GEL AND POLYMER FILM CONTAINING LINCOMYCIN HYDROCHLORIDE FOR INFLAMMATORY PERIODONTITIS DISEASES TREATMENT

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Introduction. The actual problem of contemporary pharmacy and therapeutic dentistry is the development and implementation of new effective drugs for periodontitis diseases treatment into medical practice, the signs of periodontitis diseases are characteristic for 95% of adult and 80% of children of the Ukrainian population. At present moment in spite of the presence of great number of finished drugs that are proposed for prophylaxis and treatment of periodontitis diseases, the dentists use local application of antibiotic drugs more and more frequently.

Aim. Development of the gel and polymer lincomicid hydrochloride coating film for inflammatory periodontitis diseases treatment.

Materials and methods. Lincomycin hydrochloride in the form of 30% solution manufactured by private stock corporation "PhF "Darnitsya" located Kiev has been used as the active pharmaceutical ingredient (API) in the composition of the gel and polymer coating film. Carbomer 934P, sodium carboxymethyl cellulose, propylene glycol, benzoic acid, hydroxide solution (10%) and calcium chloride (1%) were used as additional materials in the process of work. Polymer coating films were prepared by the method of flow resist coating. The gel pH was determined potentiometrically, the polymer film solubility was determined by the State Pharmacopeia of Ukraine method.

Pesults and discussion. In the process the gel developing, carbomer 934P was used as the gel formation substance (1%), the concentration of which was grounded under structural-mechanical properties, 10% sodium hydroxide solution was used as the neutralizing substance till pH 7.2 obtaining. Other additional substances that were used in the gel composition are propylene glycol (20%), benzoic acid (0.2%) as the preservative and water purified to 100.0. The lincomicin hydrochloride concentration was 30 mg/g.

The composition of the gel and its technology:

Lincomicin hydrochloride 30% solution	10.0 g
Carbomer 934P	1.0 g
Benzoic acid	0.2 g
Sodium hydroxide 10% solution	to pH 7.2
Purified water	to 100.0 g

The process of the gel production is the following: lincomicin hydrochloride solution, are added to benzoic acid solution and carbopol in the purified water under

the pH control and during sodium hydroxide mixing and then it is homogenized at the 0,9 c^{-1} rate during 10 minutes. The gel deaeration is performed if necessary. The gel standardization must take into consideration the following indicators: description, identification, pH, microbiological purity, and assay.

The term of the drug action on the site of application is usually 15-20 minutes, consequently, the frequency of its application must be 5-6 times a day, what is not very convenient for the patient. Unlike the gel, which is washed with the saliva and needs repeated application, the polymer film is the most rational form, as depending on its composition, the polymer coating film can stay on the site of application 3-6 hours and longer, and API concentration, contained in the gel concentration is almost fully absorbed on the site of application. Another advantageous peculiarity of this medicinal form is the accuracy of API dosing, decreasing of the drug intake quantity, superficial protection of the medicinal tissues, side reactions minimization.

The composition of the dental polymer film produced by the flow resist coating method applied on the dish horizontal surface (Petri dish) or special iron sets includes anionic polyelectrolyte solution (sodium carboxymethyl cellulose), the concentration of which depends on the trade mark, API solution (30% lincomicin hydrochloride), propylene glycol (plasticizer), coupling agent ($CaCl_2$ solution in which cations Ca^{++} are present) thanks to what between carboxylic groups of different macromolecules of anionic polymer cross bridges ($-\overset{o}{\overset{||}{C}}\text{-O-}Ca-O-\overset{o}{\overset{||}{C}}-$) are formed, the presence of these cross bridges delays the process of swelling and solubility of the obtained polymer film. In the process of polymer film preparation, the obtained solution is poured out on the smooth horizontal surface and dried (water eliminating) to the residual 5,0 ± 0,5% moisture (it should be taken into consideration that plasticizer is not evaporated), the final stage of the obtained film cutting is carried out by the use of acute tube of a cylindrical form with 10 mm diameter. The thickness and mass of the coating film, and also API concentration are chosen experimentally, and the term of swelling and coating film solubility at the site of application depend on the "coupling agent" (Ca^{++} concentration is also regulated).

The standardization of the obtained polymer coating film is carried out in accordance with the following requirements: description, identification and quantitative API analysis, film adhesion to hydrophilic surface, stability and elasticity of the coating film, microbiological purity.

Conclusions. The composition and gel technology and dental polymer coating film containing hydrochloride for inflammatory periodontitis diseases treatment have been developed. It has been demonstrated that polymer coating films prepared on the basis of anionic polyelectrolyte – sodium carboxymethylcellulose is a prolonged form, the solubility of which is regulated and depends on concentration of divalent cation Ca^{++}.