

DENTAL ADHESIVE WITH NANOPARTICLES AND ANTICARIOGENIC ACTIVITY

Technology for Licensing

Keywords:

Nanotechnology, mesoporous silica nanoparticles, surfactant, structure directing agent, L-arginine, secondary caries, anticariogenic effect, dental adhesion, dental materials.

Description:

Caries is the most common oral disease in people worldwide, whose operative treatment involves the removal of the altered tissue and subsequent reconstruction of the tooth with adhesive composite resins. Although the materials used in the restorative process have exceptional mechanical properties, their durability is limited by the possible secondary caries development. These caries are caused by the proliferation of acidogenic bacteria that integrate the biofilm between the tooth and the restoration.

This invention describes a dental adhesive incorporating mesoporous silica nanoparticles which, at the same time, contain L-arginine micelles within their pores. The nanoparticles present in the adhesive carry out a controlled release of L-arginine which acts as a basicity source. The pH increase at the tooth-filling interface inhibits the growth and proliferation of bacteria that lead to the formation of secondary caries. Compared to other tests where free antibacterial agents are incorporated into the adhesive, the addition of silica nanoparticles to dental adhesives does not cause significant changes in the physical-mechanical and adhesive properties of such adhesives.

Therefore, the invention is presented as the first adhesive with antibacterial therapeutic properties that maintains the physical-mechanical properties of typical materials used in dental restoration.

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A new dental adhesive incorporating mesoporous silica nanoparticles in which L-arginine is stored has been developed. The nanoparticles carry out the controlled release of L-arginine, which gives the adhesive antibacterial properties that prevent caries development, without modifying its physical-mechanical and adhesive properties.

Advantages and Benefits

- » Dental adhesive with anticariogenic activity
Dental adhesive capable of preventing the formation of secondary caries.
- » Use of silica nanoparticles
Incorporation of silica nanoparticles that maintain the physical and mechanical properties of the adhesive.
- » Controlled release of pharmaceutical agents
Material able to carry out the controlled release of L-arginine and derivatives that prevent caries formation by modifying the biofilm in tooth-filling interface.

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