AP09562096 «Development of a new dental gel with antimicrobial and anti-caries action based on oregano»

Relevance

According to the World Health Organization (WHO), caries and periodontitis are a global problem, the treatment and prevention of which is one of the most important tasks of modern dentistry. Also, the WHO noted that the concepts of "health" and "hygiene" of the oral cavity are an integral part of overall health and a determining factor in the quality of human life. The idea of the project is to develop a new drug for the treatment and prevention of bacterial infections of the oral cavity using innovative technologies based on the rational use of domestic plant materials.

Aim: development of the optimal composition, technology for the production and standardization of a new dental gel for the treatment and prevention of bacterial infections of the oral cavity based on essential oil and oregano extract.

Expected results

The production technology and optimal composition of a new dental gel with essential oil and oregano extract will be developed. Based on the results of studying the inhibition of biofilm formation by Streptococcus mutans and antibacterial action, the effectiveness of prototypes of dental gel with essential oil and oregano extract will be proved.

Research group

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Publications

1. G. A. Atazhanova, A. V. Gering, F. T. Mukasheva, P. E. Sakenova, Yu. V. Gatilov, V. S. Korneev, S. M. Adekenov. Chemical study of Pulicaria salviifoli. – Chemistry of Natural Compounds, Vol. 53, No. 1, January, 2017. – P. 178-180

2. A. I. Khlebnikov, I.r A. Schepetkin, A. S. Kishkentaeva, Z. R. Shaimerdenova, G. A. Atazhanova, S. M. Adekenov, L. N. Kirpotina, M. T. Quinn. Inhibition of T Cell Receptor Activation by Semi-Synthetic Sesquiterpene Lactone Derivatives and Molecular Modeling of Their Interaction with Glutathione and Tyrosine Kinase ZAP-70. //Molecules 2019, 24, 350; doi:10.3390/molecules24020350

3. I. A. Schepetkin, L.N. Kirpotina, P. T. Mitchell, A. S. Kishkentaeva, Z. R. Shaimerdenova, G. A. Atazhanova, S. M. Adekenov, M. T. Quinn. The natural sesquiterpene lactones arglabin, grosheimin, agracin, parthenolide, and estafiatin inhibit T cell receptor (TCR) activation// Phytochemistry 146 (2018) 36e46

4. K. Zh.Badekova, A.K. Ataeva, G.A. Atazhanov "Evaluation of the quality of essential oils using GC-MS analysis", the journal "Medicine and Ecology". issue №1, 2020. P.64-77

5. K.Zh. Badekova, G. A. Atazhanova, T. Kacergius, S. B. Akhmetova, M. K. Smagulov. Formulation of an Origanum vulgare based dental gel with antimicrobial activity//Journal of Taibah University Medical Sciences. – 2021. – Vol. 16, No 5. – P. 712-718
6. K. Badekova, G. Atazhanova, Y. Levaya, T. Kacergius, S. Akhmetova, M. Smagulov. Anti-inflammatory activity of a dental gel based on Origanum vulgare raw material // To be published in the journal "Bulletin of Karaganda University, series of biology, medicine, geography", 2021,
7. Patent of the Republic of Kazakhstan № 35343 from 05.11.2021 г. « Antimicrobial dental gel "Badekova K.Zh., Atazhanova G.A., Ivasenko S.A., Akhmetova S. B., Loseva I. V., Aitkenova A. A.

Achieved results

-the composition of a new combined drug of antimicrobial and anti-caries action based on oregano (Origanum vulgare L.) in the form of a gel and a technology for its production have been developed. Methods for quality control of the developed medicinal product based on oregano (Origanum vulgare L.) have been developed; the expiration date and storage conditions are determined.

- for the first time, the optimal composition of a dental gel with essential oil and oregano extract was developed;

-prototypes of dental gel with essential oil and oregano extract in various concentrations were obtained and developed to study the inhibition of Streptococcus mutans biofilm formation (anti-caries effect) and antibacterial action;

- for the first time, the study of the anti-caries and antibacterial effect of prototypes of dental gel was carried out. A selection of dental gel samples showing a relatively high anti-caries and antibacterial effect against test strains with minimal concentrations of essential oil and oregano extract was made. A study of the acute toxicity of dental gel in an in vivo experiment was carried out. The investigated anti-caries gel showed low toxicity. For mice and rats, the LD50 was 2000 mg / kg intragastrically. According to the generally accepted classification of toxicity of substances, dental gel can be classified as a low-toxic substance (class IV toxicity, LD50> 5000 mg / kg, intragastric administration), that is, to practically non-toxic compounds.

- for the first time a technology for producing a dental gel with essential oil and oregano extract was developed;

- for the first time, a draft of an analytical regulatory document was developed and the standardization of a dental gel with essential oil and oregano extract was carried out in accordance with the requirements of the State Pharmacopoeia of the Republic of Kazakhstan (SP RK).

Information for potential users

Target consumers of the obtained results: pharmaceutical enterprises and the population of the Republic of Kazakhstan

List of submitted articles

G.A. Atazhanova, K. Zh. Badekova, S.A. Ivasenko, T. Kacergius, Ya.K. Levaya, G.K. Kurmantaeva, M.Yu. Ishmuratova, M.K. Smagulov. Influence of essential oils on the formation of Streptococcus mutans biofilms// Research J. Pharm. and Tech., подана в сентябре 2021 г.