

Research Article

Perspectives of immortality (helichrysum) in modern medicine and pharmacy

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ABSTRACT

In recent decades' herbal preparations occupy one of the leading positions in the range of applied medicines. Despite the great heritage of medieval scientists, the majority of plants do not have enough scientific justification for their use in official medicine, such as plants of the immortelle genus. In order to generalize and systematize data on the chemical composition and application of representatives of this genus in modern practical medicine, an analysis of literary sources has been conducted. The results of the analysis show that immortelle plants can be used to create preparations based on biologically active substances that dominate their composition. Today, the most widespread in the territory of Uzbekistan and at the same time less studied is the Samarkand immortelle, and in terms of variety of chemical composition it is not inferior to the sandy and Italian immortelle. The data obtained in the course of the analysis testify to the expediency of conducting comprehensive studies of Samarkand immortelle for further introduction into practical medicine.

Keywords: sandy immortelle, Italian immortelle, Samarkand immortelle, chemical composition, biologically active substances, application in medicine.

INTRODUCTION

In recent decades, the development of new drug research has focused on the search for medical products of natural origin, in particular herbal ones. This fact is caused by a number of advantages of preparations of plant origin in comparison with synthetic ones: biologically active substances of a plant cell are similar in structure to substances of animal and human cells, which is a guarantee of their easier assimilation by the organism, a smaller spectrum of side effects, and as a consequence, a possibility of long-term use. The above is especially important in geriatric and pediatric practice. These days, most produced herbal extractions of medicines are containing both essential and concomitant biologically active substances, resulting in complex effects on the body. Also, drugs derived from medical plants are not only compatible with each other, but also with drugs of synthetic origin, which allows you to enhance the therapeutic effect through synergies. The economic aspect is important: plant raw materials are the most profitable source of medicines in this respect [7,26,27,33].

Despite the fact that a huge number of plants are used in folk medicine to treat and prevent certain diseases, their use in official medicine is limited or studied plants of the same family varies in a wide range.

THE PURPOSE OF THE STUDY

In view of the above, the purpose of the present research is to analyze literary sources, including a review of promising ideas for the use of immortelle in practical medicine and pharmacy to identify new areas of research.

RESULTS AND DISCUSSIONS

The genus immortelle (*Helichrysum*), represented by perennial herbs or semi-shrubs, has about 500 species, growing in temperate zones of the Old World, in South Africa, Australia, Asia Minor, Iran. From them 15 species grow on the territory of CIS: the main diversity is represented in the South Caucasus; and in Central Asia, there are 5 species of immortelle genus. Only a few species are medically important, the rest are ornamental plants [8,26]. To date, the most famous and widely used in medical practice are the sand immortelle - *Helichrysum arenarium* (L.) Moench. and the Italian immortelle - *Helichrysum italicum* (Roth) G. Donf. Sandy immortelle is included in pharmacopoeia of such countries as Switzerland, Germany, Poland, France, Russian Federation (XIII century) and others. [8,21,26]. Numerous studies show the rich chemical composition of this plant: there are different classes of flavonoids, hydroxycoric acids, coumarines, phthalic acid derivatives, polysaccharides, as well as diterpene alcohols, sterols, fatty acids, amino acids, inosine, unidentified phenolic pigments and volatile substances. [8,9,15,20,26,29,34].

Studies conducted by A.V.Kurkina have isolated and identified isosalipurpozid (the dominant flavonoid), salipurpozid, 5,7-dihydroxyphthalide and 5-methoxy-7-hydroxyphthalide from the flowers of the immortelle sandy. The study of the component composition of medical raw materials was carried out by the method of highly effective liquid chromatography, and the method of quantitative determination of isosalipurposide content in immortelle flowers was also developed. The author found that the content of the phytocomponent varies between 1.56 and 1.78% [16]. Scientists of the scientific and educational center "Pharmacy" of the Belgorod State National Research University have established that the process of isolation of isosalipurpozid from plant raw materials is most significantly affected by the dielectric constant solvent. The authors have tested a mathematical model describing the dependence of biologically active substance concentration on dielectric constant of water-ethanol solutions. The optimal dielectric constant solvent range for obtaining the maximum concentration of the phytocomponent in the extract is scientifically proved [6].

Gudzenko A.V. suggested the use of apigenin flavonoid as a marker for qualitative and quantitative standardization in plant mixtures of sandy immortelle flowers. He developed a method for determining this biologically active substance using the method of highly effective liquid chromatography in raw materials and plant mixtures. It has been established that the definition of flavonoid apigenin does not prevent biologically active substances of other medical plants [11].

Florses *Helichrysi* are used as medical plant raw materials. Standardization of sandy immortelle raw materials is recommended for flavonoids. Thus, Pharmacopoeias of Germany and Poland regulate the analysis of the sum of flavonoids in terms of quercetin (not less than 0.5%) and hyperoside (not less than 0.6%). SF Belarus also determines the amount of flavonoids in terms of quercetin or GSO rutin in the form of complexes with aluminum chloride. However, according to the pharmacopoeia of this country, it is allowed to vary the content of flavonoids in the raw materials in the range of 0.4-0.6%. Starting with SF XI edition (USSR) for sandy immortelle flowers the quality indicator of the content of the sum of phenolic compounds - not less than 6% in terms of GSO isosalipurposide. This method is also included in SF XIII edition [8,18,21].

This representative of the genus immortelle is the most widely studied, serves as a source for obtaining a number of drugs: Sandy immortelle flowers (*Flors Heiichrysi arenarii*), Flamin

(Flaminum), dry extract of Sandy immortelle (*Extracium flores Helichrysi arenarii siccum*), Arenarin ointment 1% (*Unguentum arenarini 1%*). In addition, plant raw materials are included in a number of broad-spectrum pharmaceutical collections (choleretics No. 1 and No. 2) and in the preparations under clinical trials of choleflavin, flastapiol, a preparation of polyphytochol and a new preparation of lavaflam [5,15,38].

Antimicrobial activity with respect to aerobic bacteria and fungi: *S. aureus* ATSS 25923, *E.coli* ATSS 25922, *P. aeruginosa* ATSS 27853, *B. subtilis* ATCC 6633, *C. albicans* ATCC 885/653; this effect is due to the presence of flavonoids (salipurposide, isosalipurposide, campherol, luteolin, naringenin, apigenin) [5].

A.V. Kurkin proposed a method of highly effective liquid chromatography to study the component composition of immortelle raw materials of sand and Flamina tablets, as well as the quantitative determination of biologically active substance. It was found that in both cases the main flavonoid was isosalipurpozid. The content of isosalipurposide in flamin tablets varied from 10.35 mg to 11.05 mg in one tablet [18].

The original medical product "Lavaflam" in the form of tablets includes vegetable ingredients made of flamine and lavender oil. A method for quantitative determination of flamine using absorption spectrophotometry in the visible area has been developed. The amount of flavonoids converted to isosalipurpozid was determined as the active beginning. Also for the identification of flavonoids of flamin was proposed a method of determination using the thin layer chromatography method. Scientists of the National Pharmaceutical University and Vinnitsa National Medical University named after M.I.Pirogov conducted research and experimental substantiation of hepatoprotective properties of this preparation.

The obtained results indicate that the test preparation lavaflam showed hepatoprotective properties in the experimental model of subchronic hepatitis in experimental animals and was not inferior to the known comparison preparation carcil [2,37,38].

Bobrytska L.A. et al. developed the technology of the original medical product in the form of solid gelatin capsules containing flamine and ornidazole. The drug is called "Meraflam" and is designed to treat associated bacterial infections. For this combined preparation the method of quantitative determination of ornidazole for the tests "Quantitative determination", "Dissolution" and "Identification" by liquid chromatography is

proposed. For detection and identification of flavonoids in the composition of the drug the method of thin layer chromatography is proposed [4,5]. Considering that the main biologically active substances of immortelle flowers are flavonoids, Korozhanom conducted experiments to study the anti-allergic activity of infusion on the basis of raw materials on the model of degranulation of fat cells in vitro. The obtained results showed a pronounced dose-dependent stabilizing effect of infusion in doses of 5, 10 and 20 mg/ml on male mice' fat cells in vitro [14].

Literary sources also indicate that at a dose of 50 mg/kg, immortelle flower extract from sandy flowers reduces autoimmune intoxication and lipid peroxidation [12,19]. A group of Japanese scientists established the ability of the extract to inhibit blood glucose levels in sucrose-loaded mice. [41]. Introduction of the extract of this medical plant raw material significantly slowed down the growth rate of neoplasms with respect to the comparison group starting from the 9th day of the experiment [23].

Employees of the Saratov State Medical University named after V.I.Razumovsky investigated the chemical composition of the received immortelle extract of sandy. Among flavonoids, in addition to isosalipurposide, were found naringin and its soluble aggregate, grunine, quercetin, apigenin, naringenin and 5-O-glucoside apigenin [10].

The same team of scientists studied the effect of flavonoid-containing extract of immortelle sand on bone marrow and peripheral blood in the intramuscular and oral administration in the experiment on experimental animals with sarcoma-45 inverted. The research results confirm the antitumor activity of the studied extract, which is expressed in the slowing down of the growth rate of the transferred sarcoma and the appearance of marked morphological changes; no toxic effect on peripheral blood is observed [22].

Bacteriostatic activity has been determined for *Staphylococcus aureus*, *Streptococcus pneumoniae* and *Moraxella catarrhalis*, as well as for *Mycobacterium tuberculosis* for preparations in various dosage forms and flavonoids of immortelle flowers [28,40,42].

Also the use of medical purposes is the Italian immortelle, which grows mainly in the Mediterranean: Algeria, Morocco, Greece, Albania, Cyprus, Montenegro, Italy, Slovenia, Croatia, Portugal and Spain, mainly cultivated in the Crimea [24]. In this type of immortelle, as in the sandy immortelle, the main biologically active substances are flavonoids (campferol, 3,5,7-trihydroxy-8-methoxyflavone; 3,5-dihydroxy-6,7,8-trimoxifla-wave); 8-isomeric biphenylchonic

acids (chlorogenic, 1,3-dicophenylchonic, etc.); coumarines; phthalides, essential oils [25]. According to the requirements of VFS 2138-92, the content of the sum of phenolic compounds (converted to quercetin) should be at least 10%.

Literature analysis has shown the presence of Italian choleric, antibacterial, antifungal, analgesic, anti-inflammatory, anti-allergic and diuretic activity in immortelle preparations. Under the action of these drugs there was a decrease in cholesterol levels, hepatoprotective activity. Preparations based on Italian immortelle are recommended for diseases of the upper respiratory tract, allergies, sunburn, eczema and psoriasis [26].

Italian immortelle essential oil has great interest. The composition of the oil is quite complex: carboxylic acids and at least 27 different esters, thanks to which a unique aroma is shown. Since ancient times, essential oil of this plant is used in folk medicine as a means with high antioxidant and wound healing properties. It is also used as a softening and toning agent in cosmetic products [36,39].

The team of authors under the guidance of V.V.Tonkovetsova studied the effect of Italian immortelle essential oil (concentration 0.1 mg/m³) on psychophysiological condition of elderly people. It was found out that this essential oil mainly influenced the psychological tone of the body: vigor, attentiveness, efficiency. It was also found that the systolic blood pressure and heart rate decreased significantly [30,31,32].

Another representative of this genus is the Samarkand immortelle *Helichrysum maracandicum*, a perennial herbaceous plant whose range covers the Pamiro-Altai and Tien Shan (mountainous areas of the Western Tien Shan, Kyrgyz Alatau and Karatau) [1,3,35].

The study of pharmacological properties of galenic preparations of Samarkand immortelle showed the presence of choleric, antispasmodic, stimulating action on gastric secretion, which is due to the presence in the medical plant of such biologically active substances as essential oil, flavonoids, coumarines, diterpenes, etc. [13].

Antimicrobial activity of immortelle flowers of Samarkand was proved based on the research results. Ethanol extraction from this plant had antiproliferative activity in relation to SENCAR mouse culture cells in vitro experiments [3].

CONCLUSION

The analysis of literary sources carried out with the purpose of generalization and systematization of data on chemical composition and application in modern practical medicine of representatives of a genus immortelle testifies to perspective

application of plants of this genus for creation of preparations on the basis of biologically active substances which are dominating in their structure. It should be noted that less studied is the Samarkand immortelle, while in terms of the variety of chemical composition it is not inferior to the sandy and Italian immortelle.

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