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DEVELOPMENT OF THE DENTAL RINSE BASED ON OCTENIDINIUM HEXAFLUOROSILICATE

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Topicality. Dental caries remains one of the most common dental diseases in the world and an important medical and social problem of modern dentistry. Despite the significant number of existing caries preventive agents, the search for new active pharmaceutical ingredients capable of combining antimicrobial and remineralizing properties remains relevant.

A promising direction is the use of ammonium hexafluorosilicates, in particular octenidinium hexafluorosilicate (OHFS), which combines in its structure an octenidinium cation and a hexafluorosilicate anion. Such a structure provides a complex caries-preventive effect of the compound.

Aim of work. Development of the composition and technology of a dental rinse based on octenidinium hexafluorosilicate, taking into account its physicochemical and pharmacological properties [1, 2].

Materials and methods. The work analyzed the physicochemical, pharmacological and technological characteristics of octenidinium hexafluorosilicate. When developing the dosage form, the following factors were taken into account: solubility of OHFS; stability of hexafluorosilicate anion; pH-dependence of the system; pharmaceutical compatibility of excipients; organoleptic characteristics of the drug; features of dental use. To create the dosage form, a dental rinse was chosen as the most promising form of local application, which ensures uniform distribution of the active substance in the oral cavity and prolonged contact with the surface of the teeth.

Research results. Based on the conducted research, the composition of the dental rinse was developed based on octenidinium hexafluorosilicate at a concentration of 0.02%. The composition of the drug includes: octenidinium hexafluorosilicate; benzalkonium chloride; glycerin; sorbitol; polysorbate-80; sodium saccharinate; menthol; citric acid; purified water.

It was established that maintaining a weakly acidic environment within the pH range of 5.5–6.5 is a necessary condition for the stability of the drug, since hydrolysis of the hexafluorosilicate anion is possible at alkaline pH. The pharmaceutical compatibility analysis showed that OHFS is incompatible with anionic surfactants,

carbonates, phosphates, and calcium and magnesium salts, which was taken into account when selecting excipients.

A technology for extemporaneous manufacturing of dental rinse has been developed, which includes: sequential dissolution of components; solubilization of flavoring; pH correction; volume adjustment with purified water; packaging in hermetic bottles and qualitative analysis of the active ingredient [3].

In addition to the basic composition, several modified formulations of the drug have been proposed for various clinical needs: children's rinse; alcohol-free version; mucoadhesive system; phytocomposition rinse; rinse for patients with hypersensitivity of the mucous membrane.

Conclusions. Octenidinium hexafluorosilicate is a promising active pharmaceutical ingredient for the creation of dental medicinal products for caries prevention. The composition of the dental rinse based on OHFS at a concentration of 0.02% has been scientifically substantiated. The optimal conditions for the stability of the drug have been established and the critical value of maintaining a weakly acidic pH environment has been determined. The technology for manufacturing a dental rinse has been developed and several modified formulations for various clinical needs have been proposed. The results obtained confirm the prospects of further pharmaceutical and clinical studies of dental preparations based on octenidinium hexafluorosilicate.

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