МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ НАЦІОНАЛЬНИЙ ФАРМАЦЕВТИЧНИЙ УНІВЕРСИТЕТ
КАФЕДРА ПРОМИСЛОВОЇ ТЕХНОЛОГІЇ ЛІКІВ ТА КОСМЕТИЧНИХ ЗАСОБІВ КАФЕДРА АПТЕЧНОЇ ТЕХНОЛОГІЇ ЛІКІВ

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СУЧАСНІ ДОСЯГНЕННЯ ФАРМАЦЕВТИЧНОЇ ТЕХНОЛОГІЇ

MODERN ACHIEVEMENTS OF PHARMACEUTICAL TECHNOLOGY

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Research aim. The aim of this work was to study the anatomical structure of the borage herb Strumok variety and determine microscopic diagnostic features.

Research methods. The herb was harvested in the Kharkiv region during the period of mass flowering, fixed in a mixture of ethanol - glycerin - water (1:1:1). The study of the anatomical structure was carried out using a BIOLAM LOMO microscope. The pictures were taken using an OLYMPUS FE-140 video camera.

Main results. Diagnostic features of the anatomical structure of borage herb Strumok variety include: sizes and nature of the location of different types of hairs; shape of epidermal cells, thickness of cell membranes and their tortuosity, types of stoma apparatus; for stems: sizes of angular-lacunar collenchyma cells, endoderm with starch grains, transitional type of structure of the central cylinder, shape of conductive bundles; for petioles: presence of collenchyma and sclerenchyma; number and nature of arrangement of vascular bundles; for leaves: dorsiventral type of structure, shape of the central vein; for flowers: presense of simple hairs and shape of epidermal cells.

Conclusions. The results of the study of anatomical diagnostic features of the structure of borage herb Strumok variety will be included in the regulatory documentation for raw materials.

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DEVELOPMENT OF THE COMPOSITION OF CHEWABLE TABLETS BASED ON DRY EXTRACTS FOR UROLOGICAL USE

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Introduction. Cystitis is an inflammatory disease of the urinary bladder, characterized by an acute or chronic course. The pathology has gender specificity: the incidence among women is 20–25%, while in men this figure does not exceed 0.5%, according to epidemiological data. There is a steady trend towards an increase in the

prevalence of this nosology, which, in particular, is due to adverse environmental conditions (long stay in rooms with low temperature), which is especially relevant in today's conditions. A critical factor in the effectiveness of cystitis therapy is the speed of achieving a clinical effect. In view of this, chewable tablets (CT) are a promising dosage form. The advantage of this form is the optimization of the drug's pharmacokinetic profile due to the disintegration of the tablet directly in the oral cavity. Higher bioavailability of active substances is ensured compared to traditional oral forms, which allows reducing the time of onset of therapeutic effect [1−6].

Purpose of the study. Selection of excipients for the formulation and manufacturing technology of chewable tablets containing dry extracts of cranberry fruits (*Oxycoccus palustris Pers.*) and common sage leaves (*Salvia officinalis)* for the treatment of cystitis.

Research methods. The physicochemical, pharmaco-technological studies were utilized to evaluate the active pharmaceutical ingredients (API), excipients and the final dosage form.

Main results. A key requirement for developing a solid dosage form is the study of the pharmaco-technological properties of the API. The first stage of our work was to determine the fractional composition of dry extracts of cranberry and common sage. This indicator affects the organoleptic, technological characteristics of the mass for tableting, the accuracy of dosing of active pharmaceutical ingredients and the average weight of the resulting tablets.

The results obtained during the granulometric analysis of dry extracts are given in Table 1.

Table 1

Results of determination of fractional composition of dry extracts

Sieve size, mm	Particle size distribution of dry extract of cranberry, %	Particle size distribution of dry extract of common sage, %
-1.0 +0.50	13.81 ± 0.02	13.57 ± 0.03

-0.50 +0.31	13.06 ± 0.02	13.08 ± 0.03
-0.31 +0.20	61.32 ± 0.01	61.15 ± 0.02
-0.20 +0.09	10.59 ± 0.01	11.09 ± 0.02
Dropout	1.22 ± 0.01	1.11 ± 0.02

Note: n = 5, P = 95 %.

The data in Table 1 indicate that the main fraction consists of extract particles with a size of 0.2 to 0.31 mm, based on which we can conclude that the extracts under study have sufficient flowability and density.

We also studied the main pharmaco-technological characteristics of the API, the results of the study are given in Table 2.

Table 2

Pharmaco-technological characteristics of dry extracts

Indicators, unit of measurement	Results	
	Dry extract of cranberry	Dry extract of common sage
Bulk volume, ml	101.00±1,31	102.00±1.25
Tapped volume, ml	85.10±0.22	86.00±0.72
Tapped capacity, ml	17.10±0.50	17.40±0.60
Bulk density. g/ml	0.90±0.11	0.93±0.11
Tapped density, g/ml	1.14±1.55	1.18±1.34
Flowability, sec/100 g	12.02±0.34	12.10±0.25
Angle of repose, degrees	29.00±1.81	30.00±1.33
Carr Index, %	17.11±1.01	17.18±1.24
Hausner ratio	1.23±0.32	1.27±0.41
Compressibility (resistance of tablets to crushing), N	44±1	45±1

Note: n = 5, P = 95%.

The data in Table 2 indicate that the studied samples of dry extracts are characterized by good flowability, which is confirmed by the value of the angle of repose. The flowability of the powders is fair, according to the Carr index and the Hausner ratio, but the particles of dry extracts have insufficient cohesion under pressure and require improvement of the compressibility index.

Therefore, we decided to incorporate the following diluents into the composition of CT: Advantose NV 100, Compressol™ SM (SPI Pharma, USA), Pearlitol® DC (Roquette, France). These excipients are specifically designed for direct compression and their functional properties align with the requirements for CT. Technological characteristics of the mixtures containing dry extracts of cranberry fruits, common sage leaves and the proposed diluents are presented in Table 3.

Table 3

Pharmaco-technological properties of the mixtures containing diluents and dry extracts of cranberry fruits and common sage leaves

Properties	Name		
	Pearlitol ® DC and mixture of dry extracts	Compressol ™ SM and mixture of dry extracts	Advantose NV 100 and mixture of dry extracts
Flowability, sec/100 g	7.25±0.22	9.21±0.21	10.50±0.15
Angle of repose, degrees	30.00±1.20	23.00±1.25	28.00±1.40
Bulk density, g/ml	0.81±0.44	0.71±0.06	0.80±0.79

Note: n = 5, P = 95 %.

The results presented in Table 3 indicate that the samples containing Compressol™ SM and Pearlitol® DC exhibited the best flowability. At the next stage, the compressibility of the tablet mixture was investigated via resistance to crushing evaluation.

The results of the study are presented in Figure 1.

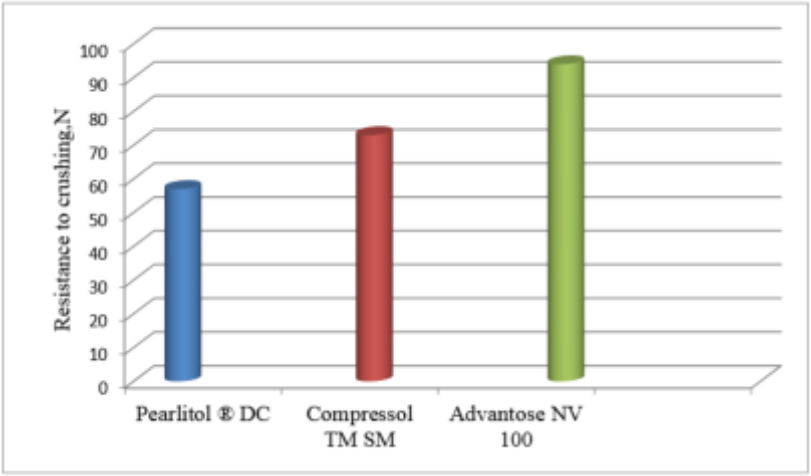

Fig. 1 Resistance to crushing of chewable tablets

The results of Figure 1 show that the tablets containing the Advantose NV 100 diluent have the highest compressibility (92 ± 7 N). The lowest value for this indicator was observed in the Pearlitol® DC mixture (55 ± 6 N). However, the increased hardness of chewable tablets can cause difficulty in chewing and swallowing in patients, and tooth damage may occur. In order to finally determine the optimal diluent in the composition of the developed CT, we investigated the disintegration index due to the possibility of swallowing without prior chewing of the tablets. The results are shown in Figure 2.

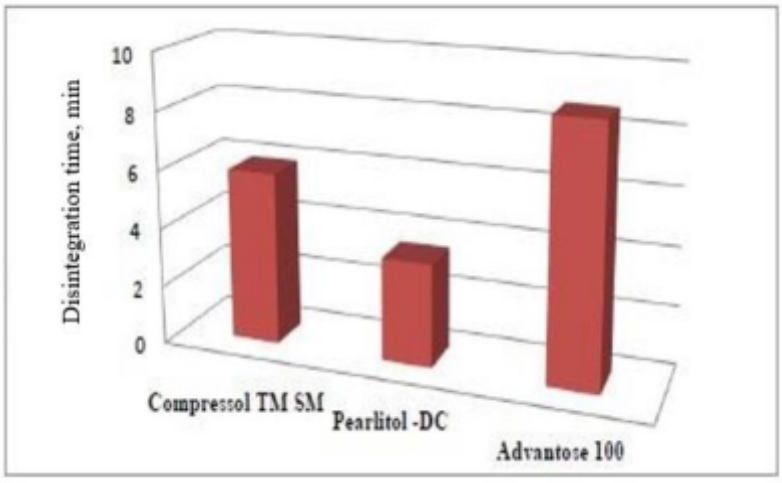

Fig. 2 Disintegration time of chewable tablets depending on the type of diluent in their composition

According to the data presented in Figure 1, according to the disintegration index, all tablets meet the requirements of the State Pharmacopoeia of Ukraine (disintegration time – 15 minutes). The best value was obtained for CT with the diluent Pearlitol ® DC.

Based on the results of the studies, Pearlitol® DC was selected as the rational diluent in the composition of the developed chewable tablets.

In order to avoid sticking of the tablet mass to the press tool for easy ejection of tablets from the die, we decided to introduce stearic acid into the composition of CT as a lubricant and also investigated the effect of its amount on the flowability of the tablet mass and the quality of the CT. The results are shown in Figure 3.

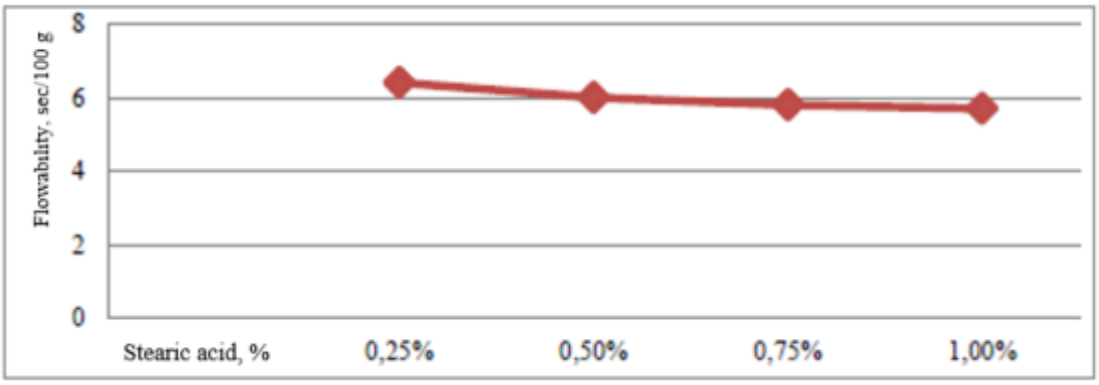

Fig. 3 Effect of stearic acid concentration on the flow properties of the tablet mass

Based on the studies, the optimal concentration of stearic acid was determined to be 0.5%, as further increases had a negligible effect on the flowability index.

Conclusions. The results of the pharmaco-technological research allowed for the development of a rational chewable tablet formulation intended for urology.

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A SOCIOLOGICAL STUDY OF THE ASSESSMENT OF THE ROLE OF PHARMACEUTICAL CARE DURING THE CORRECTION OF PSYCHO-EMOTIONAL CONDITIONS

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Introduction. Psycho-emotional disorders are among the most prevalent public health challenges of the 21st century and are associated with a substantial impact on quality of life, social functioning, and work capacity. According to international epidemiological studies, in regions affected by armed conflicts, humanitarian crises, and mass displacement, the prevalence of anxiety, depressive, and post-traumatic stress disorders increases significantly, creating a long-term burden on healthcare systems. In Ukraine, this issue has become particularly acute in the context of the full-scale war,