has developed a line of products that contain CPC and alcohol and CPC as their active ingredients or in mouthwashes containing CHX, alcohol and CPC and a combination of both act efficiently as antiplaque agents on halitosis and on gingivitis.

Different studies have shown that mouthwashes containing CHX, CPC and a combination of both act efficiently as antiplaque agents on halitosis and on gingivitis. CHX is probably the most frequently used molecule in different health disciplines due to its excellent antibacterial effect. Particularly in the oral cavity, it shows the best results. CPC penetrates and alters the cellular membrane, the non-polar side of the phospholipids that make up the bacterial cell membrane. Once the molecule attaches to the membrane, the non-polar side of the CPC penetrates and alters the cellular membrane. This alteration causes an osmotic imbalance and causes loss of cytoplasmic material and then cell death.

Even though it can also stain enamel, it displays a much lower degree than CHX. Different in vitro and in vivo studies have proven that CPC at different concentrations is effective in reducing supragingival and subgingival dental bacterial plaque, which in many cases induces inflammatory responses [12, 13]. Likewise, work carried out by Robidet et al. in 2003 clearly describes that a formulation with CPC, CHX and Zinc Lactate has good results, significantly eliminating anaerobic microorganisms, such as F. nucleatum and P. intermedia from the tongue surface and from the saliva.

Similarly, a clinical study comparing different mouthwashes showed a reduction in anaerobic microorganisms in patients’ saliva samples. This same study also measured the quantity of volatile sulphur compounds (responsible for the bad odour of halitosis) and proved that they were reduced considerably when using mouthwashes with CPC as one of its active ingredients [14].

A review from year 2008, van den Broek et al compared results from different clinical studies where the activity of different mouthwashes against halitosis was tested. They pointed out that studies in which products like HALITA, which contains CPC, CHX and Zinc Lactate in its formula are the ones that yielded the best results.

Other clinical studies have tested mouthwashes with different formulations and concentrations of CPC [16]. In general, their results show that this compound, by itself at different concentrations has antimicrobial effects. It has also been combined with Sodium Fluoride, alcohol and CHX with the intention of reducing the concentration of the two latter compounds because of their adverse effects.

Thus, it has been proven that CPC can be used as a treatment for certain oral pathologies, like for instance, mucositis, especially in patients who have undergone irradiation for head and neck cancer or those who suffer from periodontitis or gingivitis.

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What research has Dentaid carried out on the CPC molecule?

At Dentaid, a number of studies have been performed using this molecule, that have led to the confection of diverse formulations that currently aid in human oral hygiene. Also, among these, we have studies on antimicrobial activity, stability studies of the formulations for replacing ethanol in mouthwashes and improving CPC’s bioavailability.

We have also carried out different clinical studies with national and foreign universities that have shown that products containing this molecule are among the most efficient on the market.

Having proven the properties of this molecule, how can Dentaid be benefiting it in its products?

Dentaid has developed a line of products that contain CPC among its active ingredients, products that are meant for care and treatment of pathologies like periodontitis, gingivitis, halitosis or maintenance in patients that have been treated for periodontitis. Currently, a group of products is being developed where this molecule has greater bioavailability.

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