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DEVELOPMENT OF DENTAL GEL COMPOSITION AND TECHNOLOGY

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Annotation. The article reflects the results of studies on the development of the composition and technology of gels based on aqueous extraction of sage for the treatment of periodontal diseases.

Keywords: gel on the basis of aqueous plant extracts, production technology, analysis methods, thermal stability, colloidal stability.

Despite the widespread development of the production of synthetic drugs, there has recently been a trend towards an increase in the nomenclature of medicinal products derived from plants. Medicinal phyto-preparations have high therapeutic efficacy and lowest toxicity.

The object we selected for research is medicinal sage (lat., Salvia officinalis), widely distributed in the territory of our republic. According to the literature, Salvia officinalis (lat., Salvia officinalis) has anti-inflammatory and antimicrobial effects. It has an astringent effect, especially in the oral cavity (with stomatitis, gingivitis, angina) and inflammation of the gastrointestinal tract. There is information that the plant has an estrogenic and hypoglycemic effect [1,2].

Taking into account the traditional use of sage in dentistry, there is undoubted interest in the development of a dental dosage form based on it for the treatment of periodontal disease. Although the oral cavity is isolated by the accessible zone, however, the continuous moistening with its saliva causes rapid washing out of medicinal substances used in traditional water infusions.

Thus, the objective of the work is: development of a dental gel that will allow localizing the action of medicinal substances and provide a prolonged effect.

All parts of the plant contain essential oil. In leaves, it can be 2.5% of oil. The main component of the oil is cineole (up to 15%); contains also L-a-thujone, D-p-thujone, D-a-pinene, D-borneol, D-camphor. Tricyclic sesquiterpene was found. In addition to essential oil, tanning substances are still in large quantities in the leaves of sage, as well as triterpene acids (ursolic and oleanolic) [1,2].

Today, for the production of ointments, a growing interest of the researchers is represented by cellulose derivatives, in particular, the sodium salt of carboxymethylcellulose - Na-CMC.

The advantages of dosage forms containing Na-CMC as the basis are the following:

Medicinal substances are well and evenly distributed in colloidal solutions of Na-CMC, since the latter have a high dispersant effect. Solutions of Na-CMC form with mucous secretions the homogenous solutions, which promotes better contact of drugs with the affected area. All ointments, prepared on Na-CMC, form on the skin films easily removed after resorption of medicinal substances. Adsorption properties of bases from Na-CMC allow to absorb skin excretory and secretory products, which is especially important in the presence of exudate. The use of a base of Na-CMC, as well as other hydrophilic bases, provides cooling of the inflamed area caused by the gradual evaporation of water. Na-CMC has a steep viscosity curve as a function of concentration, so that it can be used to prepare ointments of any concentration, as well as liniments and lotions. The basis of Na-CMC refers to "non-allergic" auxiliary substances. The basis of Na-CMC is much more resistant to the action of microorganisms than other high-molecular carbohydrates [3].

Objective: to study the composition of pharmacologically active substances of sage medicinal leaves, to substantiate the composition of the gel, to develop the technology of dental gel for anti-inflammatory and antimicrobial action.

At the initial stage, was selected the optimal helium base, which provides the maximum therapeutic effect of the anti-inflammatory and antimicrobial gel. All helium compositions were prepared under standard conditions by mixing the aqueous extract of sage (lat.Salvia officinalis) and the amount of base MC and Na-CMC, then leaving to swell at room temperature for an hour, then again mixed. All formulations contained glycerin and aqueous sage extract [3].

Table1

The composition of studied gels

Ingredients	Composition1	Composition 2	Composition 3	Composition 4	Composition 5	Composition 6	Composition 7	Composition 8
Water extract of sage ()	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MC	6	5	-	-	6	-	6	-
Na-CMC	-	-	6	[illegible]	-	6	-	6
Glycerol	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	-	-	1	-	[illegible]	-	-	-
Ascorbic acid	-	-	-	-	-	-	1	1

Stability is an important indicator of the quality assessment of the obtained dispersed systems. According to modern requirements, ointments and gels containing vegetable water extracts should not change their consistency and delaminate during storage.

For gel compositions, aggregative stability in 3 series was determined during storage for a certain time. We studied indicators such as: appearance, color, uniformity, odor, spreadability, colloidal stability, thermal stability and pH [3].

Table 2

Results of studies of qualitative indicators of developed gels

Components of bases	Composition 1	Composition 2	Composition 3	Composition 4	Composition 5	Composition 6	Composition 7	Composition 8
Appearance	Dark brown color, with a small of sage leaves, of soft consistence	Dark brown color, with a small of sage leaves, of soft consistence	Dark brown color, with a small of sage leaves, of soft consistence	Dark brown color, with a small of sage leaves, of soft consistence	Dark brown color, with a small of sage leaves, of soft consistence	Dark brown color, with a small of sage leaves, of soft consistence	Light brown color With the small of sage leaves, soft consistency	Light brown color With the small of sage leaves, soft consistency
Homogeneity	homogeneous	homogeneous	homogeneous	homogeneous	homogeneous	homogeneous	homogeneous	homogeneous
PH value	5,6	5,6	5,6	5,6	5,6	5,6	5,6	5,6
Resistance to stratification	Stratification was observed	Stratification was observed	Stable	Stratification was observed	Stratification was observed	Stratification was observed	Stratification was observed	Stratification was observed
Thermal stability	Stratification was observed	Stratification was observed	No stratification	Stratification was observed	Stratification was observed	Stratification was observed	Stratification was observed	Stratification was observed
Colloidal stability	Stratification was observed	Stratification was observed	No stratification	Stratification was observed	Stratification was observed	Stratification was observed	Stratification was observed	Stratification was observed

It was experimentally established that the formulations № 1, 2, 4, 5, 6, 7, 8 for their consistency properties did not meet the requirements for soft medicinal forms.

The appearance of the gel was determined visually, the homogeneity of the mass, and such indicators as the stability of the gel under the influence of temperature changes and colloid stability, loss in mass during drying - in accordance with the methods given in ND and in literature.

The appearance and color of the gel is determined by viewing the sample placed in a thin, even layer on a slide or a sheet of white paper. Uniformity, the absence of lumps and grains, is determined by touching the sample lightly. The odor of the dental gel is determined by the organoleptic method.

The pH of the aqueous extract was determined according to the method of SP XI.

The lubricity of the substrates with the measurement of the diameter of the blurred spot on the glass plate under the action of the load.

The colloidal stability was determined by centrifugation, after centrifugation in tubes there is no phase separation.

Determination of thermal stability in the determination of 5-6 tubes are filled with 6-10 ml of dental gel and placed them in a thermostat with a temperature of 40-45°C for 7 days, then these samples are transferred for 7 days in a refrigerator with a temperature of 10-12°C, after which gel for three days stand at room temperature. Stability is determined visually: if no phase separation is observed, the dental gel is stable.

To quantify the tannins of vegetable water extracts in the gel, a selection was made of conditions that allow the gel to be disintegrated, representing a hydrophilic system and maximizing the extraction of tannins. In the course of the study, the conditions influencing their release from the gel were studied, namely: the use of various weights, extractants, methods of gel breakdown and extraction of active substances.

Conclusions

1. The type, composition, production technology and method for standardizing the gel with aqueous plant extracts from the collection have been theoretically and experimentally substantiated.

2. The method for determining tannins in a dental gel has been developed, and technological indicators for the quality of the gel and the expiry date have been established.

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