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## Development of composition of medicinal cosmetic cream of anti-inflammatory action

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### Abstract

Preliminary composition of the medicinal product has been determined. Theoretically and experimentally, by pharmacological screening, the structure of medicinal cosmetic products in a form of cream being developed has been approved, in order to be used for dermatological diseases and skin damages, namely: first degree burns, various skin inflammation and irritations, dermatitis. The phytocomposition 2 has been choosed (fruit of wild carrot, flowers of Moroccan chamomile and Aloe leaves) which will effect anti-inflammatory, wound healing, burntreatment, regenerating, hydrating, softening, analgesic and antioxidative activity.

**Keywords:** phytocomposition, cream, anti-inflammatory action, medical herbal raw, medical cosmetic product.

### 1. Introduction

Today, skin diseases are the common medical problems. Its state is one of the indicators of the total body health. Skin can perform its required functions in a good condition only. Therefore it is important to look carefully after it and take necessary measures to prevent the loss of elasticity and tone, and also premature wrinkles forming.

It is known, that even minimal UV skin damage leads to negative consequences. UV-rays destroy cells of the upper layers of skin, damage blood capillaries, that causes to feeling of pain, heartburn and all signs of inflammation – sunburn [3, 6].

According to the literature data, today 90% of people use medicinal cosmetics to restore skin after sunburns, to care of problem-prone skin, delicate skin around the eyes, after surgery and dermatitis of various origins [2].

One of the main directions of modern cosmetology is application of biologically active substances with cosmetic means, such as vitamins, biogenic stimulators, plant extracts, hormones, bactericidal agents, enzymes, protein hydrolysates, aminoacids, their complexes and foremost - oil. This direction is promising because of the possibility of preventive and therapeutic effect on diseases accompanied by any cosmetic defect.

The need for a comprehensive therapy with several mono-drugs applied, has driven us to develop a medicinal cosmetic product based on herbal raw, which would ensure a wide range of pharmacological actions and effect on different parts of pathological process.

Currently, burns and skin inflammation of different origin are being treated with drugs such as: "Panthenol", "Bepanten", "Myramistin -Darnitsa", "Dioksizol-Darnitsa" and "Methyluracilum" [9].

The purpose of our work was to develop a structure and determine defined therapeutic dose of herbal raw for medicinal cosmetic product in the cream form, for its use to prevent, cure dermatological diseases and eliminate cosmetic defects.

### 2. Research Material and Techniques

When developing drug for the treatment of first degree burns and skin inflammation we have taken into account the need for introduction of plants that have the actions as follows: anti-inflammatory (wild carrot fruits, leaves of treelike aloe, flowers of Moroccan chamomile, seeds of sea buckthorn, grass of Lathyrus pratensis, leaves and inflorescence of Tanacetum balsamita, Origanum shoots, Salvia leaves, Arctium roots, Arnica anthodium, flowers and fruits of Hawthorn, Marigold blossoms, Mallow leaves, Tussilago farfara leaves, Yarrow leaves, grass of Celandine, Eucalyptus leaves, Mint leaves, Oak leaves, Linden inflorescence, Ginseng roots), wound healing (leaves of Kalanchoe, wild carrot fruits, flowers of Moroccan chamomile, Linden inflorescence, Ginseng roots, Arnica anthodium, Marigold blossoms, roots and leaves of Cynoglossum, grass of St. John's wort, Symphytum root, Yarrow leaves, roses

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flowers), burntreating (seeds of sea buckthorn, wild carrot fruits, aloe leaves, leaves and fruits of plantain, grass of St. John's wort, leaves of yarrow), regenerating (Symphytum root, flowers of Moroccan chamomile, Marigold blossoms, wild carrot fruits, leaves of Aloe, Yarrow leaves, Avocado fruits, Anis fruits, Coconut palm fruits), antiseptic (Eucalyptus leaves, Marigold blossoms, Salvia leaves, flowers of Moroccan chamomile, wild carrot fruits, Origanum shoots, top of St. John's wort, flowers of Blue Chamomile), analgesic (Eucalyptus leaves, Mint leaves, wild carrot fruits, fruits and blossom of Crataegus, flowers of Moroccan chamomile, Origanum shoots, Symphytum root, birch buds, Melissa leaves), antioxidative (Marigold blossoms, wild carrot fruits, grass of St. John's wort, Salvia leaves), softening (flowers of Moroccan chamomile, birch buds, Tussilago farfara leaves), dermicial (Aloe leaves, fruits of Cydonia, Marigold blossoms, Acacia leaves, Anis fruits, Sambucus roots, Salvia leaves), bacteriostatic (Aloe leaves, Salvia leaves, grass of St. John's wort, Achillea leaves, fruits of Allium and Garlic, wild carrot fruits, Mint leaves, leaves and fruits of Plantain), protective (Aloe leaves, Coconut palm fruits, wild carrot fruits, Rosmarinus leaves), hydrating (Aloe leaves, Coconut palm fruits, birch buds, Marigold blossoms, Rosmarinus leaves), cleaning (flowers of Moroccan chamomile, flowers of Blue Chamomile, Mint leaves, Salvia leaves, Marigold blossoms, grass of St. John's wort, flowers and fruits of Hawthorn), anti-oedemateous (flowers of Moroccan chamomile, fruits of Allium, leaves of Plantain, Oak cork, Mint leaves) [1, 4, 7, 8, 12].

We also added herbal components with duplicate actions to the composition, because complication of the complex of biologically active substances causes to potentiation of pharmacological effects due to the fact that components of similar activity have different points of influence and increase reliability of therapeutic effect expected, as well as multivalency of action.

The composition of the preparation being developed includes plants, which medicinal properties have long been used in traditional and non-traditional medicine.

### 3. Research Findings and Discussion

Further, it was needed to determine quantitative value of each species of medicinal plants.

The correlation of (%) components in phytocompositions has been justified theoretically considering the contribution of each component in the final therapeutic effect and experimentally by evaluation of herbal components activity.

To select promising phytocomposition for the treatment of various dermatological diseases, burns, skin inflammation and wounds, it has been reasonable to conduct screening research based on a model of Carrageenan-Induced Paw Edema of rats, comparing of anti-inflammatory actions of four different compositions on a model of thermal burn and experimental erythema [4, 5, 11].

Structure of developed phytocompositions are shown in the Table 1.

**Table 1:** Structure of phytocompositions developed

Nº of composition	Structure	Quantitative content, g
I	Wild carrot fruits	50
	Flowers of Moroccan chamomile	25
	Rosmarinus leaves	25
II	Wild carrot fruits	50
	Flowers of Moroccan chamomile	25
	Aloe leaves	25
III	Wild carrot fruits	50
	Acacia leaves	25
	Aloe leaves	25
IV	Flowers of Moroccan chamomile	40
	Aloe leaves	30
	Achillea leaves	30

The next stage of our research was to select the medical herbal raw to be further introduced to the composition of medicinal cosmetic product with integrated anti-inflammatory activity.

Three types of herbal raw material have been selected with a strong anti-inflammatory activity and wide range of activity as stated in the literature. The results are shown in the Table 2.

**Table 2:** Medical herbal raw, selected for design of medical cosmetic product with a wide range of activity

Medical herbal raw	Basic biologically active substances
Fructus Daucus carotae – Wild carrot fruits	Organic acids (formylic, ethanoic, butyric); etheric oil (its composition includes $\alpha$ -pinen, myrcene, limonen, camphene, $\pi$ -cymene, geraniol, geranyl acetate, citronellol, thymol, $\beta$ - pinen etc.); Coumarine (Umbelliferone, Selenanes, Eskuletin, Scopoletin, Peucedanine osthole); Steroids; flavonoids (5-hydroxyflavon, luteolin, quercetine, chrysin, apigenin, kaempferol, quercitrine); fatty oil (its composition includes palmic, petroselinic, oleinic, linoleic and other acids).
Flores Ormenis multicaulis – Flowers of Moroccan chamomile (Blue)	Ether oil of Blue chamomile. Its composition includes: monoterpens ( $\alpha$ -terpinene, limonene, $\beta$ -ocimene); sesquiterpens (chamazulene, bisabolene, farnesene, trans- $\alpha$ -farnesene, $\delta$ -cadinene, $\alpha$ -copaen, caryophyllene, $\gamma$ -muurolen, $\alpha$ - muurolen; esquiterpenoles: $\alpha$ -bisabolol, farnesol); oxides (1, 8-cineol, $\alpha$ - bisabolol oxid A, $\alpha$ - bisabolol oxide, epoxybisabolol, bisabonon oxide A); coumarines (herniarine, umbelliferone); ethers: dicycloether).
Folias Aloeae Arborescens – leaves of treelike Aloe	Carbohydrates: monosaccharides (glucose, magnesium); polysaccharides (acemanna). Anthraquinone, aleolytic acid, cinnamylic acid, phenylacrylic acid, chrysophanic acid, aloemodin, aloin. Coprosterol, phytosterol, luteol, isobarbaloin. Coumarines, flavonoids, morphofunctional organic acids, tocopherols, oleosin A, oleosin B. Salicylic acid, sterol, triterpene, saponin, lignin.

After selection optimal medicinal herbal raw, we analyzed and studied their chemical composition so that to predict biologically active substances which are part of selected MHR, pharmacological activity. The results are shown in the Table. 3.

**Table 3:** Predicted activity of selected MHR

Pharmacological activity 1	BAS 2	MHR which includes BAS 3
Anti-inflammatory, wound healing	Formylic acid	Wild carrot seeds
	Peucedanine	Wild carrot seeds
	Osthole	Wild carrot seeds
	Scopoletin	Wild carrot seeds
	Umbelliferone	Wild carrot seeds, Flowers of Moroccan chamomile
	Selenanes	Wild carrot seeds
	Esculetin	Wild carrot seeds
	Cariofilen	Flowers of Moroccan chamomile
	Limonene	Wild carrot seeds, Flowers of Moroccan chamomile
	Chamazulene	Flowers of Moroccan chamomile
	Quercetine	Wild carrot seeds
	Bisabolene	Flowers of Moroccan chamomile
	Glucose	Leaves of treelike Aloe
	Anthraquinone	Leaves of treelike Aloe
	Acemannan	Leaves of treelike Aloe
	Coprosterol	Leaves of treelike Aloe
Sitosterol	Leaves of treelike Aloe	
Luteol	Leaves of treelike Aloe	
Regenerative	Bisabolene	Flowers of Moroccan chamomile
Antiseptic	Esculetin	Wild carrot seeds
	Formylic acid	Wild carrot seeds
	Limonene	Wild carrot seeds
	Magnesium	Leaves of treelike Aloe
	Farnesol	Flowers of Moroccan chamomile
Antibacterial, antifungal	Cineol	Flowers of Moroccan chamomile
	Bisabolene	Flowers of Moroccan chamomile
Cleaning	Formylic acid	Wild carrot seeds
	Anthraquinone	Leaves of treelike Aloe
	Cinnamylic acid	Leaves of treelike Aloe
	Chrysophanic acid	Leaves of treelike Aloe
	Bisabolene	Flowers of Moroccan chamomile
Antioxidative	Farnesol	Flowers of Moroccan chamomile
	Formylic acid	Wild carrot seeds
Analgesic	Glucose	Leaves of treelike Aloe
	Anthraquinone	Leaves of treelike Aloe
	Geraniol	Wild carrot seeds
	Acemannan	Leaves of treelike Aloe
	Isobarbaloin	Leaves of treelike Aloe
	Chrysophanic acid	Leaves of treelike Aloe
Softening, hydrating	Palmic acid	Wild carrot seeds
	Linoleic acid	Wild carrot seeds
	Glucose	Leaves of treelike Aloe

On the grounds of conducted research, it appears that pharmacological activity of the cream with phytocomposition № 2 (51, 7%) exceeded activity of comparison drug "Panthenol" (41, 7%), phytocomposition № 4 (39, 8%), № 1 (36, 5%) and phytocomposition № 3 (40, 5%).

According to the research results, cream with phytocomposition № 2 showed a high anti-inflammatory and antiexudative activity(64, 8%) contrary to the comparison drug (50, 7%) and other phytocompositios (№ 1 - 42, 2%, № 2 – 34, 5%, № 3 - 43, 1%).

Thus, based on the data from literature sources, we suggested medicinal herbal raw which can be introduced into the composition of medicinal cosmetic product being developed. Pharmacologically approved that the drug in a cream form will have a high anti-inflammatory, wound healing, burntreating,

regenerating and antioxidant activity. He will also have antibacterial, antifungal, analgesic and soft antiseptic properties. Additionally, the cream will have good skin cleaning, hydrating and damping activity.

#### 4. Conclusions

1. Theoretically and experimentally, by pharmacological screening, the structure of medicinal cosmetic products in a form of cream being developed has been approved, in order to be used for dermatological diseases and skin damages, namely: first degree burns, various skin inflammation and irritations, dermatitis.
2. It has been established that the herbal composition № 2 shows an ability to create anti-inflammatory, wound healing, burntreating, regenerating, softening, analgesic

and antioxidant action at the level of the reference drug.

3. According to the literature data, within experienced scientific and non-traditional medicine the logical and structural analysis has been conducted of a number of medicinal herbal raw materials, based on that a model prediction of pharmacological activity has been made of biologically active substances which are included into its structure.
4. According to the results of conducted studies, preliminary composition of the medicinal product has been determined (fruit of wild carrot, flowers of Moroccan chamomile and Aloe leaves) which will effect anti-inflammatory, wound healing, burn-treating, regenerating, hydrating, softening, analgesic and antioxidative activity.

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