Ф А 2.2.1-32-367

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QUALIFICATION WORK

on the topic: «**DEVELOPMENT OF COMPOSITION AND TECHNOLOGY OF OINTMENT FOR THE TREATMENT OF PSORIASIS**»

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Kharkiv - 2023 year

ANNOTATION

The composition and technology of extemporaneous ointment of anti-inflammatory action on the basis of components of plant origin are offered. The stability and technological properties of topical ointments have been studied.

Studies were performed on three samples, as an emulsifier was selected Olivoil Emulsifier in the amount of 8%. Organoleptic and physicochemical parameters of model ointment samples were determined in accordance with HFC methods. According to the results of the research, the shelf life (30 days) was set.

The work is presented on 53 pages, includes 11 tables, 6 figures, 55 sources of literature.

Key words : chamomile oil , plant components, anti-inflammatory action, stability, technology.

АНОТАЦІЯ

Запропоновано склад і технологію екстемпоральної мазі протизапальної дії на основі компонентів рослинного походження. Вивчено стабільність та технологічні властивості мазі для місцевого застосування.

Дослідження проводилися на трьох зразках , у якості емульгатору було обрано Olivoil Emulsifier у кількості 8 %. Органолептичні та фізико-хімічні показники модельних зразків мазі визначено відповідно до методик ДФУ. За результатами проведених досліджень встановлено термін зберігання (30 діб).

Робота викладена на 53 сторінках, включає 11 таблиці, 6 рисунків, 45 джерел літератури.

Ключові слова: олія ромашки, рослинні компоненти, протизапальна дія, стабільність, технологія.

CONTENT

INTRODUCTION

Actuality of theme. Natural products are one of the sources of drugs in the pharmaceutical industry, one of the most famous sources of natural products are medicinal plants. Medicinal plants are able to treat some specific diseases and can be a potential source of drugs.

Psoriasis is the most common skin disease affecting people of all ages and genders. Approximately every fifth person has faced one or another form of skin inflammation during his life.

For some people, psoriasis becomes a serious cosmetic problem due to serious damage to the skin of the face. Most often, to eliminate inflammation, it is enough to get rid of negative consequences, but some forms of the disease are caused by chronic diseases of internal organs.

Despite many studies, the etiology and pathogenesis are not sufficiently understood, although genetic predisposition and changes in the immune response are considered important factors in the development of the disease. It has been established that this disease is the result of a complex interaction of defects in the barrier function of the skin, immune changes, environmental factors, and infectious agents.

The purpose of the study . Theoretical justification and experimental studies on the development of the composition and technology of an extemporaneous ointment based on components of plant origin for the treatment of psoriasis.

Research tasks :

– conduct an analysis of literature data on etiology, pathogenesis, classification and modern approaches to the treatment of psoriasis;

– to analyze data on the use of components of plant origin for use in dermatology to ensure a comprehensive effect;

– justify the choice of active and auxiliary substances of the medicinal product;

– on the basis of experimental studies, choose the technology of the

ointment with a reasonable composition.

The subject of research . Research on the substantiation of the composition and technology of dermatological ointment of extemporaneous production based on components of plant origin.

Research objects . Flax oil, lavender oil, chamomile oil , emulsion base.

Research methods . Organoleptic, technological, physical and chemical.

Practical significance of the obtained results . The composition and technology of the ointment with plant components are substantiated.

Scientific novelty . For the first time, the composition and technology of an extemporaneous anti-inflammatory ointment were substantiated.

Structure and scope of qualification work. The qualification work consists of an introduction, a literature review (Chapter 1), an experimental part (Chapters 2 and 3), general conclusions, a list of used literary sources, and appendices. The work is laid out on 53 pages, includes 11 tables, 6 figures, and 45 literature sources.

CHAPTER 1

MODERN APPROACHES TO THE CORRECTION OF PSORIASIS

1.1. Classification, pathogenesis of psoriasis

Psoriasis is a chronic autoimmune disease in which the process of skin formation is accelerated. Normally, human skin is protected by barrier and immune functions, but the pathological condition arises due to constant exposure to negative factors. Doctors include burning, itching, redness and the appearance of rashes among the characteristic symptoms of psoriasis. The rash can be limited or spread over the entire body. Skin inflammation negatively affects a person's appearance and worsens the patient's quality of life. The main method of treating psoriasis is drug therapy.

Fig. 1.1 Psoriasis

Dropsy psoriasis. This form looks like small, numerous, dense nodules covered with scales scattered over the skin.

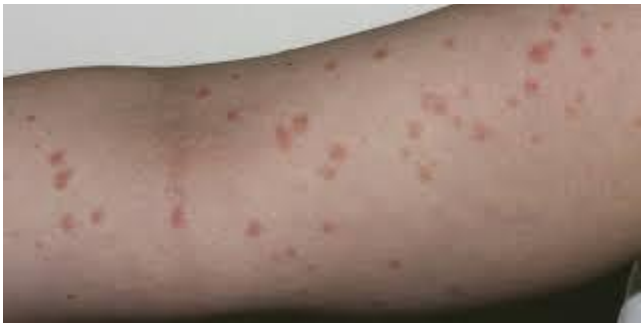


Fig. 1.2. The appearance of tear-shaped psoriasis

Plaque psoriasis. Appears in the form of plaques covered with white scales. It is most often localized in places such as elbows, knees and scalp.

Psoriasis of skin folds. This form of psoriasis affects areas such as the armpits, inguinal folds, buttocks and genital area.

Pustular psoriasis. It manifests itself as an acute, severe skin lesion in the form of superficial pustules (pustules), which is accompanied by redness of the skin and high temperature. The process is not infectious and the pustules do not contain bacteria.

Psoriatic arthritis. This is an inflammatory disease affecting the joints. Small joints of the hands and feet are most often affected. In most cases, patients first develop skin rashes, but in some patients, the joints are the first to be affected. Sometimes joint damage occurs without rashes on the skin.

Pustular psoriasis of the palms and soles is a chronic localized form of pustular psoriasis that usually occurs in middle age.

Exudative psoriasis - often develops in patients with diabetes and is characterized by pronounced swelling and brightness of psoriatic papules, the formation of yellow scaly crusts on their surface due to their exudation.

Psoriatic erythroderma. This is a very dangerous form of the disease. In this case, the disease affects the entire skin, including the scalp, face, trunk, arms and legs.

Plaque psoriasis. This form of psoriasis causes the skin to redden and develop silvery, shiny, slightly raised rashes called plaques. They have clear borders and are very flaky. Plaques often appear in the same place on both sides of the body, for example on the left and right elbows. Affected skin often itches, especially during exacerbations or in severe cases of plaque psoriasis. In this case, the skin often additionally suffers from combing, injuries may occur on it.

The sizes of plaques may vary. Their diameter can be from one to 10 centimeters or more. In some people, several small plaques appear on certain areas

of the body, for example only on the scalp. In others, on the contrary, large plaques appear in one or more parts of the body.

In principle, plaque psoriasis can occur on any part of the skin. The head, elbows, knees and back are most often affected. Also, plaques often form behind the ears, on the hands and feet, or on the navel.

In many cases, the skin on the patient's hands and feet becomes very dry and cracked. It can be very painful. It causes particular discomfort when the cracked skin is stretched when moving, comes into contact with substances that irritate the skin, such as fruit acids, or when a person hits.

In addition, with plaque psoriasis, the nails may change. Psoriasis of the nails becomes noticeable by small dimples on the nail ("thimble" symptom), thickening of the nail or a change in its color to yellowish-brown ("oil spot" symptom). Complete exfoliation of the nail is also possible.

Plaque psoriasis, the most common form of psoriasis, accounts for about 85 to 90 percent of all psoriasis cases. This form of psoriasis usually presents as raised, red, scaly patches covered with white scales. These lesions/plaques most commonly occur on the scalp, extensor surfaces of the elbows and knees, trunk, and buttocks, although they can appear anywhere. Psoriasis is associated with several other serious diseases such as diabetes, cardiovascular disease, lymphoma and depression, alcoholism, etc. The etiology of psoriasis includes genetic and environmental factors, but it is complex and poorly understood. Population genetic studies have revealed a strong hereditary component, and the type of inheritance is multifactorial. Many environmental, physiological, and psychological factors, including infections, skin trauma, alcohol, tobacco, obesity, medications, and stress, are known to cause psoriasis and/or exacerbate an existing condition. Treatment options are varied and range from topical medications, including salicylic acid, coal tar, anthralin, corticosteroids, vitamin D3 analogs, calcineurin inhibitors, and tazarotene for mild disease, UV therapy for moderate disease, and systemic medications, and biologics for more severe disease. disease. Although these traditional treatments are effective in controlling symptoms, there is no permanent cure for psoriasis.

The leading role in the development of psoriasis belongs to endogenous factors - hyperreactivity of the skin, disruption of functional and biochemical processes in the skin, due to non-allergenic exogenous factors (psycho-emotional stress, tobacco smoke). The development of plaque psoriasis is based on a genetically determined characteristic of the immune response to allergens. Characteristic signs of the immune response in patients with psoriasis: predominance of T-helper II, hyperproduction of general IgE and specific IgE antibodies. Propensity for hyperreactivity of the skin is the most important factor.

Heredity: if both parents suffer from psoriasis, the child will be sick in 80% of cases; if only mother or father, then - in 50%; if everyone is healthy, the probability of the child developing the disease is only 10%. Identifying high-risk children allows timely prevention and treatment

Atopy: increased sensitivity of the body to exposure to various types of allergens (animal wool, flower pollen, house pollen, some food products).

Increased sensitivity of the skin: increased level of immunoglobulin E in the blood, which is the cause of the development of the allergic process (transmitted more often on the maternal line - in 80% of cases, less often on the paternal line - in 20%).

Researchers from University College Cork in Ireland have found that the presence of parents increases a child's risk of developing psoriasis in the first two years of life. The results of the study were published in the journal Pediatric Dermatology.

The presence of psoriasis (psoriasis, plaque psoriasis, or allergic rhinitis) in the mother, father, or both parents immediately increased the probability of developing psoriasis in the child during the first two years of life by 2.2 times. The presence of the disease in the father increased the risk slightly more than the presence of the disease in the mother (by 2 and 1.7 times, respectively).

The risk of the child developing psoriasis after six months was 57% higher if the mother had been diagnosed with psoriasis, and 76% higher if the mother had been diagnosed with the disease. The presence of psoriasis in the father increased

the risk of developing psoriasis in the child by 90% and 70%, respectively. Similar data were obtained for children aged 12 and 24 months.

The results of the BASELINE study with the participation of 1505 children were analyzed. Skin was assessed at birth and then at 2 months, 6 months, 12 months, and 2 years of age. Parents filled out a questionnaire and noted the presence of psoriasis, plaque psoriasis, or allergic rhinitis. The incidence of psoriasis in children older than six months was the highest and amounted to 18.6%.

The researchers believe that the collected information allows identifying children with a high risk of developing psoriasis in order to conduct prevention and start treatment in time.

Causes and development of the disease:

- High voltage;

- contamination of food products with food additives (preservatives, dyes and flavorings);

- parents who smoke;

- chronic infections and problems with the child's gastrointestinal tract;

- Duration of the child's stay in adverse weather conditions (gusty wind, climate, heat, severe frost)

According to official statistics, about 20% of the population of Ukraine suffers from plaque psoriasis. "We can say that all the residents of our country faced this problem in one way or another," Oleksandr Litus is confident.

In Ukraine, over the past ten years, there has been a gradual increase in the incidence and prevalence of psoriasis among children aged 0 to 14 years. Statistical data indicate insufficient accurate accounting of patients suffering from this disease and frequent incorrect interpretations of diagnoses. The onset of the disease usually occurs in early childhood.

1.2. Modern approaches to the therapy of psoriasis

Topical drugs (drugs that are applied directly to the skin) are the mainstay of treatment for skin diseases. Systemic drugs are taken orally or injected and distributed throughout the body. In some cases, when a high concentration of the drug is needed on the affected area, the doctor injects the drug directly under the skin (intradermal injection).

The active ingredient or drug in the preparation for local use is mixed with an inactive ingredient (carrier). The vehicle determines the consistency of the product (eg thick and oily or light and watery) and whether the active ingredient remains on the surface or penetrates the skin. Depending on the type of carrier used, the same drugs can be administered in:

- ointments
- creams
- lotions
- baths and tubs
- foam
- decision
- powders
- gels

In addition, many drugs are available in different dosages (concentrations). The choice of means depends on where the drug will be used, how it will look, how convenient it is to apply and leave.

Special treatment of patients with psoriasis is carried out exclusively with the provision of specialized medical care. It has been proven that the special treatment carried out contributes to the achievement of long-term remissions and even the recovery of patients.

Necessary actions of the doctor:

1. If psoriasis is suspected, the patient should consult an allergist/pediatric allergist and a dermatologist/pediatric dermatologist within a week for a consultation to confirm the diagnosis and determine further treatment tactics.

2. Monitoring of the patient's compliance with the recommendations of the allergist/pediatric allergist and dermatologist/pediatric dermatologist regarding skin care and prevention of contact with allergens.

3. During the examination and special treatment, facilitate the patient's implementation of all the recommendations of the allergist/pediatric allergist and dermatovenerologist/pediatric dermatologist and other specialists.

In the analyzed databases, only one RCT was found (F. Giordano-Labadie, 2006), which studied the effectiveness of using emollients for 8 weeks in the treatment of patients with plaque psoriasis. In the main group, the quality of life in the assessment of the CDLQI index was significantly improved ($p = 0.001$), but the values of the SCORAD index were not significantly different (EL = 1-).

The use of emollients is relevant when conducting external therapy with topical corticosteroids (TCS) in connection with the presence of a steroid-sparing effect - the possibility of reducing the dose of corticosteroids against the background of the use of emollients. In one RCT (R. Grimalt, 2007), 162 children received emollients twice a day, in addition, if necessary, corticosteroids of high and medium activity were used. The evaluation of the effectiveness of the treatment was carried out in 6 weeks. It was found that in the main group, the amount of highly active corticosteroid used was significantly less than the absence of differences in the values of the SCORAD index and quality of life of patients.

In two studies, a comparative assessment of the effectiveness of two algorithms of external therapy was carried out: corticosteroid 2 times a day and corticosteroid in the morning + emollient in the evening. AW Lucky's study conducted in 2007 (n=25) used hydrocortisone (EL=2–), and F. Muzaffar (2002) used betamethasone valerate 0.1% (n=50); (EL = 2-). There was no statistical difference between the main and control groups in the clinical manifestations of plaque psoriasis in these two studies after 3 and 4 weeks, respectively, while the number of TCS used in the main group was 2 times less.

In Germany (MJ Cork, 2008), the effectiveness of four different algorithms for external therapy of TCS was studied:

- use of fluprenidine acetate (fluprenidine acetate) 2 times a day without emollients;

– corticosteroid – on the 1st and 3rd day, on the 2nd day – a softening agent;

- corticosteroid on the 1st and 4th day, on the 2nd and 3rd – a softening agent;

- corticosteroid on the 1st and 5th day, from the 2nd to the 4th day - a softening agent.

After 3 weeks, it was established that there was no significant difference in the clinical manifestations of plaque psoriasis in the groups, but the fourth group used 75% less hormone than the first.

Research by MJ. Cork (2003) identified an exemplary need for emollients in children with plaque psoriasis. It was shown that after treatment in 51 children with psoriasis, the use of emollients increased from 150 to 581 g/week. The experience of the Kharkiv Children's Allergological Center shows that most patients use emollients in insufficient quantities.

The guidelines recommend using large amounts of unscented emollients daily (up to 250-500 g per week). Emollients should be convenient to use so that they can be used anywhere. It is recommended to review the selection of emollients annually to ensure that the chosen combination is optimal. The problem of choosing clinically and economically effective emollients, as well as the study of their effect on the number and severity of psoriasis exacerbations, was highlighted as an urgent research issue - the evidence base on this issue was deemed insufficient.

Algorithm of external therapy

In recent years, many new ways and methods of treatment of plaque psoriasis have been proposed . However, external therapy occupies an important place in the complex treatment of this disease. Depending on the clinical picture of psoriasis and localization of skin lesions, external medicinal products are used in different medicinal forms (aqueous solutions, emulsions, lotions, aerosols, pastes, creams, ointments, etc.) and in different concentrations. When conducting external therapy and in order to avoid complications, it is necessary to follow a certain sequence of application of local drugs according to the development of the skin process.

1. In case of an acute inflammatory process with edema, lotions, aerosols, wet-drying bandages in the form of aqueous solutions (1-2% tannin, 0.25% silver nitrate, Burov's liquid, etc.) are used.

2. In the case of an acute inflammatory process without wetting, preference is given to emulsions, lotions, aerosols, water sprays, pastes, creams, which include naphthalan or corticosteroids.

3. With a subacute inflammatory process - creams, pastes, powders.

4. With a chronic non-specific inflammatory process - warming ointments, compresses.

5. With pronounced infiltration in foci of lichenization, cracks, fatty creams, ointments with keratolytic properties with tar, naphthalan, ichthyol in higher concentrations (5-10% and higher) are more effective.

6. In the regression stage of the skin process - ointments, balms and creams with biological additives and vitamins.

During the rehabilitation period, proper skin care is necessary (limitation of water procedures with washcloths, alkaline detergents), use of emollients, moisturizing agents with vitamins A, D, E, F, etc. in pharmacy form. Creams are used at all stages of the disease. Creams prepared according to the "oil in water" principle have a cooling, anti-inflammatory, surface-absorbing effect. Water-in-oil creams have a less pronounced cooling effect, but have a deeper "greasy" effect.

To reduce acute manifestations in the form of closed skin surfaces and crusts, lotions that dry and disinfect, for example, with chamomile infusion, are prescribed.

The paste contains the same amount of fat and powder. The presence of fat helps to soften scales and crusts and nourishes the skin.

Ointment contains one or more medicinal substances evenly mixed with an oily base. Ointments are prescribed for a chronic process accompanied by dryness, lichenization, infiltration in cases where an occlusive effect is required.

The gel leaves no visible traces of application. There is no effect of oily spots. Gels are used in cases where the skin does not tolerate fat.

When the scalp is damaged, lotions and emulsions are especially useful, and in its absence, creams or ointments (pastes are not used).

It is better to use creams or lotions (emulsions) on the skin of the face. It is not recommended to use ointments on areas with folds, especially axillary and inguinal-femoral. Preference should be given to other dosage forms. Naphthalene, tar, and ichthyol drugs are successfully used in the treatment of psoriasis patients. They are used in the form of pastes, ointments, creams in different concentrations depending on the stage of the disease and the clinical form of the disease (the more acute the inflammatory process, the lower the concentration of the drugs included in the dosage form should be). Naphthalan ointment has a softening, absorbent, anti-inflammatory, anti-pruritic effect on the skin, stimulates reparative processes. The healing properties of the oil depend on the hydrocarbons and resins contained in it. Naphthalene oil preparations are used for infiltration skin changes in the form of naphthalene ointment (mixture of 70 parts of refined oil, 18 parts of paraffin, 12 parts of petroleum jelly), liniment of naphthalene oil (10% liniment of refined naphthalene oil, zinc oxide and starch 5-10% of naphthalene paste) . The bandage is applied to the affected areas of the skin 1-2 times a day. Oil and its derivatives are contraindicated in wetting processes.

Tar is a product of dry distillation of various trees (pine, beech, juniper, birch) and coal. Tar preparations improve the blood supply of tissues, stimulate the regeneration of the epidermis, have an anti-inflammatory effect, promote the absorption of infiltrates, have antiseptic properties, affect skin receptors, and soothe itching. In its pure form, tar is rarely used for short-term applications, it is more often used in a concentration of 5-15% as part of a tar paste or ointment. The more acute the inflammatory process, the lower the tar concentration should be. When prescribing preparations containing tar, its photosensitizing effect and complications in patients with kidney diseases should be taken into account. In this regard, tar preparations are not applied to large areas of the skin.

ASD - Dorogov's antiseptic-stimulant (3rd fraction), made from animal tissues. It has an antiseptic effect, dissolving the infiltrate. The disadvantage of drugs

from ASD is a specific unpleasant smell. ASD is used in the form of a 2-5-10% paste, less often in the form of an ointment. Ichthyol contains 10.5% of bound sulfur, has an anti-inflammatory effect, accelerates the dissolution of infiltrates, reduces itching, prevents the development of pathogenic microflora. In the acute stage of the disease, external means with a low content of ichthyol should be used. In the case of a chronic course of the process with pronounced infiltration, pastes and ointments containing from 5 to 20% ichthyol are used.

The listed drugs have long been used for the treatment of patients with psoriasis, especially in hospital conditions. Their general disadvantage is an unpleasant smell and the fact that they stain clothes. The latter limits their use in ambulatory care. The effectiveness of plaque psoriasis depends on the correct choice of external means. However, even the most powerful drugs will not help if you do not follow diet therapy and other recommendations of a dermatologist.

Systemic antibacterial therapy is prescribed for widespread secondary infection of foci

Signs of a bacterial infection are:

- the appearance of serous-purulent crusts, pustules;
- enlarged painful lymph nodes;
- sudden deterioration of the patient's general condition.

Antibacterial drugs for external use

Antibacterial drugs for external use are used to treat localized forms of secondary infection.

Combined drugs for local use, containing glucocorticosteroids in combination with antibacterial, antiseptic, antifungal drugs, can be used in short courses (usually within 1 week) in the presence of signs of secondary skin infection.

Antimicrobial drugs for external use are applied to the affected areas of the skin 1-4 times a day for up to 2 weeks, taking into account clinical manifestations.

To prevent and eliminate secondary infection in places of cracks, especially in children, aniline dyes are used: fucorcin, 1-2% aqueous solution of methylene

blue (methylthioninium chloride). Frequency of application 1-2 times a day for 5-10 days.

Systemic antibacterial drugs

Indications for prescribing systemic antibacterial therapy:

- temperature increase;
- regional lymphadenitis;
- the presence of an immunodeficient state;
- the most common forms of secondary infection.

General principles of prescribing systemic antibacterial therapy:

Systemic antibacterial drugs are used to treat recurrent or widespread bacterial infections.

Before prescribing systemic antibacterial drugs, it is recommended to carry out a microbiological study to identify the causative agent and determine sensitivity to antibacterial drugs.

Penicillins protected by inhibitors, cephalosporins of the first or second generation, macrolides, etc. are used with high efficiency.

The duration of systemic antibacterial therapy is 7-10 days.

Maintenance therapy with systemic antibacterial drugs is inadmissible due to the risk of developing resistance of microorganisms to antibacterial drugs.

Systemic antiviral drugs

One of the severe and life-threatening complications of psoriasis is the development of Kaposi's eczema herpeticum when the skin is infected with herpes simplex virus type I, which requires the appointment of systemic antiviral therapy with acyclovir or other antiviral drugs.

Peculiarities of therapy with systemic antiviral drugs in children

For the treatment of Kaposi's eczema herpeticum in children, it is recommended to prescribe a systemic antiviral drug - acyclovir.

In the case of a diffuse process accompanied by general symptoms (increased body temperature, symptoms of severe poisoning), hospitalization of the child in a hospital with a boxed ward is necessary. Intravenous administration of acyclovir is

recommended in hospitals. External therapy consists in the use of antiseptics (fucorcin, 1% aqueous solution of methylene blue, etc.).

In case of damage to the eyes, it is recommended to use eye ointment with acyclovir, which is placed in the lower conjunctival sac 5 times a day. Treatment is continued for at least 3 days after symptoms disappear.

Doses and regimens of acyclovir for children			
International non-proprietary name	**Oral use**	**Intravenous administration**	**Time of use**
Acyclovir	200 mg 5 times a day for children older than 2 years, 100 mg 5 times a day for children younger than 2 years	5-10 mg per kg of body weight per day every 8 hours	within 10 days

Measures to prevent secondary infection:

- avoid long-term use of antibacterial drugs for external use to avoid the development of bacterial resistance;
- avoid contamination of drugs for external use:
- tubes with ointments cannot be kept open;
- when applying creams, it is necessary to follow hygienic procedures - use clean sponges, remove cream residues from the surface of the jar.

Requirements for treatment results

- clinical remission of the disease;
- restoration of lost working capacity;
- to improve the quality of life of patients with plaque psoriasis.

1.3. The relevance of using components of plant origin in the therapy of

dermatological diseases

Medicinal plants have been traditionally used for centuries to treat wounds and skin diseases of mankind. Skin conditions are one of the most common reasons people visit dermatologists. The requirements for the treatment and prevention of these diseases are quite broad, because a number of factors can be involved in the pathological process, including a wide range of bacteria, including those that are resistant to antibiotics.

Medicinal plants are one of the most important sources of natural products [3]. From ancient times to this day, medicinal plants are used for treatment in most countries of the world [4]. The development of modern medicine is based on the practice of herbal traditional medicine, centuries-old beliefs and observations [5].

Plants have developed a complex defense system consisting of a diverse set of chemicals. It has long been recognized that the presence of antimicrobial compounds in plant tissues is an important factor as natural products and can be used as plant pesticides or bactericidal and fungicidal agents active against human pathogens [6].

Plants, one of the most important sources of new pharmacologically active compounds that enter pharmaceutical products during the manufacture of drugs, have a long history of treating various diseases. To date, there are between 35,000 and 70,000 species of plants that have been tested for medicinal use. Plants with ethnopharmacological uses were the primary sources of drugs for the early discovery of drugs associated with their original ethnopharmacological purpose. Today, the search for medicines obtained from plants is based on their bioactivity.

Plants in general are rich in antioxidants, which are crucial for their survival in the environment. These antioxidants are often associated with reduced health risks that contribute to the development of diseases such as diabetes. Traditional plant-based medicines are still common because plants are often inexpensive to prepare, effective, and their use for common ailments results in minimal complications. Thus, plant extracts have become an invaluable source of compounds promising for the development of new drugs.

When using compounds of plant origin, especially extracts, it is important to consider that the results of their action may vary depending on the type of extract and the extraction method used [41, 42], as well as the amount of active components in the plant material. A number of environmental factors can affect the number of active components in plant material [43]. It is also necessary to take into account the difference between plant parts used for their production and between plant subspecies [44, 45].

As the demand for drugs for the population increases and the number of different diseases increases, researchers continue to search for sources of new and more effective drugs. Medicinal plants are one of the priority directions for the search for natural products for the pharmaceutical industry.

Herbal therapy for skin diseases has been used for thousands of years. Specific plants and methods of their use were developed at the regional level based on local plants and through trade in ethnobotanicals. Herb use systems have developed regionally in Europe, the Middle East (Ghazanfar 1994), Africa, India (Behl and Srivastava 2002), China, Japan, Australia, and the Americas.

Two well-known systems still in use are Ayurvedic plants in India (Kapoor 1990) and plant combinations developed as part of Traditional Chinese Medicine (TCM) in China (Xu 2004).). In Europe and the US, the use of pure plants declined as purified extracts and synthetic chemicals became available.

In Western medicine, treatment with medicinal plants began as folk medicine. In the United States, it began in colonial times when domestic plants were used by women in the home (Winslow and Kroll 1998). Native American use of medicinal plants also greatly influenced the use of medicinal herbs in the United States. The medicinal botanicals of the Iroquois in the northeastern United States became well known to colonists (Herrick 1995). In the nineteenth century, these Old World European and Native American traditions were expanded and used by a group of physicians known as "eclectics." As herbal medicine continued to develop in the United States, it was further influenced by European and Chinese practices (Winston and Dattner 1999).

Over the past two decades, herbal therapy has grown in popularity among patients seeking alternative treatments to traditional Western allopathic medicine. Therefore, in recent years there has been a revival of the use of both medicinal plants and drugs based on them for the following reasons: the side effects of chemical drugs became apparent, the call to return to nature sounded, natural remedies became part of the green revolution, and there was a return to organic products.

Means based on medicinal plant raw materials (MRP), including for the treatment of skin diseases, are now gaining popularity among patients and among doctors. In Asia, especially China and India, medicinal herbs that have been used for centuries are now being studied scientifically.

LRS and products based on it are used to treat the most common dermatological diseases.

Conclusions to section 1

1. Psoriasis is one of the most common and serious skin diseases. Despite the huge progress achieved in this field in recent years, the treatment of psoriasis is a rather complex problem and requires the joint work of the doctor, the patient and his family members.
2. Psoriasis is a chronic, genetically determined inflammation of the skin, characterized by a typical clinical picture. The leading clinical symptom of psoriasis, which occurs in all age groups, is itching of the skin. Approximately 2% of the population suffers from psoriasis, which is a major public health problem worldwide. Patients with psoriasis often have comorbidities and are at higher risk for depression and suicide.
3. Nowadays, consumers are increasingly interested in medicines containing products of natural origin. Experimental studies have also demonstrated the benefits of plant extracts and oils, such as antioxidant capacity, tyrosinase inhibition, and antimicrobial activity, which may be beneficial in alleviating and preventing a variety of skin conditions.

SECTION 2
RESEARCH OBJECTS AND METHODS

The development of the composition and technology of extemporaneous ointment is based on technological and physicochemical research.

When developing the composition of the medicinal product, the following selected ingredients were used: calendula oil, chamomile oil. To prepare the emulsion base, it was suggested to use vegetable fatty oil - almond. **Olivoil Emulsifier** was chosen as an emulsifier . The selected components met the requirements of the regulatory documentation in terms of qualitative and quantitative indicators.

2.1. Research objects

Almond oil (lat. Oleum Amygdalarum), Amygdalae oleum virginum (PhEur), Almond oil (BP, USP-NF, CAS No. 8007-69-0); syn.: bitter almond oil – fatty oil consisting mainly of glycerides of linoleic and palmitic acids. PhEur 2005 describes almond oil obtained by cold pressing the ripe seeds of two varieties of common almonds (sweet and bitter) - Amygdalus communis L., var dulcis DC and Amygdalus communis L., var amara DC or their mixtures. If necessary, add a suitable antioxidant. USP 23 describes the selected oil as a product obtained by pressing the seeds of Prunus amygdalus Batsch (sub Rosaceae).

Almond oil is a transparent, oily liquid, colorless or pale yellow in color, odorless, with a pleasant oily (nutty) taste; does not dry in the air; does not solidify at a temperature of -10 °C, but remains transparent and liquid. Properties of almond oil: melting point - 320 °C, melting point - 18 °C, density - 0.910-0.915 g/cm ^{3}, acid number - no more than 2.0, iodine number - 95-105, saponification number - 190-200. Almond oil is mixed with chloroform and ether; soluble in anhydrous alcohol.

The oil is used as a solvent: in pediatrics (gentle laxative in the form of an emulsion), for the production of solutions and suspensions (for subcutaneous and intramuscular injections), in the production of nasal sprays, in preparations for local

skin application. The oil is sterilized at 150 °C for 1 hour. It is a stable product and does not become bitter for a long time. Store in well-closed containers in a cool, dry, light-protected place.

Calendula oil (Oleum Calendulae) is obtained by the method of extraction from the flowers of calendula (Calendula officinalis), family Asteraceae. It is an oil extract of flower baskets and marginal flowers. Appearance: golden-yellow to greenish liquid (the longer the oil is stored, the more orange it acquires).

Calendula oil contains isoprene compounds (mono-, sesqui-, di-, tri-, tetraterpenoids). Among monoterpene compounds, bicyclic ones prevail: camphene, borneol, camphor. Triterpene alcohols, represented by monools, diols and triols, which are mainly esterified with lauric, palmitic, myristic and acetic acids; monools: α-amyrin, ψ-taraxasterol (heterolupeol), taraxasterol, β-amyrin, lupeol. It also contains triterpenoids, carotenoids, flavonoids, essential oil, phenolic acids, sterols and bitter-tasting sequiterpene lactones (calendin).

Chamomile oil has a light yellow color and a light aroma of the flower itself - grassy-sweet with a fruity aftertaste.

Chamomile oil is obtained by extraction with fatty vegetable oil from flower baskets containing flavonoids, glycosides, organic acids, vitamins (B1 , B2 , carotene), bitterness, triterpene alcohols, fatty oil, choline, phytosterol, coumarins, macro- and microelements 8% essential oil of blue color (the main component of which is hamazulene). Essential oil (chamomile oil) is extracted from the inflorescences of this plant, which is widely used in pharmacy and cosmetology. In its composition, the most valuable substance is hamazulene, which has anti-inflammatory, sedative and anesthetic properties. Hamazulene ($C_{14}H_{16}$) is a thick blue liquid, is the most valuable substance and is 6%.

Olivoil Emulsifier – solid wax tiles that dissolve in the hot fatty phase, help to stabilize the viscosity and consistency of the drug. This emulsifier is created exclusively on the basis of natural substances, it is perfectly combined with multi-component prescriptions of creams and lotions. The composition of "Olivoil Emulsifier" includes synthetic fatty acids contained in olive oil and

hydrolyzed wheat proteins. Permissible dosage is 2-10%. The country of manufacture is Italy.

Properties of the Olivoil Emulsifier emulsifier

- Does not contain harmful synthetic elements;
- Allows to create stable cream bases;
- Does not harm the hydrolipid balance of the epidermis;
- Softens the skin and gives it silkiness;
- Stable at high temperatures;
- Eliminates minor wrinkles.

2.2 . Research methods

WITH review on the main ones requirements given _ in articles " Soft medical means made _ in pharmacies » [9, 28] for research stability chosen ones ointments of their compositions are used parameters description and with stability. Evaluated external appearance ointment , her color , smell and homogeneity _

Samples of ointment and pharmacy were studied production assigned for skin application _ Therefore , except articles " Soft medical means made _ in pharmacies » they should answer requirements general article and " Soft LZ for skin application ".

But in _ process research ointment was determined their stability during storage.

To determine the colloidal stability and quality of the ointment, the stratification method using centrifugation was used. Determination method: 5 g of ointment from each sample is placed in test tubes, transferred to a centrifuge holder. After 10 minutes (centrifuge rotation speed - 500 rpm), the contents of the test tubes are checked for delamination. In the case of dividing the samples into separate components, measure the height of the stratified fractions and describe their appearance. The test tubes are again placed in the centrifuge and after 10 minutes (centrifuge rotation speed – 1000 rpm) the same measurements and determinations

as in the first stage are carried out. Then only the number of revolutions is increased. 2000, 3000 rpm and so on until delamination occurs in all samples taken. Based on the results of this study, conclusions are drawn about the comparative stability or instability of ointments.

Determination of thermal stability is based on the separation of the emulsion system into oil and water phases when the temperature increases. The research was conducted according to the following methodology

The method of determining thermal stability: put 10 ml of ointment samples into the test tubes, cover with lids and place in a thermostat (temperature 40-42°C) for 1 week. After a week, the samples are placed in the refrigerator (temperature 10-12°C) also for 1 week. After that, the samples are kept for 3 days at room temperature.

Stability is determined visually by the presence or absence of delamination in the samples. The emulsion system is considered stable if, after thermostating, no water phase is observed in the samples, the separation of the oil phase layer is allowed no more than 0.5 cm.

Determination of the pH of the ointment is carried out in order to control the condition of the components of the product during the storage of the drug. A significant change in pH can indicate a change in their physical and chemical state. To determine the pH of the product, pour 50 ml of purified water (temperature 50-60 °C) and shake for 30 minutes. The resulting extract is filtered and potentiometric titration is carried out according to the DFU method [4, 5, 6].

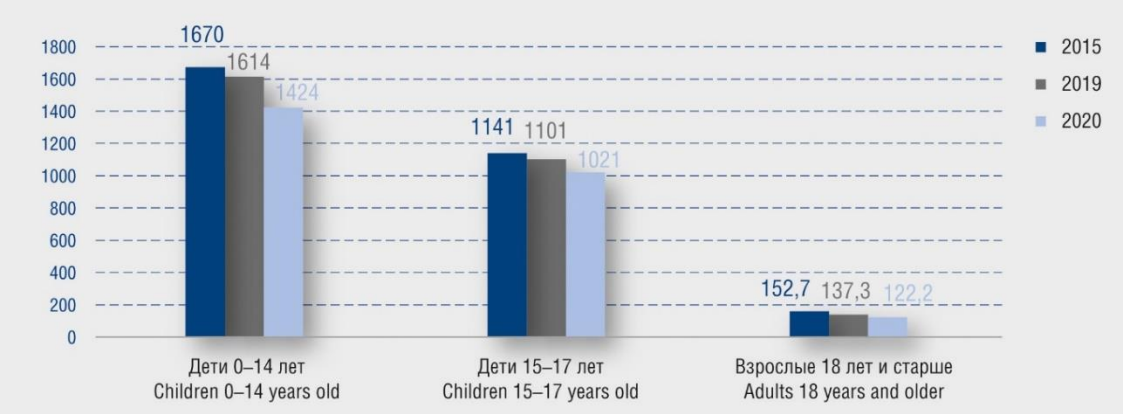
Conclusions to section 2

1. The research objects that were used in the development of the composition of the ointment are identified, and their characteristics are given.

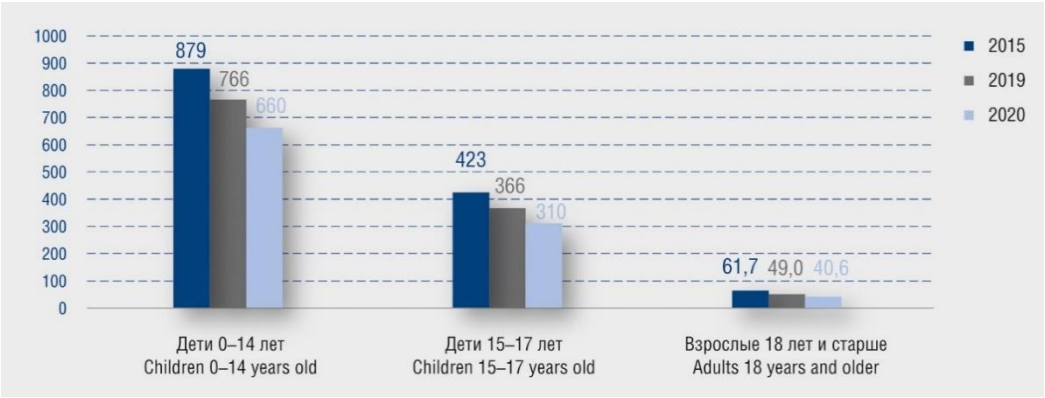
2. Methods of experimental research are chosen, which allow to obtain complete and reliable results.

SECTION 3.
JUSTIFICATION OINTMENT COMPOSITION AND TECHNOLOGY FOR THE TREATMENT OF PSORIASIS

3.1. **Psoriasis incidence statistics in the world**



Prevalence of psoriasis in different age groups of the population (per 100,000 of the relevant population), 2015, 2019 and 2020.



Incidence of psoriasis in different age groups of the population (per 100,000 of the relevant population), 2015, 2019 and 2020.

Prevalence and incidence of psoriasis (per 100,000 population), 2015–2020.

Recidivism rate (statistics from Ukraine)

The frequency of relapses is less than once a year (once every few years) in 11 (9.8%) patients, once a year in 54 (48.2%) patients, several times (two, three times) a year. in 37 (33.1%) patients. Continuously relapsing course of the disease was observed in 10 (8.9%) patients.

Impact of plaque psoriasis on life:

- 43% of patients react painfully to touch and are ashamed of their body; - 85% of patients are ashamed of their appearance;

- many patients were mocked because of their appearance;

- the disease affects the relationship with a sexual partner:

- for some patients, psoriasis prevented them from making friends.

- during the year, patients are forced to take sick leave due to an exacerbation for an average of 2.5 days;

- for every sixth adult patient, plaque psoriasis creates serious obstacles to career growth;

- every tenth adult experiences discrimination at the workplace;

- 36% of patients over the age of 14 say that psoriasis interferes with their concentration.

Many people who suffer from this disease are confused by the appearance of their skin, constant itching and continuous, sometimes involuntary combing. In fact, plaque psoriasis is not a life-threatening disease, but, undoubtedly, this disease greatly impairs the quality of a person's life.

3.2. Justification of the choice of the main and auxiliary components of the ointment, taking into account its purpose

The use of plants for medicinal purposes is as old as mankind, and the coming years are likely to see the continued introduction of new products containing natural oils and extracts to the market. Before the use of synthetic substances with similar properties, plants were the main source of all means for treatment [7]. Molecules of natural plants are still interesting for new research. However, the use of extracts requires special attention to extraction methods, the ratio of plant material and solvent, and the content of active ingredients [8].

In addition, the use of plant products (extracts and oils) in dermatological products is emphasized by the prescriptions of doctors and the consumer demand of patients who are increasingly concerned about purchasing environmentally friendly products [9]. However, consumers often do not realize the fact that natural products are a complex mixture of many chemical compounds, which, unfortunately, can be the cause of the development of adverse reactions. To overcome this potential problem, researchers need to chemically characterize plant-derived components by composition. Furthermore, the in vitro cytotoxic potential of such compounds can be determined in several human cell lines before screening in humans can be

performed. These procedures can be an asset in ensuring the safety of consumers who prefer to use natural products and therefore the acceptability of the product being sold.

We were asked to include such components in the composition of the ointment so that it could be prescribed for most types of dermatitis.

Almond oil is very popular and often used in various studies. Especially in those related to the skin. This is due to the fact that this oil has been used for centuries to treat various skin diseases, such as dermatitis, psoriasis and eczema.

Research shows that oleic acid (omega-9), which is predominant in almond oil, acts as a penetration enhancer for other compounds that are injected with the oil. Quality almond oil is a rich source of vitamin E (tocopherol), a powerful antioxidant. Thanks to vitamin E, almond oil improves the condition of the barrier functions of the skin, helps to reduce inflammation and even enhances the own synthesis of ceramides in the skin, helps to eliminate inflammation on the skin. Vitamin F ensures the proper functioning of the sebaceous glands; retinol restores skin tone, increases the formation of epithelial cells; ascorbic acid improves the regeneration of the epidermis; fatty acids nourish the cells, soften the skin and retain moisture in the intercellular spaces. Almond oil exhibits anti-inflammatory, rejuvenating, softening, nourishing, moisturizing, anti-burn, pain-relieving properties, helps to eliminate inflammation on the skin. Vitamin F ensures the proper functioning of the sebaceous glands; retinol restores skin tone, increases the formation of epithelial cells; ascorbic acid improves the regeneration of the epidermis; fatty acids nourish the cells, soften the skin and retain moisture in the intercellular spaces. Almond oil exhibits anti-inflammatory, rejuvenating, softening, nourishing, moisturizing, anti-burn, pain-relieving properties. Almond oil for the face is perfectly distributed, absorbed into the skin, because it has a large amount of oleic acid.

Medicinal products containing calendula oil help to normalize metabolic processes and reduce secretions from the sebaceous glands, effectively narrow pores, and relieve inflammation. And with deep penetration into the layers of the dermis, the substance reduces the possibility of acne and blackheads. The oil is also

a great remedy for dry skin. It soothes, nourishes irritated and sensitive cells of the epidermis, helps eliminate peeling and redness. In addition, it is an excellent moisturizing and emollient component that stimulates the healing of small wounds.

Chamomile oil has a strong bactericidal, anti-inflammatory and soothing effect, and also stimulates blood circulation. These properties have made chamomile an indispensable tool in the treatment of various inflammatory processes, ranging from skin irritation to eczema. In addition, chamomile intensively nourishes and moisturizes the skin, softens the skin, treats acne and acne, whitens the skin and fights pigmentation, stimulates skin regeneration.

As for the amount of each specified component, they were chosen based on literature data (Table 3.1).

Table 3.1.

The composition of the oil phase of the ointment being developed

Component	The amount in the composition of the ointment	
	%	
Almond oil	5	
Calendula oil	5	
Chamomile oil	5	
The total mass of the oil phase	*15*	

The Olivoil Emulsifier emulsifier was chosen for the creation of the emulsion system, which is easily emulsified, has the unique property of creating emulsions with a high degree of absorption even with a large % of fat phase. Olivoil Emulsifier is a completely vegetable component of Italian production, the basis of which is wheat germ oil.

Purified water was used as the aqueous phase of the emulsion base.

It was necessary to determine in what quantity it is necessary to use the selected emulsifier in order to obtain a stable emulsion system.

For this, the following samples of ointments with different emulsifier content were prepared and tested, taking into account that the minimum recommended concentration is 2% of the total weight of the ointment, and the maximum is 10% (Table 3.2).

Table 3.2.

Compositions of ointment samples with different contents of the Olivoil Emulsifier emulsifier

Ointment component	%	Warehouse no				
		1	2	3	4	5
Almond oil	5	2.5				
Clove oil (marigolds)	5	2.5				
Chamomile oil	5	2.5				
Olivoil Emulsifier	***2-10%***	***1.0 (2%)***	***2.0 (4%)***	***3.0 (6%)***	***4.0 (8%)***	***5.0 (10%)***
Purified water		36.5 ml	35.5 ml	34.5 ml	33.5 ml	32.5 ml
The total weight of the ointment	*100*	*50.0*	*50.0*	*50.0*	*50.0*	*50.0*

Samples of composition ointments were prepared taking into account the physicochemical properties of the components. The composition of the ointment includes substances with different physicochemical properties, which determine the method of their introduction:

- the selected oils - almond, evening primrose and chamomile - mix well, so a mixture of vegetable fatty oils was prepared;
- emulsifier of the first kind, Olivoil Emulsifier, according to the literature, must be introduced into the oil phase, so it was added to the mixture of fatty oils (almond, nigella, and chamomile),

controlling the temperature of the mixture. The optimal input temperature of the selected emulsifier is about 60°C.

The technology of samples of ointments with different contents of the Olivoil Emulsifier emulsifier is shown in table 3.2.

Table 3.2.

Technology of ointment samples with different content of Olivoil Emulsifier emulsifier

Stage I. Preparation of the oil phase.	Oils are poured into a porcelain cup - almond, evening primrose, and chamomile. The mixture of oils is heated in a water bath, controlling the temperature with a thermometer. At a temperature of 60°C, add the calculated amount of Olivoil Emulsifier, heat until the emulsifier completely melts to obtain a transparent mixture.
Stage II. Preparation of the aqueous phase.	The calculated amount of purified water is measured into a heat-resistant stand using a measuring cylinder, and heated to a temperature of 50-60°C.
Stage III. Mixing of oil and water phase.	The mixture of vegetable oils and Olivoil Emulsifier is transferred to a mortar that has been preheated in a water bath. Warm purified water is quickly added, thoroughly mixed (emulsified) until completely cooled and a homogeneous white mass is obtained.

The obtained samples of ointments are transferred to jars for release and used for further research.

Samples of ointments were studied according to the indicators according to the methods described in chapter 2: appearance, color, smell, ease of application, pH, thermal stability, colloidal stability.

The data of research results are given in tables 3.3, 3.4, 3.5, 3.6 and 3.7.

Table 3.3.

Organoleptic quality indicators of sample No. 1 with emulsifier content 2%

Indicator	**Expiration date**			
	after preparation	**1 day**	**2 days**	**3 days**
1	**2**	**3**	**4**	**5**
Color	White with a yellow tint	White with a yellow tint	White with a yellow tint	White with a yellow tint
Scent	Light smell of vegetable oils	Light smell of vegetable oils	Light smell of vegetable oils	Light smell of vegetable oils
Homogeneity	A homogeneous mass	The mass is heterogeneous, there is delamination and the release of oil drops on the surface	The mass is heterogeneous, there is delamination and the release of oil drops on the surface	The mass is heterogeneous, there is delamination and the release of oil drops on the surface
pH	6.9	No determination was made	No determination was made	No determination was made

Note. The table shows the data of three studies.

From these tables, it can be seen that sample 1, 1 day after preparation, becomes stratified with the release of drops of oil on the surface of the ointment mass, so pH was not determined in it and it was excluded from further research.

Table 3.4.

Organoleptic quality indicators of sample No. 2 with emulsifier content 4%

Indicator	Expiration date			
	after preparation	1 day	2 days	3 days
1	2	3	4	5
Color	White with a yellow tint	White with a yellow tint	White with a yellow tint	White with a yellow tint
Scent	Light smell of vegetable oils	Light smell of vegetable oils	Light smell of vegetable oils	Light smell of vegetable oils
Homogeneity	A homogeneous mass	A homogeneous mass	The mass is heterogeneous, there is delamination and the release of oil drops on the surface	The mass is heterogeneous, there is delamination and the release of oil drops on the surface
pH	6.8	6,7	No determination was made	No determination was made

Note. The table shows the data of three studies.

Table 3.5.

Organoleptic quality indicators of sample No. 3 with emulsifier content 6%

Indicator	Expiration date			
	after preparation	1 day	2 days	3 days
1	2	3	4	5
Color	White with a yellow tint	White with a yellow tint	White with a yellow tint	White with a yellow tint

Scent	Light smell of vegetable oils	Light smell of vegetable oils	Light smell of vegetable oils	Light smell of vegetable oils
Homogeneity	A homogeneous mass	A homogeneous mass	The mass is heterogeneous, stratification is observed	The mass is heterogeneous, stratification is observed
pH	6.9	6.8	No determination was made	No determination was made

Note. The table shows the data of three studies.

In samples No. 2 and No. 3, signs of delamination were observed after 2 days of observation, therefore pH was not determined in them either and they were excluded from further research.

Table 3.6.

Organoleptic quality indicators of sample No. 4 with an emulsifier content of 8%

Indicator	**Expiration date**			
	after preparation	**1 day**	**2 days**	**3 days**
1	**2**	**3**	**4**	**5**
Color	White with a yellow tint	White with a yellow tint	White with a yellow tint	White with a yellow tint
Scent	Light smell of vegetable oils	Light smell of vegetable oils	Light smell of vegetable oils	Light smell of vegetable oils
Homogeneity	A homogeneous mass	A homogeneous mass	A homogeneous mass	A homogeneous mass
pH	6.9	6.8	6.8	6.6

Note. The table shows the data of three studies.

Table 3.7.

Organoleptic quality indicators of sample No. 5 with emulsifier content 10%

Indicator	**Expiration date**			
	after preparation	**1 day**	**2 days**	**3 days**
1	**2**	**3**	**4**	**5**
Color	White with a yellow tint	White with a yellow tint	White with a yellow tint	White with a yellow tint
Scent	Light smell of vegetable oils	Light smell of vegetable oils	Light smell of vegetable oils	Light smell of vegetable oils
Homogeneity	A homogeneous mass	A homogeneous mass	A homogeneous mass	A homogeneous mass
pH	6.8	6.8	6,7	6,7

Note. The table shows the data of three studies.

Samples No. 4 and No. 5 remained stable during 3 days of observation. Therefore, they were stored in yellow-hot glass jars with lids at refrigerator temperature.

The selected samples No. 4 and No. 5 were studied according to the indicators according to the methods outlined in section 2: appearance, color, smell, ease of application, pH, thermal stability, colloidal stability.

3.2. Study of the stability of ointment samples during storage

According to the requirements of the DFU, ointments made extemporaneously should be stored in a cool place protected from light in well-closed jars, because at high and low temperatures, emulsion ointments can delaminate.

During 1 month, the organoleptic indicators of the quality of the selected samples and their stability were studied. The pH indicator was also determined (Table 3.8).

Table 3.8.

Quality indicators of the researched samples of ointments (storage period – 30 days)

Indicator	**Expiration date**			
	after cooking	**10 days**	**20 days**	**30 days**
1	**2**	**3**	**4**	**5**
Sample 4				
Color	White with a yellow tint	White with a yellow tint	White with a yellow tint	White with a yellow tint
Scent	Light smell of vegetable oils	Light smell of vegetable oils	Light smell of vegetable oils	Light smell of vegetable oils
Homogeneity	A homogeneous mass	A homogeneous mass	A homogeneous mass	The mass is heterogeneous, there is slight delamination
pH	6.9	6,7	6.4	No determination was made

1	2	3	4	5
Sample 5				
Color	White with a yellow tint	White with a yellow tint	White with a yellow tint	White with a yellow tint
Scent	Light smell of vegetable oils	Light smell of vegetable oils	Light smell of vegetable oils	Light smell of vegetable oils
Homogeneity	A homogeneous mass	A homogeneous mass	A homogeneous mass	A homogeneous mass
pH	6.8	6,7	6,7	6.5

Note. The table shows the data of three studies.

The results of the research are shown in Table 3.8, from which it can be seen that in sample No. 4 with an emulsifier content of 4%, it remained stable during 20 days of storage. After 30 days, signs of delamination were observed in this sample, therefore pH was not determined at the end of the research.

Sample No. 5 with emulsifier content - 10% remained stable throughout the observation period - 30 days. No visual changes were observed in it, the pH value did not change significantly, which allows us to conclude that the components of the ointment remain stable.

Thus, on the basis of the conducted research, the following composition of emulsion ointment with plant components was chosen for use in the therapy of dermatological diseases, in particular, plaque psoriasis (Table 3.9).

Table 3.9.

Ointment component	%	Composition No. 5

Almond oil	5	2.5
Calendula oil	5	2.5
Chamomile oil	5	2.5
Lanol P	***10%***	***5.0***
Purified water		37.5 ml
The total weight of the ointment	*100*	*50.0*

Conclusions to chapter 3

1. Reasonable choice of active components of the ointment, taking into account its use.

2. Experimentally selected concentration of plant-based emulsifier Olivoil Emulsifier. It is 10%.

3. Proven stability of the ointment during storage at refrigerator temperature for 30 days.

4. The proposed technology of extemporaneous ointment with plant components.

GENERAL CONCLUSIONS

1. An analysis of literature data on the etiology and pathogenesis of psoriasis was carried out. Existing classifications and modern approaches to the therapy of this disease are considered.

2. The relevance of components of plant origin for use in dermatology to ensure the complex effect of the drug for the treatment of psoriasis has been proven.

3. The choice of active and auxiliary components of the medicinal product is theoretically justified.

4. Extemporaneous ointment technology is proposed.

5. The stability of the ointment of the selected composition has been proven.

REFERENCES

1. Extemporaneous ointments: quality analysis according to modern requirements / L.P. Savchenko, K. A. Uminska, V. O. Vrakin, V. A. Georgiants. Pharmacy XXI century: trends and perspectives : Mat. VIII National Congress of pharmacists of Ukraine, Kharkiv, September 13-16, 2016. In 2 vols., T. 1., Kharkiv, NFaU Publishing House, 2016. P. 210.

2. The world of medicinal plants NSP: Illustrated reference book / under the editorship. P.V. Druzhynyna, A.F. Novikov; composition I. Turova. - M., 2010.

3. Savchenko L. P., Uminska K. A., Georgiants V. A. Use of the Headspace method for rapid analysis of extemporaneous ointment with tinctures of calendula and eucalyptus. Coll. of science works of cooperation NMAPO named after P. L. Shupyk . 2017. Issue 28. P. 115-122 .

4. Pharmacognosy. Medicinal raw materials of plant and animal origin: textbook / under the editorship. H.P. Yakovleva - St. Petersburg: SpetsLit, 2010.

5. Almeida, IF; Maleckova, J.; Saffi, R.; Monteiro, H.; Goios, F.; Amaral, MH; Costa, PC; Garrido, J.; Silva, P.; Pestana, N.; *et al.* Characterization of an antioxidant surfactant-free topical formulation containing *Castanea sativa* leaf extract. *Drug Dev. Ind. Pharm.* **2015** , *41* , 148–155. [**Google Scholar**] [**CrossRef**] [**PubMed**]

6. Alper A, Mesut G, Elif Mine K. Deep learning based skin cancer diagnosis. 2017 Jun 29 Presented at: 2017 25th Signal Processing and Communications Applications Conference (SIU); 15-18 May 2017; Antalya, Turkey. [CrossRef]

7. Alper B, Mehmet Emin Y, Hasan B, Abdullah Ç. Deep neural network based diagnosis system for melanoma skin cancer. 2017 Jun 29 Presented at: 2017 25th Signal Processing and Communications Applications Conference (SIU); 15-18 May 2017; Antalya, Turkey p. 2017. [CrossRef]

8. Amaral, LF; Moriel, P.; Foglio, MA; Mazzola, PG Caryocar brasiliense supercritical CO_2 extract possesses antimicrobial and antioxidant properties useful for personal care products. *BMC Complement Altern. Med.* **2014** , *14* . [**Google Scholar**] [**CrossRef**] [**PubMed**]

9. Anitha, T. Medicinal plants used in skin protection. *Asian J. Pharm. Clin. Res.* **2012** , *5* , 35–38. [**Google Scholar**]

10. Barreira, JC; Casal, S.; Ferreira, IC; Peres, AM; Pereira, JA; Oliveira, MB Chemical characterization of chestnut cultivars from three consecutive years: Chemometrics and contribution for authentication. *Food Chem. Toxicol.* **2012** , *50* , 2311–2317. [**Google Scholar**] [**CrossRef**] [**PubMed**]

11. Barros, L.; Carvalho, AM; Ferreira, IC Comparing the composition and bioactivity of crataegus monogyna flowers and fruits used in folk medicine. *Phytochem. Anal.* **2011** , *22* , 181–188. [**Google Scholar**] [**CrossRef**] [**PubMed**]

12. Barroso, MR; Barros, L.; Dueñas, M.; Carvalho, AM; Santos-Buelga, C.; Fernandes, IP; Barreiro, MF; Ferreira, ICFR Exploring the antioxidant potential of *Helichrysum stoechas* (L.) moench phenolic compounds for cosmetic applications: Chemical characterization, microencapsulation and incorporation into a moisturizer. *Ind. Crops Prod.* **2014** , *53* , 330–336. [**Google Scholar**] [**CrossRef**]

13. Brinker TJ, Hekler A, Utikal JS, Grabe N, Schadendorf D, Klode J, et al. Skin cancer classification using convolutional neural networks: systematic review. J Med Internet Res 2018 Oct 17;20(10):e11936. [CrossRef]

14. Esteva A, Kuprel B, Novoa RA, Ko J, Swetter SM, Blau HM, et al. Dermatologist-level classification of skin cancer with deep neural networks. Nature 2017 Jan 25;542(7639):115-118. [CrossRef]

15. *European Pharmacopoeia 8.0* , 8th ed.; EDQM—European Directorate for the Quality of Medicines & Healthcare (Council of Europe): Strasburg, France, 2014.

16. Fiume, MM; Bergfeld, WF; Belsito, DV; Hill, RA; Klaassen, CD; Liebler, DC; Shank, RC; Marks, JG, Jr.; Slaga, TJ; Slaga, TJ; *et al.* Safety assessment of *Vitis vinifera* (Grape)-derived ingredients as used in cosmetics. *Int. J. Toxicol.* **2014** , *33* , 48S–83S. [**Google Scholar**] [**CrossRef**] [**PubMed**]

17. Food and Drug Administration (FDA). *Frequency of Use of Cosmetic Ingredients* ; FDA: Washington, DC, USA, 2012.

18. Fowler, JF, Jr.; Woolery-Lloyd, H.; Waldorf, H.; Saini, R. Innovations in natural ingredients and their use in skin care. *J. Drugs Dermatol.* **2010** , *9* , s72–s81. [**Google Scholar**] [**PubMed**]

19. Fujisawa Y, Otomo Y, Ogata Y, Nakamura Y, Fujita R, Ishitsuka Y, et al. Deep-learning-based, computer-aided classifier developed with a small dataset of clinical images surpasses board-certified dermatologists in skin tumor diagnosis. Br J Dermatol 2019 Feb;180(2):373-381. [CrossRef] [Medline]

20. Haddouchi, F.; Chaouche, TM; Ksouri, R.; Medini, F.; Sekkal, FZ; Benmansour, A. Antioxidant activity profiling by spectrophotometric methods of aqueous methanolic extracts of *Helichrysum stoechas* subsp. *rupestre* and *Phagnalon saxatile* subsp. *saxatile* _ *Chin. J. Nat. Med.* **2014** , *12* , 415–422. [**Google Scholar**]

21. Haloui, E.; Marzouk, B.; Marzouk, Z.; Bouraoui, A.; Fenina, N. Hydroxytyrosol and oleuropein from olive leaves: Potent anti-inflammatory and analgesic activities. *J. Food Agric. Environ.* **2011** , *9* , 128–133. [**Google Scholar**]

22. Han SS, Kim MS, Lim W, Park GH, Park I, Chang SE. Classification of the clinical images for benign and malignant cutaneous tumors using a deep learning algorithm. Journal of Investigative Dermatology 2018 Jul;138(7):1529-1538. [CrossRef]

23. Haofu L, Jiebo L. A deep learning approach to universal skin disease classification. AI Magazine 2018 Sep 18:2015.

24. Haofu L, Yuncheng L, Jiebo L. Skin disease classification versus skin lesion characterization: achieving robust diagnosis using multi-label deep neural networks. 2017 Apr 24 Presented at: 2016 23rd International Conference on Pattern Recognition (ICPR); 4-8 Dec. 2016; Cancun, Mexico. [CrossRef]

25. Hara, T.; Matsui, H.; Shimizu, H. Suppression of microbial metabolic pathways inhibits the generation of the human body odor component diacetyl bystaphylococcus spp. *PLoS ONE* **2014** , *9* . [**Google Scholar**] [**CrossRef**] [**PubMed**]

26. Hashmi S. 'Coming of Age' of artificial intelligence: evolution of survivorship care through information technology. Bone Marrow Transplant 2015 Nov 9;51(1):41-42. [CrossRef]

27. Hollestein LM, Nijsten T. An insight into the global burden of skin diseases. Journal of Investigative Dermatology 2014 Jun;134(6):1499-1501. [CrossRef]

28. Iravani, S.; Zolfaghari, B. Pharmaceutical and nutraceutical effects of *Pinus pinaster* bark extract. *Res. Pharm. Sci.* **2011** , *6* , 1–11. [**Google Scholar**] [**PubMed**]

29. Jufeng Y, Xiaoxiao S, Jie L, Paul LR Clinical skin lesion diagnosis using representations inspired by dermatologist criteria. 2018 Dec 17 Presented at: JL, Clinical Skin Lesion Diagnosis using Representations Inspired by Dermatologist Criteria, in IEEE Conference on Computer Vision and Pattern Recognition; 2018; Salt Lake City, UT, USA. [CrossRef]

30. Karimkhani C, Dellavalle RP, Coffeng LE, Flohr C, Hay RJ, Langan SM, et al. Global skin disease morbidity and mortality: an update from the Global Burden of Disease study 2013. JAMA Dermatol 2017 May 01;153(5):406-412 [FREE Full text] [CrossRef] [Medline]

31. Keser, S.; Demir, E.; Yilmaz, O. Phytochemicals and antioxidant activity of the almond kernel (*Prunus dulcis* mill.) from Turkey. *J. Chem. Soc. Pak.* **2014** , *36* , 534–541. [**Google Scholar**]

32. Li CX, Shen CB, Xue K, Shen X, Jing Y, Wang ZY, et al. Artificial intelligence in dermatology: past, present, and future. Chin Med J (Engl) 2019 Sep 05;132(17):2017-2020 [FREE Full text] [CrossRef] [Medline]

33. Liu Y, Jain A, Eng C, Way DH, Lee K, Bui P, et al. A deep learning system for differential diagnosis of skin diseases. Nat Med 2020 May 18;26(6):900-908. [CrossRef]

34. Mapunya, MB; Nikolova, RV; Lall, N. Melanogenesis and anti-tyrosinase activity of selected south African plants. *Evid.-Based Complement. Alternat. Med.* **2012** , *2012* . [**Google Scholar**] [**CrossRef**] [**PubMed**]

35. Maqsood, S.; Benjakul, S. Comparative studies of four different phenolic compounds on *in vitro* antioxidant activity and the preventive effect on lipid oxidation of fish oil emulsion and fish mince. *Food Chem.* **2010** , *119* , 123–132. [**Google Scholar**] [**CrossRef**]

36. Marini, A.; Grether-Beck, S.; Jaenicke, T.; Weber, M.; Burki, C.; Formann, P.; Brenden, H.; Schonlau, F.; Krutmann, J. Pycnogenol ® effects on skin elasticity and hydration coincide with increased gene expressions of collagen type I and hyaluronic acid synthase in women. *Skin Pharmacol. Physiol.* **2012** , *25* , 86–92. [**Google Scholar**] [**CrossRef**] [**PubMed**]

37. Miralles, P.; Chisvert, A.; Salvador, A. Determination of hydroxytyrosol and tyrosol by liquid chromatography for the quality control of cosmetic products based on olive extracts. *J. Pharm. Biomed. Anal.* **2015** , *102* , 157–161. [**Google Scholar**] [**CrossRef**] [**PubMed**]

38. Mukul, S.; Surabhi, K.; Atul, N. Cosmeceuticals for the skin: An overview. *Asian J. Pharm. Clin. Res.* **2011** , *4* , 1–6. [**Google Scholar**]

39. Naylor CD. On the prospects for a (deep) learning health care system. JAMA 2018 Sep 18;320(11):1099. [CrossRef]

40. Pal A, Garain U, Chandra A, Chatterjee R, Senapati S. Psoriasis skin biopsy image segmentation using deep convolutional neural network. Computer Methods and Programs in Biomedicine 2018 Jun;159:59-69. [CrossRef]

41. Pangti R, Mathur J, Chouhan V, Kumar S, Rajput L, Shah S, et al. A machine learning-based, decision support, mobile phone application for diagnosis of common dermatological diseases. J Eur Acad Dermatol Venereol 2020 Nov 12;35(2):536-545. [CrossRef]

42. Pérez-Bonilla, M.; Salido, S.; van Beek, TA; Altarejos, J. Radical-scavenging compounds from olive tree (*Olea europaea* L.) wood. *J. Agric. Food Chem.* **2013** , *62* , 144–151. [**Google Scholar**] [**CrossRef**] [**PubMed**]

43. Ponomarenko, J.; Trouillas, P.; Martin, N.; Dizhbite, T.; Krasilnikova, J.; Telysheva, G. Elucidation of antioxidant properties of wood bark derived saturated diarylheptanoids: A comprehensive (DFT-supported) understanding. *Phytochemistry* **2014** , *103* , 178–187. [**Google Scholar**] [**CrossRef**] [**PubMed**]

44. Rains, JL; Jain, SK Oxidative stress, insulin signaling, and diabetes. *Free Radic. Biol. Med.* **2011** , *50* , 567–575. [**Google Scholar**] [**CrossRef**] [**PubMed**]

45. Rao, HJ Therapeutic applications of almonds (*Prunus amygdalus* L.): A review. *J. Clin. Diagn. Res.* **2012** , *6* , 130–135. [**Google Scholar**]

46. Ren S, He K, Girshick R, Sun J. Faster R-CNN: towards real-time object detection with region proposal networks. IEEE Trans Pattern Anal Mach Intell 2017 Jun 1;39(6):1137-1149. [CrossRef] [Medline]

47. Ross G, Jeff D, Trevor D, Jitendra M. Rich feature hierarchies for accurate object detection and semantic segmentation. : IEEE; 2014 Sep 25 Presented at: 2014 IEEE Conference on Computer Vision and Pattern Recognition; Columbus, OH, USA; 23-28 June 2014 p. 2014. [CrossRef]

48. Ross G. Fast R-CNN, in Proceedings of the IEEE International Conference on Computer Vision. 2015 Sep 07 Presented at: 2015 IEEE International Conference on Computer Vision (ICCV); December 7-13, 2015; Santiago p. 1440-1448. [CrossRef]

49. Shalizar Jalali, A.; Hasanzadeh, S. Crataegus monogyna fruit aqueous extract as a protective agent against doxorubicin-induced reproductive toxicity in male rats. *Avicenna J. Phytomed.* **2013** , *3* , 159–170. [**Google Scholar**] [**PubMed**]

50. Sies K, Winkler JK, Fink C, Bardehle F, Toberer F, Buhl T, et al. Past and present of computer-assisted dermoscopic diagnosis: performance of a conventional image analyzer versus a convolutional neural network in a prospective data set of 1,981 skin lesions. European Journal of Cancer 2020 Aug;135:39-46. [CrossRef]

51. Sun X, Yang J, Sun M, Wang K. A benchmark for automatic visual classification of clinical skin disease images, in European Conference on Computer Vision. 2016 Sep 17 Presented at: European Conference on Computer Vision; October 8-16, 2016; Amsterdam p. 2016. [CrossRef]

52. Tschandl P, Kittler H, Argenziano G. A pretrained neural network shows similar diagnostic accuracy to medical students in categorizing dermatoscopic images after comparable training conditions. Br J Dermatol 2017 Jul 19;177(3):867-869. [CrossRef]

53. Tschandl P, Rinner C, Apalla Z, Argenziano G, Codella N, Halpern A, et al. Human–computer collaboration for skin cancer recognition. Nat Med 2020 Jun 22;26(8):1229-1234. [CrossRef]

54. Wang, S.; Liu, X.-M.; Zhang, J.; Zhang, Y.-Q. An efficient preparation of mulberroside a from the branch bark of mulberry and its effect on the inhibition of tyrosinase activity. *PLoS ONE* **2014** , *9* . [**Google Scholar**] [**CrossRef**] [**PubMed**]

55. Xiaoxiao S, Jufeng Y, Ming S, Kai W. A benchmark for automatic visual classification of clinical skin disease images. 2016 Sep 17 Presented at: European Conference on Computer Vision; October 11-14, 2016; Amsterdam, The Netherlands. [CrossRef]

Ф А 2.2.1–32-366

National University of Pharmacy

Faculty for foreign citizens' education
Department Technology of Drugs

Level of higher education master

Specialty 226 Pharmacy, industrial pharmacy
Educational program Pharmacy

APPROVED
The Head of Department
Technology of Drugs
_Tatyana YARNYKH
"_28_" _September_ 2022

ASSIGNMENT
FOR QUALIFICATION WORK
OF AN APPLICANT FOR HIGHER EDUCATION

Iman TALHI

1. Topic of qualification work: « Development of composition and technology of ointment for the treatment of psoriasis », supervisor of qualification work: Marina BURYAK, PhD, assoc. prof.,

approved by order of NUPh from "6" of February 2023 № 35

2. Deadline for submission of qualification work by the applicant for higher education: April 2023.

3. Outgoing data for qualification work: development of the composition and technology of an extemporaneous ointment based on components of plant origin for use in dermatology.

4. Contents of the settlement and explanatory note (list of questions that need to be developed): analyze data from the literature on etiology, pathogenesis, classification and modern approaches to the treatment of dermatological diseases of various etiologies; to analyze data on the use of components of plant origin for use in dermatology to ensure a comprehensive effect; justify the choice of active and auxiliary substances of the medicinal product; on the basis of experimental studies, choose the technology of ointment with a well-grounded composition.

5. List of graphic material (with exact indication of the required drawings):
3 tables, 4 figures

6. Consultants of chapters of qualification work

Chapters	Name, SURNAME, position of consultant	Signature, date	
		assignment was issued	assignment was received
I Chapter	Marina BURYAK, assistant professor of higher education institution of department drug technology	28/09/2023	28/09/2023
II Chapter	Marina BURYAK, assistant professor of higher education institution of department drug technology	28/09/2023	28/09/2023
III Chapter	Marina BURYAK, assistant professor of higher education institution of department drug technology	28/09/2023	28/09/2023

7. Date of issue of the assignment: «_28_» _September_ 2022

CALENDAR PLAN

№ з/п	Name of stages of qualification work	Deadline for the stages of qualification work	Notes
1.	Analysis of literature data. Treatment of nervous system diseases, analyze of pharmaceutical market of homeopathic drugs and their dosage forms.	September – November 2022	**done**
2.	Researches of active substances and excipients	December 2022 – February 2023	**done**
3.	Justification of the results	March 2023	**done**
4.	Registration of qualification work	April 2023	**done**

An applicant of higher education _____ Iman TALHI

Supervisor of qualification work _____ Marina BURYAK

ВИТЯГ З НАКАЗУ № 35
По Національному фармацевтичному університету
від 06 лютого 2023 року

нижченаведеним студентам 5-го курсу 2022-2023 навчального року, навчання за освітнім ступенем «магістр», галузь знань 22 охорона здоров'я, спеціальності 226 – фармація, промислова фармація, освітня програма – фармація, денна форма здобуття освіти (термін навчання 4 роки 10 місяців та 3 роки 10 місяців), які навчаються за контрактом, затвердити теми кваліфікаційних робіт:

Прізвище студента	Тема кваліфікаційної роботи		Посада, прізвище та ініціали керівника	Рецензент кваліфікаційної роботи
• **по кафедрі технології ліків**				
Талхі Іман	Розробка складу та технології мазі для лікування псоріазу	Development of composition and technology of ointment for the treatment of psoriasis	доц. Буряк М.В.	доц. Семченко К.В.

Підстава: подання деканів, згода ректора

Ректор

Вірно. Секретар

Ф А2.8-47-110

ВИСНОВОК

Комісії з академічної доброчесності про проведену експертизу

щодо академічного плагіату у кваліфікаційній роботі

здобувача вищої освіти

№ 112703 від « 28 » квітня 2023 р.

Проаналізувавши випускну кваліфікаційну роботу за магістерським рівнем здобувача вищої освіти денної форми навчання Талхі Іман, 5 курсу, _____ групи, спеціальності 226 Фармація, промислова фармація, на тему: «Розробка складу та технології мазі для лікування псоріазу / Development of composition and technology of ointment for the treatment of psoriasis», Комісія з академічної доброчесності дійшла висновку, що робота, представлена до Екзаменаційної комісії для захисту, виконана самостійно і не містить елементів академічного плагіату (компіляції).

Голова комісії,

професор **Інна ВЛАДИМИРОВА**

2%

26%

Ф А 2.2.1-32-353

REVIEW

of scientific supervisor for the qualification work of the master's level of higher education of the specialty 226 Pharmacy, industrial pharmacy

Iman TALHI

on the topic: "Development of composition and technology of ointment for the treatment of psoriasis"

Relevance of the topic. Almost everyone has encountered skin problems. Acne and pimples, oily sheen, enlarged or blocked pores, blackheads, white subcutaneous "grains", vascular defects, skin peeling, pigmentation, etc. This list can be continued. But the only question that worries the owners of these defects is what to do to solve the issue of problematic skin. According to statistics in Ukraine, 85% of young people aged 12 to 25 and 11% over 25 have problem skin.

Practical value of conclusions, recommendations and their validity. The approaches proposed by the acquirer to the development of the optimal composition of extemporaneous ointment can be used in the production process of pharmacies in the production of soft dosage forms.

Assessment of work. The work was performed at a sufficient theoretical and practical level of scientific research. The qualification work contains substantiated conclusions and has practical significance.

General conclusion and recommendations on admission to defense. The qualifying work of Iman TALHI was completed at the appropriate scientific level and can be submitted for defense to the Examination Commission of the National Pharmaceutical University.

Scientific supervisor _____ Maryna BURYAK

12 April 2023

Ф А 2.2.1-32-356

REVIEW

of scientific supervisor for the qualification work of the master's level of higher education of the specialty 226 Pharmacy, industrial pharmacy

Iman TALHI

on the topic: "Development of composition and technology of ointment for the treatment of psoriasis"

Relevance of the topic. Natural products are one of the sources of drugs in the pharmaceutical industry, one of the most famous sources of natural products are medicinal plants. Medicinal plants are able to treat some specific diseases and can be a potential source of drugs.

Many important medicines are natural products or are derived from them. Thus, almost 39% of all drugs approved by the Food and Drug Administration (FDA, USA) are of natural origin, and 48.6% of all cancer drugs registered from the 1940s to today are or are natural products or their derivatives. Natural products are important sources in the drug discovery process. There are more than 200,000 natural metabolites that have different bioactive properties, which indicates the importance of products of natural origin for the creation of new medicines based on them.

Theoretical level of work. The work carried out by the acquirer on the analysis of literature data on the researched issue is thorough and systematized.

Author's suggestions on the research topic. Based on the analysis of literature data and the conducted experiment, the author proposed the optimal composition of the dosage form.

Practical value of conclusions, recommendations and their validity. The results of the work can be used in the production process of pharmacies in the production of soft dosage forms.

Disadvantages of work. The work contains unsuccessful expressions, spelling and grammatical errors, incompleteness of conclusions.

General conclusion and assessment of the work. The composition and content of Iman TALHI qualifying work meets the requirements and can be submitted for defense to the Examination Commission of the National Pharmaceutical University .

Reviewer _____ assoc. prof. Kateryna SEMCHENKO

28 April 2023

Ф А2.2.1-91-287

МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ
НАЦІОНАЛЬНИЙ ФАРМАЦЕВТИЧНИЙ УНІВЕРСИТЕТ

ВИТЯГ З ПРОТОКОЛУ № 11
«28» квітня 2023 року
м. Харків

засідання кафедри
технології ліків

Голова: завідувачка кафедри, доктор фарм. наук, професор Тетяна ЯРНИХ
Секретар: канд. фарм. наук, асистент Світлана ОЛІЙНИК

ПРИСУТНІ: професор Тетяна ЯРНИХ, професор Олександр КОТЕНКО, професор Юлія ЛЕВАЧКОВА, професор Ріта САГАЙДАК-НІКІТЮК, доцент Марина БУРЯК, доцент Володимир КОВАЛЬОВ, доцент Наталія ЖИВОРА, асистент Світлана ОЛІЙНИК, асистент Єлизавета ЗУЙКІНА

ПОРЯДОК ДЕННИЙ

1. Про представлення до захисту до Екзаменаційної комісії кваліфікаційних робіт здобувачів вищої освіти.

СЛУХАЛИ: проф. Тетяну ЯРНИХ – про представлення до захисту до Екзаменаційної комісії кваліфікаційних робіт здобувачів вищої освіти.

ВИСТУПИЛИ: Здобувач вищої освіти 5 курсу групи Фс18(4,10д)-06 спеціальності 226 Фармація, промислова фармація Іман ТАЛХІ з доповіддю на тему «Розробка складу та технології мазі для лікування псоріазу» (науковий керівник: доцент закладу вищої освіти Марина БУРЯК).

УХВАЛИЛИ: Рекомендувати до захисту кваліфікаційну роботу.

Голова
Завідувачка кафедри, проф. _____ **Тетяна ЯРНИХ**
(підпис)

Секретар
асистент _____ **Світлана ОЛІЙНИК**
(підпис)

Ф А2.2.1-32-042

НАЦІОНАЛЬНИЙ ФАРМАЦЕВТИЧНИЙ УНІВЕРСИТЕТ

ПОДАННЯ
ГОЛОВІ ЕКЗАМЕНАЦІЙНОЇ КОМІСІЇ ЩОДО ЗАХИСТУ
КВАЛІФІКАЦІЙНОЇ РОБОТИ

Направляється здобувач вищої освіти Іман ТАЛХІ до захисту кваліфікаційної роботи за галуззю знань 22 Охорона здоров'я
спеціальністю 226 Фармація, промислова фармація
освітньою програмою Фармація
на тему: «Розробка складу та технології мазі для лікування псоріазу».

Кваліфікаційна робота і рецензія додаються.

Декан факультету _____/ Світлана КАЛАЙЧЕВА /

Висновок керівника кваліфікаційної роботи

Здобувач вищої освіти Іман ТАЛХІ представив магістерську роботу, яка за об'ємом теоретичних та практичних досліджень повністю відповідає вимогам до оформлення магістерських робіт.

Керівник кваліфікаційної роботи

_____ Марина БУРЯК

«12» квітня 2023 року

Висновок кафедри про кваліфікаційну роботу

Кваліфікаційну роботу розглянуто. Здобувач вищої освіти Іман ТАЛХІ допускається до захисту даної кваліфікаційної роботи в Екзаменаційній комісії.

Завідувачка кафедри технології ліків

_____ Тетяна ЯРНИХ

«28» квітня 2023 року

Qualification work was defended

of Examination commission on

« ___» of June 2023

With the grade _____

Head of the State Examination com-

mission, DPharmSc, Professor

_____/ Oleh SHPYCHAK /