UDC 582.711.712+61+615.1

Anastasiia KULAKIVSKA
Student at the Department of Technology of Biologically Active Substances, Pharmacy and Biotechnology, Lviv Polytechnic National University, Stepan Bandera str., 12, Lviv, Ukraine, 79013 (anastasiia.kulakivska.bt.2020@lpnu.ua)
ORCID: *0009-0001-8188-7779*

Roksolana KONECHNA
PhD in Pharmacy, Associate Professor at the Department of Technology of Biologically Active Substances, Pharmacy and Biotechnology, Lviv Polytechnic National University, Stepan Bandera str., 12, Lviv, Ukraine, 79013 (roksolana.t.konechna@lpnu.ua)
ORCID: *0000-0001-6420-9063*
Scopus Author ID: *56038094400*

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MALVA SYLVESTRIS L.: ANALYTICAL REVIEW OF DISTRIBUTION, CHEMICAL COMPOSITION, BIOLOGICAL ACTIVITY AND MEDICAL APPLICATION (LITERATURE REVIEW)

Actuality. *Phytotherapy is one of the priority areas of pharmacy. The advantages of this direction are, of course, relative safety, accessibility, ensuring access for people of any age. The Malvaceae family is famous for such medicinal plants as Althea officinalis and Hibiscus sabdariffa. Malva sylvestris L., which is currently widely used in medicine and pharmaceutical practice.*

Purpose of the article. *To analyze and summarize the data of literary sources regarding the botanical characteristics, distribution area, content of biologically active substances and the spectrum of potential use in pharmacy of Malva sylvestris L (common mallow).*

Material and methods. *Literary and electronic sources of information on botanical description, distribution area, chemical composition and pharmacological activity.*

Result and discussion. *Malva sylvestris L. is a biennial or annual plant with a wide area of distribution.*

Malva sylvestris L. contains a significant amount of biologically active substances in the form of micro- and macroelements (especially K, Fe), amino acids and proteins (asparagine), carbohydrates (sucrose and fructose), organic acids (oxalic acid), flavonoids (malvidin), vitamins, pigments and mucus.

The plant has been used since ancient times due to its anti-inflammatory, emollient, laxative, antitumor and antimicrobial properties.

Conclusion. *The results of the data analysis of the studied sources of information indicate the widespread distribution of the plant, the content of valuable biologically active compounds in the plant material, a significant spectrum of pharmacological activity and the use of Malva sylvestris L. in medicine. Further more detailed phytochemical, pharmacognostic and pharmacological study of the plant and conducting thorough research in the direction of clarifying the possibility of creating new therapeutic and preventive means on its basis is expedient.*

Key words. *Malva sylvestris L., common mallow, area of distribution, biologically active substances, pharmacological effect.*

Анастасія КУЛАКІВСЬКА
студентка кафедри технології біологічно активних сполук, фармації та біотехнології, Національний університет «Львівська політехніка», вул. Степана Бандери, 12, м. Львів, Україна, 79013 (anastasiia.kulakivska.bt.2020@lpnu.ua)
ORCID: *0009-0001-8188-7779*

Роксолана КОНЕЧНА
кандидат фармацевтичних наук, доцент кафедри технології біологічно активних сполук, фармації та біотехнології, Національний університет «Львівська політехніка», вул. Степана Бандери, 12, м. Львів, Україна, 79013 (roksolana.t.konechna@lpnu.ua)
ORCID: *0000-0001-6420-9063*
Scopus Author ID: *56038094400*

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MALVA SYLVESTRIS L.: АНАЛІТИЧНИЙ ОГЛЯД ПОШИРЕННЯ, ХІМІЧНОГО СКЛАДУ, БІОЛОГІЧНОЇ АКТИВНОСТІ ТА МЕДИЧНОГО ЗАСТОСУВАННЯ (ОГЛЯД ЛІТЕРАТУРИ)

Актуальність. *Фітотерапія є одним із пріоритетних напрямів фармації. Перевагами цього напряму є, звичайно, відносна безпека, доступність, забезпечення доступу для людей будь-якого віку. Родина Malvaceae славиться такими лікарськими рослинами, як Althea officinalis and Hibiscus sabdariffa, Malva sylvestris L., яка нині використовується значною мірою у медичній та фармацевтичній практиці.*

Мета дослідження *– проаналізувати та узагальнити дані літературних джерел щодо ботанічної характеристики, ареалу поширення, вмісту біологічно активних речовин та спектра виявленого використання у фармації Malva sylvestris L. (калачики лісові).*

Матеріал і методи. *Літературні та електронні джерела інформації щодо ботанічного опису, поширення ареалу, хімічного складу та фармакологічної активності.*

Результати дослідження. *Malva sylvestris L. – це дво- або однорічна рослина, яка має широкий ареал поширення.*

Malva sylvestris L. містить значну кількість біологічно активних речовин у вигляді мікро- і макроелементів (особливо K, Fe), амінокислот і білків (аспарагін), вуглеводів (сахароза і фруктоза), органічних кислот (щавлева кислота), флавоноїдів (мальвідин), вітамінів, пігментів та слизів.

Рослина використовувалася з давніх-давен завдяки протизапальним, пом'якшувальним, послаблювальним проносним, протипухлинним і антимікробним властивостям.

Висновок. *Результати аналізу даних опрацьованих джерел інформації свідчать про широке розповсюдження рослин, уміст у рослинній сировині цінних біологічно активних сполук, значний спектр фармакологічної активності та застосування Malva sylvestris L. у медицині. Доцільним є подальше більш детальне фітохімічне, фармакогностичне та фармакологічне вивчення рослин та проведення обґрунтованих досліджень для з'ясування можливості створення нових лікувально-профілактичних засобів на її основі.*

Ключові слова: *Malva sylvestris L, калачики лісові, ареальне поширення, біологічно активні речовини, фармакологічна активність.*

Introduction. Herbal medicine or phytomedicine refers to the use of plants and herbs for the purpose of cure and mitigation of human ailments. Plants have been used for medicinal purposes by humans since long before recorded history. Although modern medicine has taken over the lead from herbal medicines in the treatment of diseases in humans, the use of herbals has increased in recent years worldwide, as they are believed to be safer than modern medicines with few or no side effects. Many times, the whole herb is consumed either fresh or in the dried and powdered form (Shirwaikar, 2015).

In post COVID-19 business landscape, the global market for Herbal Medicines estimated at US$135.8 Billion in the year 2022, is projected to reach a revised size of US$248.6 Billion by 2030, growing at a 7.9% over the analysis period 2022–2030 (Yahoo Is Part of the Yahoo Family of Brands, 2023).

Malva sylvestris or common mallow but also known as wood mallow, tree mallow and high mallow. For centuries, this plant has been used as traditional medicine and can now be found growing in North America, Europe, and Oceania. Recently, scientists have discovered new useful application such as using it for antineoplastic activity in B16 cells (Malva Sylvestris – Plant Finder, n.d.; Alesiani, 2007, p. 90–95).

Purpose of the article. Gather and analyze information about area, chemical composition, toxicity studies, cultivation methods, pharmacological activity and describe some medicinal products based on *Malva sylvestris* (common mallow).

Material and methods. Summon information from different scientific journals such as Hindawi, Oxford Academic, Research Gate, NCBI and others, books, patents.

Result and discussion. *Malva sylvestris* is a biennial or perennial plant that grow all around the world. This herb has been used for thousands of years due to its anti-inflammatory, emollient, demulcent laxative, antioneoplastic and antimicrobial properties.

Malva sylvestiris contains a significant amount of biologically active compound as a micro- and macroelements (especially K, Fe), amino acids and proteins (aspargine), carbohydrates (sucrose and fructose), organic acid (oxalic), flavonoids (malvidin), vitamins, pigments and mucilages.

Botanical description

Stem: erect or supple branched 10–60 cm. long with fairly much covered with simple or star-shaped hairs.

Leaves: simple, lengthwise petiolated, suborbicular-twisted. The upper leaves have 5–7 lobes with rounded-toothed margins.

Flowers: single or in axillary fascicles, on unequal peduncles, shorter than the leaves.

Fig. 1. Common mallow *(Malva Sylvestris L.* | Plants of the World Online | Kew Science, n.d.)

Classification:

Kingdom: *Plantae* – Plants

Subkingdom: *Tracheobionta* – Vascular plants

Superdivision: *Spermatophyta* – Seed plants

Division: *Magnoliophyta* – Flowering plants

Class: *Magnoliopsida* – Dicotyledons

Subclass: *Dilleniidae*

Order: *Malvales*

Family: *Malvaceae Juss*. – Mallow family

Genus: *Malva L*. – mallow

Species: *Malva sylvestris L*. – high mallow (USDA Plants Database, n.d.)

The calicula has oval-lanceolated divisions that are shorter than the calyx. The calyx is slightly accrescent, with roughly triangular divisions that do not hide the carpels. The corolla is a beautiful rosepurple, veined with darker red and strongly indented, 3 to 4 times as long as the calyx. The carpels are reticulated-wrinkled on the back, with an acute non-toothed margin.

Fruits: 12 reniform achenes which remain fused at maturity (A Guide to Medicinal Plants in North Africa, 2005).

Origin area and cultivated

Area in the world

Malva sylvestris L. is an annual plant native to regions in Europe, Northern Africa, and Southwest Asia. In North America, it has naturalized throughout southern Canada and the U.S. except for several States in the Deep South (Louisiana to Florida) (Malva Sylvestris – Plant Finder, n.d.; Malva Sylvestris L. | Plants of the World Online, n.d.).

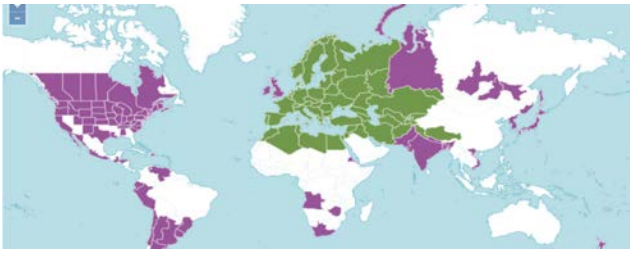

Fig. 2. Area of *Malva sylvestris* L. (■ – native; ■ – introduced) Area in Ukraine

Malva sylvestris L. grown in light forests, among bushes, near roads, in fields, but more often in forest areas in the north of the Forest Steppe (Loboda, n.d.; Terninko, 2011, p. 37–41).

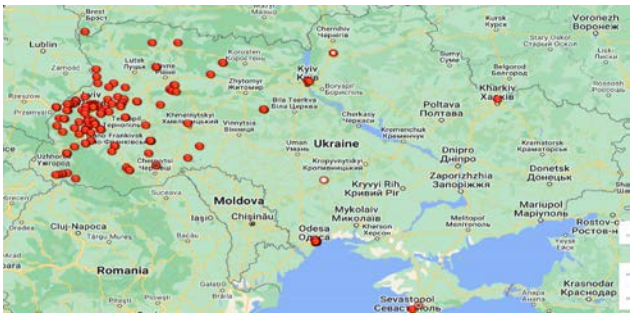

Fig. 3. Area of *Malva sylvestris* L. in Ukraine

Harvesting and storage

Medicinal uses include various parts of plants such as roots, flowers, leaves and occasionally the whole plant are utilized.

To harvest the leaves, they are cut while the vegetation is developing; this can be done twice a year. The leaves are trimmed to remove 2 cm of petioles. The flowers pick up before they are fully open by separating the peduncles from the cups.

Preparing the raw material: drying in the sun and then in a shelter at the 35°C. The dried flowers and leaves will be conserved in a dry place away from damp and light. After drying, the flowers turn purple or dark purple. The grass dried retains about 22% of its original weight, while flowers and leaves retain up to 18% and 16% respectively.

In the fall, it is recommended to dig up the roots when the stems start to dry or are completely dry. The roots wash thoroughly without removing the bark, and then allow them to dry in the shade or a well-ventilated room with spreading them out in a thin layer to ensure they dry properly (A Guide to Medicinal Plants in North Africa, 2005; Terninko, 2011, p. 37–41).

Composition of biologically active compound

1. Macro- and microelements

Medicinal plants are a natural source of minerals that bind to organic compounds in the most comfortable way for metabolic processes. The mineral composition of the mallow soil was compared to that of the surrounding soil using flame atomic emission spectroscopy, which was performed using a mixture of acetylene and air.

The studied samples contain numerous elements, such as potassium, calcium, iron, and aluminium, particularly in the leaves. The roots accumulate zinc (Terninko, 2011, p. 168–169).

In a comparative analysis of *Alcea rosea* L. and *Malva sylvestris* L., it was observed that *Alcea rosea* L. exhibited greater levels of N, P, Na, Fe and Mn, while *Malva sylvestris* L. displayed higher levels of K, Ca, Mg, Zn and Cu in their nutrient composition (Kordalı, 2021).

2. Proteins and amino acids

Proteins and amino acids are the primary molecules that build cells and organisms.

The crude protein content (N × 6.25) of the samples was estimated by the macro-Kjeldahl method.

The ninhydrin assay was performed on various extracts of mallow, revealing the presence of amino acids in each sample. Through chromatography, asparagine, glutamic acid, proline, arginine, and glycine were identified in all parts of the plant. The fruits and leaves were found to contain threonine, serine, alanine, valine, phenylalanine, and histidine, while leucine was found in the fruits and lysine in the leaves (Barros, 2010, p. 1466–1472; Terninko, 2012, p. 81–84).

3. Carbohydrates

Research has shown that most carbohydrates in plant materials derived from polysaccharides demonstrate an unknown mechanism during antioxidant activity. For leaves sucrose was the most abundant sugar (3.97 g/100g of dry weight), while fructose predominated in flowers (8.72 g/100g) and glucose immature fruits (1.52 g/100 g) and in leafy flowered stems (4.74 g/100g). Flowers revealed the highest total sugars content, and highest levels of fructose and glucose, while immature fruits showed the lowest levels in total sugars (2.30 g/100 g). (Mousavi, 2021, p. 1–13; Barros, 2010, p. 1466–1472).

4. Fatty Acids and sterols

Several studies on seeds of the *Malvaceae* family describe the occurrence of cyclopropenoid fatty acid derivatives. The most commonly found are sterulic (9,10-methylene-9-octadecenoic) and malvalic (8,9-methylene-8-heptadecenoic) acids. Generally, both fatty acids are present together in concentrations that vary up to 60%, depending on the species, and they are usually accompanied by small amounts of the cyclopropenoid analogs. They are also found in leaves, roots and shoots.

The oils were examined by GC-MS with respect to their fatty acid contents (Tešević, 2012, p. 221–227).

5. Organic acids

A total of 13 organic acids extracted from the leaves of *M. sylvestris* are known. These compounds contribute to developing the immunostimulant and antioxidant properties for *M. sylvestris* and their preparations based on these natural compounds. It is analyzed by chromatography (Mousavi, 2021, p. 1–13).

Table 1

Results of analysis mallow in compassion with soil

Elements	Leaves	Fruit	Roots	Flowers	Soil
Macroelements					
K	5010	3300	2070	3120	2200
Ca	1435	890	550	830	1700
Mg	500	500	310	470	9500
Na	17	11	70	10	1300
Si	1200	445	520	415	32500
P	285	210	115	190	230
Microelements					
Fe	80	33	48	52	2900
Mn	8	8	5	8	1500
Al	50	11	34	31	5600
Pb	<0.03	<0.03	<0.03	<0.03	2.8
Ni	<0.03	0.40	0.14	0.21	5.5
Mo	<0.02	<0.02	<0.02	<0.02	0.7
Cu	0.83	1.7	1.7	1.7	2.1
Sr	33	22	14	16	12
Zn	1.7	1.1	6.9	1.0	10

Table 2

Content of proteins and aminoacids

	Leaves	Flowers	Fruits	Leafy flowered stems	Roots
Proteins (g/100 g of dry weight)	12.25	8.50	3.26	14.26	-
Amino acids mg/100 mg					
Asn	1.9	-	1.5	-	1.0
Thr*	1.1	-	0.35	-	0.2
Ser	0.8	-	0.3	-	0.155
Gln	1.8	-	0.85	-	0.35
Pro	1.75	-	1.0	-	0.6
Gly	1.1	-	0.55	-	0.3
Ala	0.8	-	0.35	-	0.25
Cys	trace	-	trace	-	trace
Val*	0.6	-	0.3	-	0.155
Met*	0.3	-	0.15	-	0.1
Ile*	0.25	-	0.15	-	0.1
Leu*	0.1	-	0.4	-	0.155
Tyr**	0.45	-	0.35	-	0.2
Phe*	0.75	-	0.5	-	0.2
His**	1.1	-	0.6	-	0.25
Lys*	0.7	-	0.2	-	0.1
Arg**	2.5	-	1.0	-	0.35
Total content of essential amino acids	16.0	-	8.55	-	4.47
Total content of essential amino acids	23.75	-	23.98	-	22.62

Table 3

Sugars composition (g/100 g of dry weight) of different *Malva sylvestris* components

	Leaves	Flowers	Immature fruits	Lefly flowered stemps
Fructose	1.82	8.72	0.40	3.53
Glucose	3.15	7.63	1.52	4.74
Sucrose	3.97	2.47	0.11	3.30
Trehalose	2.67	1.47	-	3.09
Raffinose	-	-	0.26	-
Total sugar	11.61	20.02	2.30	14.67

Table 4

Lipid percentage and fatty acid composition of two *Malvaceae* species

	M. sylvestris	*M. sylvestris var. mauritana*
Fatty acids	9.60	7.18
Palmitic acids	24.28	23.22
Stearic acid	3.68	3.06
Palmitoleic acid	0.33	0.34
Oleic acid	13.66	13.00
Linoleic acid	44.16	48.30
Linolenic acid	0.77	0.83
Cyclopropenoid fatty acid: Malvalic acid	0.85	0.96
Sterulic acid	0.52	0.42

Table 5

Quantitative contents of organic acids in leaves of *M. sylvestris*

Acid	Retention time (min)	Content (mg/kg)	Acid	Retention time (min)	Content (mg/kg)
Oxalic	8,88	4170,7	Phenylacetic	16.62	103.6
Malonic	11.13	1284.4	Salicylic	16.93	219.0
Fumaric	11.97	6924,8	Malic	21.32	3510.0
Succinic	12.95	644,9	Citric	28.46	13133.2
Benzoic	13.96	60.1	Vanillic	31.33	84.3
Glutaric	15.51	37.7	Ferulic	38.99	397.7
			p-Coumaric	39.73	65.9

6. Flavonoids

M. sylvestris has significant quantities of flavonoids as showed in a study involving the nutraceutical potential of its extracts. Flavonoids have been found mostly in the flowers, especially anthocyanins such as malvidin 3,5-diglucoside (malvin), which occurs exclusively in the flavylium cationic form (Vadivel, 2016, p. 33–45; Barros, 2010, p. 1466–1472).

Table 6

The total amount of flavonoids (mg/g)

Leaves	Flowers	Immature fruits	Flowered stems
210.8	46.6	25.4	143.4

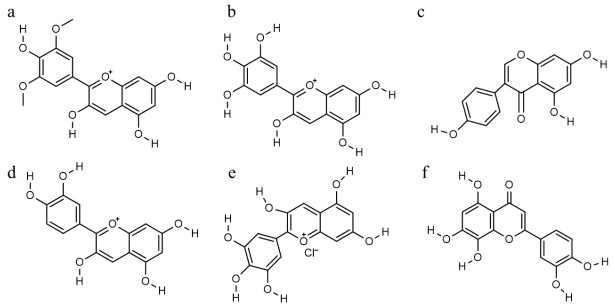

Fig. 4. Flavonoids in *Malva sylvestris* L.: a – malvidin; b – delphinidin; c – genistein; d – cyaniding; e – petunidin; f – hypolaetin

7. Anthocyanins

Anthocyanins – phenolic compounds that contain in petals and provide their colour.

Plants containing anthocyanins are characterized by high activity of redox biochemical reactions because due to the specific chemical structure of anthocyanins aglycones are active participants in biochemical processes.

Plants belonging to the *Malvaceae* family number about 1,500 species and were widely distributed on the territory of the Luhansk region. The flowers of plants of this family have a bright colour from pale pink to black-purple, which is due to the presence of anthocyanins in them, in particular malvidin. Anthocyanins were observed using two methods of extraction and UV-spectrophotometry. (Onishchenko, 2012, p. 126–127).

Table 7

Results of containing anthocyanins in flowers of *Malvaceae* family

Method	Common mallow (*Malva sylvestris L.)*	Dwarf mallow *(Malva neglecta Wall.)*
	Containing in %	
A (malvidin)	0.12	0.11
B (cyanidin)	0.15	0.09

8. Terpens

The chemical composition of a water extract of *M. sylvestris* has been investigated, by HPLC, NMR and MS analysis and resulted in the isolation of a sesquiterpene (14) and a new tetrahydroxylated linear diterpeneas (21) well as two monoterpenes: linalool and linalool-1-oicacid (Cutillo, 2016, p. 481–485).

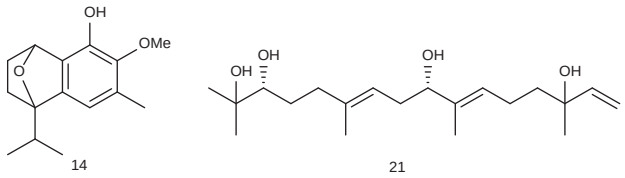

Fig. 5. Structure of new terpenes isolated from *M. sylvestris*

9. Vitamins

The antioxidant effect of mallow is determined by tocopherols (vitamin E) and ascorbic acid (vitamin C) and carotenenoids. Flowers contain the highest amount of ascorbic acid while green plant tissues have the most vitamin E.

Tocopheroles are considered a remarkable cancer prevention agent of the tocopherols in the human body The identification of tocopherols was done through HPLC, while spectrophotometry was used to identify tocopherols and ascorbic acid (Mousavi, 2021 p. 1–13; Barros, 2010, p. 1466–1472).

Table 8

Vitamins composition in different parts of plants (mg/g extract)

	Leaves	Flowers	Immature fruits	Flowered stems
Ascorbic acid	0.17	1.11	0.27	0.20
Carotenoids	0.19	0.03	0.01	0.11
Tocopherols:				
α-tocopherol	83.70	14.03	2.07	28.40
β-tocopherol	1.48	0.57	0.26	0.57
γ-tocopherol	20.05	2.53	0.28	5.93
δ-tocopherol	1.29	0.24	-	0.02

10. Pigments

Chlorophyll a, chlorophyll b and xanthophyll's presence was confirmed by separation of pigments from acetone extract of these plant species. Nowadays, chlorophylls and carotenoides have a very important role in prevention and therapy of different diseases of human beings, including immune system, different forms of skin disease and characteristic anti-oxidative influence is attributed to them.

Quantitative analysis was performed using spectrophotometry by method of Redzić (2005), Mohajer (2016), Ombra (2023).

Table 9

Spectrophotometrical analysis of pigments

Pigment	Redzić (2005), µg/g dry mass	Mohajer (2016), µg/g dry mass	Ombra (2023), µg/g dry mass
Chlorophyll A	11.93	2.491	$1.9 \cdot 10^{-3}$
Chlorophyll B	1.66	4.025	$1.6 \cdot 10^{-3}$
Carotenoides	5.185	0.054	104.1

11. Mucilages

The average yield of dried mucilage obtained from *Malva sylvestris* was found to be 4.2 %. Acute toxicity study of both mucilage showed no manifestations of toxic syndromes. The suspending properties of Malva sylvestris 0.5, 1, 1.5, and 2% w/v in calcium carbonate suspension. The pH of the suspensions was found to be slightly basic. They have low rate of sedimentation, high viscosity, slightly basic pH and are easily redispersible. Thus, it can be concluded that the extracted mucilage from fruits of Malva sylvestris has the potential of a suspending agent even at low concentration and can be used as a pharmaceutical adjuvant (Yeole, 2010, p. 385–389).

12. Alkaloids

An HPLC with UV detector was used for quantitative determination of two alkaloids, Sanguinarine and Berberine in low concentration 0.00509% and 0.1011258 %, respectively (Mohajer, 2016).

Pharmacological activity and uses

Though less useful than marshmallow (*Althaea officinalis*), common mallow is an effective demulcent.

The flowers and leaves are emollient and good for sensitive areas of the skin. It is applied as a poultice to reduce swelling and draw out toxins. Taken internally, the leaves reduce gut irritation and have a laxative effect.

When common mallow is combined with eucalyptus (*Eucalyptus globulus*), it makes a good remedy for coughs and other chest ailments. As with marshmallow, the root may be given to children to ease teething (Chevallier, 2016, p. 336).

Extracts of fresh have antimicrobial activity have a significant effect on both Gram-positive and Gram-negative bacteria (Popova, 2014, p. 41–48).

M. sylvestris showed antineoplastic activity in B16 cells and it is provided by flavonoids: quercetin, apigenin, genistein, myricetin (Alesiani, 2007, p. 90–95).

The aqueous fraction of *M. sylvestris* presented anti-inflammatory, controlled osteoclastogenic mechanisms and antioxidant abilities in different *in vitro* and *in vivo* methods. In addition, we suggest that given its multi-target activity the bioactive fraction may be a good candidate in the therapy of chronic inflammatory diseases (Benso, 2016, p. 1–19).

Malva sylvestris stands out from the numerous species used in traditional medicine and food due toits variety of uses. Its consumption is reported tohave originated in 3000 BC and archaeologicalstudies have shown evidence of *M. sylvestris* seeds inthe dental calculus of human fossils in the region of Syria (Henry, 2008, p. 1–8).

Medicinal and preventive preparations and remedies based on plants

Therapeutic and preventive drugs and patents based on common mallow are listed in table 10.

Cultivation

How and When to Plant Mallow

Malva sylvestris pass in spring after the danger of frost, mallow seeds sow directly in the garden in an area that receives full sun and has some protection from the wind. Mallow plants grow well in ordinary soil as long

Table 10

Patents based on *Malva sylvestris L.*

№	Name	Author	Country	No. of patent	Application
1	Plant substance based on *Malva sylvestris* with anti-inflammatory properties (Nemiatykh, 2014)	Nemyatih Oksana, Onyshchenko Ulyana, Ternenko Inna	Ukraine	90284	1.Plant substance with an anti-inflammatory effect based on leaves of mallow that collected in the pre-flowering phase 2. Plant substance based on mallow roots
2	Medicinal product with antioxidative action based on leaves of *Malva sylvestris* (Lazarchyk, 2014)	Lazarchuk Oksana, Onishchenko Ulyana, Nemyatih Oksana, Ternenko Inna	Ukraine	105593	A medicinal product with antioxidative activity is a thick extract from the leaves of the mallow
3	Compositions containing *Malva sylvestris* extract and use thereof on mucosal tissues (Stone, 2006)	Stone Violetta Iotsova, Zhao Renbin, Seiberg Miri (Johnson & Johnson Consumer)	The USA	WO2006047470A2	*Malva sylvestris* extract can improve tissue elasticity, structural integrity, and mucus production.
4	Pharmaceutical Compositions For The Topical Use Containing Medicinal Plants Extracts With Antiphlogistic And Cicatrising Activities (Baraldi, 2003)	Baraldi Mario	Italy	WO03033007A1	Extracts of chamomile heads (*Matricaria recutita*), althaea roots (*Althaea officinalis L.*), malva flowers (*Malva sylvestris*), large-leaved lime flowers (*Tillia Platyphyllos*) and milfoil flowers (*Achillea millefolium L.*) are endowed with anti-inflammatory and cicatrising properties.
5	Combination product for relieving sore throats comprising honey, propolis, erysimum and mallow (Bertrand, 2023)	Bertrand Eugénie, Gentilhomme Marilyn, Vigneau Aurore (Urgo rech innovation et developpement)	France	WO2023057390A1	The combination of least honey, propolis, *Erysimum* and mallow help to relieve sore throats.

as it is well-draining. In areas with mild winters, mallow seeds can also be sown in the fall (McAlpine, 2023).

Seed-starting indoors is not recommended because mallow doesn't transplant well.

Light

Mallow requires full sun to be at its best. It can tolerate a small amount of shade, but the bloom color may be subdued.

Increasing light intensity significantly promoted somatic embryo proliferation, but not culture growth. However, somatic embryogenesis did not occur if cultures were exposed to light immediately after inoculation, minimum initial incubation induction in the dark (at least for one day) was required. (McAlpine, 2023; Konstas, 2003, p. 315–319).

Soil and Water

Moist, well-drained soil that is organically enriched is ideal, although ordinary soil is sufficient. Some authors have reported harmful effects in livestock when plant grown on nitrogen rich soils, the plant tends to concentrate high levels of nitrates in its leaves. Some mallow plants can adjust to dry conditions, but most prefer a moist environment. At first, they benefit from weekly watering, but water them deeply once every 10 to 14 days after they settle in (Barros, 2010, p. 1466–1472; McAlpine, 2023).

Fertilizer

Fertilize mallow plants once a year in late fall or early spring with a slow-release balanced fertilizer with a 10-10-10 NPK ratio. For the amount to use, follow product package instructions (McAlpine, 2023).

Conclusions. *Malva sylvestiris* it is plant that extensive spread and used in medicine for it is demulcent, emmolient, antimicrobial, antioxidant and antineoplastic activity and can reduce swelling and draw out toxins from skin. In the production of pharmaceutical products, leaves, flowers, and roots of mallow are dried. This plant can be used as natural sourse of flavonoids: malvidin, delphinidin, genistein, cyaniding, petunidin, hypolaetin. The seeds have occurred the presence of cyclopropenoid fatty acid derivatives. Flowers contain the highest amount of ascorbic acid while green plant tissues have the most vitamin E. The average yield of dried mucilage obtained from *Malva sylvestris* was found to be 4.2%.

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Внесок авторів:
Кулаківська А.Є. – збір матеріалу, аналіз літератури, написання статті;
Конечна Р.Т. – ідея, концепція, дизайн дослідження, редагування статті.

Електронна адреса для листування з авторами:
roksolana.t.konechna@lpnu.ua