How to Cite: Suleimen, Ye.M., Mamytbekova, G.K., Serikbai, G., Birimzhanova, D.A., Doudkin, R.V., Gorovoy, P.G., Ross, S., Martins, K.H.G. (2025). Composition and biological activity of essential oil from aboveground parts of *Artemisia messerschmidtiana*. *Fundamental and Experimental Biology, 30,* 4(120), 26–33. https://doi.org/10.31489/2025FEB4/26-33

Research Article

https://doi.org/10.31489/2025FEB4/26-33

UDC 630.866.1:633.878.32 Received: 22.08.2025 | Accepted: 15.10.2025 | Published online: 31 December 2025

Ye.M. Suleimen[1*], G.K. Mamytbekova[2], G. Serikbai[3], D.A. Birimzhanova[4], R.V. Doudkin[5], P.G. Gorovoy[6], S. Ross[7], C.H.G. Martins[8]

[1, 2,3, 4]*Kazakh University of Technology and Business named after K. Kulazhanov, Astana, Kazakhstan;*
[1]*Engineering Laboratory of NMR Spectroscopy, Sh. Ualikhanov Kokshetau University, Kokshetau, Kazakhstan;*
[1]*KazMunayGas Engineering LLP, Astana, Kazakhstan;*
[1, 2, 3, 4]*Institute of Applied Chemistry LLP, Astana, Kazakhstan;*
[5, 6]*G.B. Yelyakov Pacific Institute of Bioorganic Chemistry, Far Eastern Branch of the Russian Academy of Sciences, Vladivostok, Russia;*
[5]*Botanical Garden-Institute of the Far Eastern Branch of the Russian Academy of Sciences, Vladivostok, Russia;*
[7]*National Center for Natural Products Research and Department of Pharmacognosy, School of Pharmacy, University of Mississippi, Oxford, USA;*
[8]*Institute of Biomedical Sciences (ICBIM), Federal University of Uberlândia, Uberlândia, Brazil*
[*]*Corresponding author: syerlan75@yandex.kz*

Composition and biological activity of essential oil from aboveground parts of *Artemisia messerschmidtiana*

The study of the chemical composition of biologically active compounds from plants of the natural flora is a promising direction for investigating their biological activity and potential use as sources for the medicinal, pharmaceutical, and cosmetic industries. This article presents the results of an evaluation of the composition and biological activity of essential oil isolated from *Artemisia messerschmidtiana* from the Far East. The essential oil was extracted by hydrodistillation. The obtained essential oil was tested for cytotoxic, fungicidal, antimicrobial, antimalarial, tuberculostatic, and antileishmanial activities. The composition of the extracted essential oil was analyzed by GC–MS methods. The total composition of the essential oil included 43 components, with the highest content observed for 1,8-cineole, camphor, and α-campholenal. Testing of the essential oil revealed weak antimicrobial, fungicidal, and antimalarial activities, and high cytotoxic activity. No antituberculosis or antileishmanial activity was detected in the essential oil. The results contribute to the understanding of the biological activity of components of the genus *Artemisia* L.

Keywords: Artemisia messerschmidtiana, essential oil, biological activity, chromatography-mass spectrometry

Introduction

The study of the composition of essential oils and the biological activity of medicinal plants is an important task for science. Numerous studies have shown that plants of the genus Artemisia L. differ within sections and species in terms of the content of many groups of biologically active substances, including the composition of essential oils. These differences are influenced by various factors, such as soil conditions, differences in moisture, solar insolation, temperature, altitude above sea level, and age characteristics. The composition and quantitative accumulation of individual components are influenced by the timing of raw material collection, fertility and fertilization, drying conditions, and the genetic characteristics of individual plant populations. Differences in chemical composition depend on the plant organ, and the extraction method. A review of the literature on the evaluation of essential oils of the genus *Artemisia* and compounds isolated from them shows that in recent years, numerous studies have been conducted on their antibacterial, antifungal, antiviral, and other anti-infective properties [1].

Despite extensive research on the genus *Artemisia*, not all species have been studied sufficiently, which creates potential for the search for new medicinal compounds in the natural flora.

Artemisia messerschmidtiana Besser (=*Artemisia gmelinii* var. *messerschmidtiana* Poljakov) is a semi-shrub 60–80 cm high of the *Asteraceae* family. It grows in Buryatia, Irkutsk and Chita regions, Krasnodar Krai, and Mongolia (Fig. 1) on slopes with shrubby meadow-steppe vegetation and forest edges [2].

Figure 1. Areas of *A. messerschmidtiana*
(from Artemisia gmelinii var. messerschmidtiana Poljakov | Plants of the World Online | Kew Science)

As a continuing our research on essential oils of wormwood from the Far East [3–6] and Kazakhstan [7–9], we investigated the chemical composition and some kinds of biological properties of *A. messerschmidtiana's* essential oil from aboveground parts.

Previously, South Korean scientists isolated methyl esculin, daphnetin, 6-methyl esculetin, dimethyl daphnetin, esculin, and umbelliferone from *A. messerschmidtiana* raw materials [10].

The study of the aerial part *of A. messerschmidtiana* allowed the isolation of scopoletin, whose structure was established by spectral methods. The antibacterial and cytostatic activity of the dry extract and essential oil was studied. The content of 43 chemical elements in the plant was determined by atomic emission spectrometry. The anatomical structure of *A. messerschmidtiana* Bess. was also studied [11].

Experimental

Collection of raw materials. Raw materials of *A. messerschmidiana* for research were collected in the second decade of September 2017, in an oak forest on the southern steep slope on the left bank of the Razdolnaya (Suifun) River, near the village of Chernyatino, Oktyabrsky District, Primorsky Krai (Russian Federation) (Fig. 2).

Figure 2. A. messerschmidtiana

The herbarium code for *A. messerschmidtiana* sample was 103564. Plant samples were collected into herbarium fund of G.B. Eljakov Pacific Institute of Bioorganic Chemistry, laboratory of chemotaxonomy (Far East Branch of RAS, Vladivostok, Russian federation).

Obtaining essential oil. Essential oil was obtained by hydro distillation methods from aboveground parts with a Clevenenger apparatus, period of extraction was 2 hours [12], using hexane trap.

The essential oil of *A. messerschmidtiana* was tested on anti microbial and fungicidal activity, using the standard strains: *Aspergillus fumigates* ATCC 204305, *Candida albicans* ATCC 90028, *Candida krusei* ATCC 6258, *Staphylacoccus aureus* ATCC 29213, MRSATCC 33591, *Pseudomonas aeruginosa* ATCC 27853, *Candida glabrata* ATCC 90030, *Cryptococcus neoformans* ATCC 90113, *Escherichia coli* ATCC35218, and *Mycobacterium intracellulare* ATCC 23068 [13]. The reference preparations were amphotericin B and ciprofloxacin.

Primary screening was performed using a dose 50 μg/ml twice. Inhibition of bacterial and fungal growth (% Ing.) was taken into account in comparison with positive and negative controls. In secondary screening, samples were tested at concentrations ranging from 2 to 50 μg/ml of a suspension of 9 strains of microorganisms, and IC50 was calculated based on the results.

The anti malarial activity of essential oil sample was tested as inhibition strains of *Plasmodium falciparum* (chloroquine-sensitive — D6, and chloroquine-resistant — W2) using negative and positive control. The preparation chloroquine was applied as a negative control. Also the essential oil was tested on the mammalian cellular line VERO. The selectivity index (SI) was assessed as the ratio IC_{50} VERO to IC_{50} D6 or W2.

Study of cytotoxic activity was conducted on nauplii of *Artemia salina* [14]. Mortality and survival rates of larvae after exposure to different concentrations of essential oil were recorded. Mortality (P) index was calculated by the formula:

$$P = (A - B - C) / N \times 100\ \%$$

where, A is the number of dead larvae after 24 hours; B is the number of larvae that died before the start of the test; C is the average number of larvae that died in the negative control; N is the total number of larvae.

Mycobacteria testing was performed using the REMA method [15–18]. Working solutions of essential oil were diluted in Middle Brook 7H9 culture medium with the addition of OADC. 100 mL of Middle Brook 7H9 and essential oil were added to all test wells, with control wells containing no essential oil samples. Activity was assessed by color: blue color indicated no growth of mycobacteria, pink color indicated growth [19]. Isoniazid, amphotericin B, and chlorhexidine dihydrochloride were used as negative controls.

Testing for anti-leishmaniasis activity. The activity of essential oil was evaluated *in vitro* against *L. donovani* promastigotes (Pms) by flow cytometry (FACS). FACS analysis was performed to quantitatively assess fluorescence levels in treated and untreated groups. A decrease in fluorescence intensity indicated inhibition of parasite growth. J774 macrophages ($5x10^5$ cells per well) in 12-well culture plates were infected with Pms at a ratio of 10:1. The infection level in infected macrophages before and after treatment with the preparation was measured using FACS.

All tests were performed in triplicate. The activity of the samples was also evaluated by Gimza staining [20].

Results and Discussion

Gas Chromatography-mass spectrometry (GC/MS) is a highly accurate analytical method that allows the qualitative and quantitative composition of essential oils to be determined. Using GC/MS, it is possible to characterize in detail all components present in essential oils, including major and minor components, which may also have biological activity and influence the aroma and properties of the oil.

GH/MS analysis of essential oils was conducted by literature data [4]. Retention indices were recalculated relative to normal hydrocarbons C_8-C_{32}.

In essential oil of *A. messerschmidtiana* was determined 43 components. The main components are 1,8-cineole (29.1 %), camphor (24.8 %), and α-campholinal (4.9 %) (Tab. 1).

Table 1

Component composition of the essential oil of *A. messerschmidtiana*

R_{calc}	Component	Area, %	R_{calc}	Component	Area, %
797	Hexanal	0,3	116	Borneol	2.3
843	2-Hexenal	0.2	1167	α-Santolin alcohol	1.9
916	Tricyclene	0.3	1168	*Unidentified 2*	0.8
926	α-Pinene	0,6	**1169**	**α-Campholenal**	**4.9**
941	Camphene	2.3	1174	Terpinene-4-ol	0.9

Continuation of Table 1

R_{calc}	Component	Area, %	R_{calc}	Component	Area, %
963	4(10)-Thujone	0.1	1182	*p*-Cymene-8-ol	0.9
985	1-Octen-3-ol	0.8	1188	α-Terpineol	0.4
1010	3,5,5-Tetramethyl-1,3-cyclohexadiene	0.3	1200	*trans*-Piperitol	0.2
1016	*o*-Diethylbenzene	0.2	1224	*trans*-Chrysotenyl acetate	2,0
1020	*o*-Cymene	0.2	1278	Bornyl acetate	1.3
1033	**1,8-Cineole**	**29.1**	1288	Eucarvon	0.4
1052	γ-Terpinene	0.2	1307	5-Isopropenyl-2-methylcyclopent-1-ene-carboxaldehyde	0.1
1065	*cis*-Linalool oxide	0.1	1468	β-Eudesmene	0.2
1100	6-Methyl-3,5-heptadien-2-one	0.2	1562	Spatulenol	0.8
1100	***Unidentified 1***	**8.1**	1565	Caryophyllene oxide	1.2
1116	Chrysanthenone	0.4	1592	Gumulen-1,2-epoxide	0.1
1130	*cis*-2-p-Menten-1-ol	0.3	1646	Neointermedium	0.3
1133	*cis*-Chrysanthenol	0.5	1651	5β,10α-Eudesm-11-en-4-ol	0.6
1147	**Camphor**	**24.8**	1680	(*1R,7S, E*)-7-isopropyl-4,10-dimethylenecyclode-5-enol	0.2
1148	*p*-Mentha-1,5-dien-8-ol	0.2	1794	Methyl ester of isocostonic acid	0.5
1155	Pinacurvone	1.0	1968	*n*-Hexadecanoic acid	0.3
1161	Isogeranial	0,2		**Total**	**90,7**

Testing on the anti microbial and fungicidal activity showed weak activity (Tab. 2).

Table 2

Anti microbial and fungicidal activity of *A. messerschmidtiana* essential oil

Essential oils / comparison preparation	*C. albicans*	*C. glabrata*	*C. krusei*	*A. fumigatus*	*C. neoformans*	*S. aureus*	MRS	*E. coli*	*P. aeruginosa*	*M. intracellulare*	Test concentration (μg/ml)
Amphotericin B	10	99	100	99	100	-	-	-	-	-	5
Ciprofloxacin	-	-	-	-	-	89	96	98	97	85	1
Essential oil	0	5	3	0	6	0	0	2	11	5	0

The essential oil from this plant has also been studied for its antimalarial activity and showed low activity with 40 % inhibition against *Plasmodium falciparum* D6 compared to the reference drug chloroquine (Tab. 3).

Table 3

Antimalarial activity of *A. messerschmidtiana* essential oil

Essential oils/comparison drug	*P. falciparum* D6 % Inh.
Chloroquine	9
Essential oil of *A. messerschmidtiana*	4

The essential oil of the plant was also studied for cytotoxic activity. All concentrations of essential oil demonstrated acute lethal toxicity, so, all larvae died.

The testing on anti tuberculosis activity (Tab. 4, 5) showed no significant effect.

Table 4

Activity of *A. messerschmidtiana* essential oil against mycobacteria (anti-tuberculosis activity) and yeast

Essential oils/comparison preparation	*M. tuberculosis* H37Rv ATCC 27294	*M. avium* ATCC 25291	*C. krusei* ATCC 6258	*C. parapsilosis* ATCC 22019
Essential oil *A. messerschmidtiana*	2000	>2000	>3000	>3000
Positive control	0.06Isoniazid	>1.0 Isoniazid	1.0 Amphotericin B	0.5 Amphotericin B
Test concentration against *Mycobacterium* sp from 31.25 μg/ml to 2000 μg/ml. Concentration of reference preparations against *Mycobacterium* sp from 0.015 μg/ml to 1.0 μg/ml				

Table 5

Activity of *A. messerschmidtiana* essential oil against bacteria

Essential oils/comparison preparation	*E. faecalis* ATCC 4082	*S. salivarius* ATCC 25975	*S. mitis* ATCC 49456	*S. mutans* ATCC 25175	*S. sanguinis* ATCC 10556	*S. sobrinus* ATCC 33478	*L. casei* ATCC 11578
Essential oil of *A. messerschmidtiana*	400	400	400	400	>400	400	400
Chlorhexidine dihydrochloride	7.375	1,844	7.375	0.922	3.688	1,844	3.688
Test concentration against yeast: 1.46 μg/ml to 3000 μg/ml. Concentration of reference products against yeast: 0.031 μg/ml to 16.0 μg/ml. Control: C. *parapsilosis* ATCC 22019—MIC value: 0.25–1.0 μg/ml. C. *krusei* ATCC 6258—MIC value: 0.25–2.0 μg/ml							

The latest series of tests on *A. messerschmidtiana* essential oil showed no anti-leishmaniasis activity compared to existing drugs.

Conclusion

Thus, the studies conducted show that 43 components were found in the essential oil of *A. messerschmidtiana*. The major components were camphor, 1,8-cineole, and α-campholenal. Analysis of biological activities showed that the tested essential oil exhibited weak fungicidal, antimicrobial, and antimalarial effects, but high cytotoxic activity. No antituberculosis or antileishmanial activity was detected in the essential oil.

Acknowledgments

The authors would like to thank Dr. M. Jacob for his assistance in studying the antimicrobial activity, and Dr. Sh. Khan (University of Mississippi, USA) for his assistance in studying the antimalarial activity.

Funding

This study is conducted with financial support of the Science Committee of the Ministry of Science and Higher Education of Kazakhstan (program BR24992761). Plant material was collected according with the state assignment to the Pacific Institute of Bioorganic Chemistry named after G.B. Yelyakov FE Branch of RAS (agreement No. 075-03-2025-231).

Conflict of Interest

Authors declare no conflict of interest.

Author contribution

The manuscript was written through contributions of all authors. All authors have given approval to the final version of the manuscript. CRediT: **Suleimen Ye.M.** — investigation, methodology, funding, writing-review & editing; **Mamytbekova G.K.** — conceptualization, essential oil isolation, antimicrobial and antifungal activity, data curation; **Serikbai G.** — antimicrobial activity; **Birimzhanova D.A.** — data curation, GS/MS data interpretation; **Doudkin R.V. —** investigation, methodology, plant material collection; **Gorovoy P.G. —** investigation, methodology, plant material collection; **Ross S. —** GC/MS analysis; **Martins C.H.G. —** investigation of antituberculosis activity.

References

1 Abad, M.J., Bedoya, L.M., Apaza, L., & Bermejo, P. (2012). The *Artemisia* L. Genus: are view of bioactive essential oils. *Molecules, 17,* 2542–2566. https://doi.org/10.3390/molecules17032542

2 Bisht, D., Kumar, D., Kumar, D., Dua, K., & Chellapan, D.K. (2021). Phytochemistry and pharmacological activity of the genus *Artemisia*. *Arch Pharm Res., 44*(5), 439–474. https://doi.org/10.1007/s12272-021-01328-4

3 Özek, G., Suleimen, Ye.M., Tabanca, N., Doudkin, R., Gorovoy, P.G., Göger, F., Wedge, D.E., Ali, A., Khan, I.A., & Başer K.H.C. (2014). Chemical diversity and biological activity of the volatiles of five *Artemisia* species from Far East Russia. *Records of Natural Products, 8*(3), 242–261.

4 Suleimen, Ye.M., Doudkin, R.V., Gorovoi, P.G., Wang, M., Khan, I., & Ross, S.A. (2014). Composition and bioactivity of *Artemisia umbrosa* essential oil. *Chemistry of natural compounds, 50*(3), 545–546. https://doi.org/10.1007/s10600-014-1011-z

5 Suleimen, Ye.M., Doudkin, R.V., Gorovoi, P.G., Wang, M., Khan, I., & Ross, S.A. (2015). Constituent compositions of essential oils from *Artemisia littoricola* and *A. mandshurica*. *Chemistry of natural compounds, 51*(4), 790–792. https://doi.org/10.1007/s10600-015-1414-5

6 Suleimen, Ye.M., Sisengalieva, G.G., Adilkhanova, A.A., Dudkin, R.V., Gorovoy, P.G., & Iskakova Zh.B. (2019). Composition and biological activity of essential oil from *Artemisia keiskeana*. *Chemistry of Natural Compounds, 55*(1), 154–156. https://doi.org/10.1007/s10600-019-02641-7

7 Suleimen, R.N., Suleimen, Ye.M., Ashimbaeva, M.D., Birimzhanova, D.A., Ibataev, Zh.A., Mamytbekova, G.K., Doudkin, R.V., & Gorovoy, P.G. (2023). Component composition and biological activity of essential oil from *Kalimeris incise. Chemistry of Natural Compounds, 59*(1), 180–182. https://doi.org/10.1007/s10600-023-03948-2

8 Suleimen, Ye.M., Ibatayev, Zh.A., Suleimen, R.N., & Mamytbekova, G.K. (2022). Constituent composition and biological activity of essential oil from *Artemisia sublessingiana*. *Chemistry of Natural Compounds, 58*(4), 766–769. https://doi.org/10.1007/s10600-022-03790-y

9 Suleimen, Ye.M., Ibatayev, Zh.A., Suleimen, R.N., Birimzhanova, D.A., Mamytbekova, G.K., & Ishmuratova, M.Yu. (2022). Constituent composition of essential oil from *Artemisia semiarida. Chemistry of Natural Compounds, 58*(5), 951-952. https://doi.org/10.1007/s10600-022-03838-z

10 Hahn, D.R. (1966). Biochemical studies on the constituents of *Artemisia messrschmidtiana* Besser var. viridis Besser and their derivatives. II. Cholagogic acitivity of coumarin derivatives. *Journal of the Pharmaceutical Society of Korea, 10*(3), 25–29.

11 Iskakova, Zh.B., Suleimen, Ye.M., Ishmuratova, M.Yu., Doudkin, R.V., & Gorovoy, P.G. (2014). Phytochemical study of *Artemisia messerschmidtiana* Bess. *Natural and Mathematic Sciences in Modern World: materials of XX International Scientific-Practical Conference*. Novosibirsk, 7(19), 93–104.

12 Kolge, P., & Tamboli, F.A. (2019). *Analysis of Raw Materials*. Bharati Vidyapeeth College of Pharmacy. Maharashtra, India.

13 Kikhanova, J.S., Iskakova, J.B., Dzhalmakhanbetova, R.I., Seilkhanov, T.M., Ross, S.A., & Suleimen, E.M. (2013). Constituents of *Artemisia austriaca* and their biological acitivity. *Chemistry of Natural Compounds, 49*(5), 967-968. https://doi.org/10.1007/s10600-013-0796-5

14 Suleimenov, E.M. (2009). Components of *Peusedanum morisonii* and their antimictobial and cytotoxic acitivity. *Chemistry of Natural Compounds, 45*(5), 710–711. https://doi.org/10.1007/s10600-009-9423-x

15 Porto, T.S., Rangel, R., Furtado, N.A.J.C., de Carvalho, T.C., Martins, C.H.G., Veneziani, R.C.S., Da Costa, F.B., Vinholis, A.H.C., Cunha, W.R., Heleno, V.C.G., & Ambrosio, S.R. (2009). Pimarane-type diterpenes: antimicrobial activity against oral pathogens. *Molecules, 14*, 191–199. https://doi.org/10.3390/molecules14010191

16 (2009). *CLSI — Clinical and Laboratory Standards Institute. Methods for dilution antimicrobial susceptibility tests for bacteria that grow aerobically.* M7-A8.

17 Palomino, C.J., Martin, A., Camacho, M., Guerra, H., Swings, J., & Portales, F. (2002). Resazurin microtiter assay plate: simple and inexpensive method for detection of drug resistance in *Mycobacterium tuberculosis. Antimicrobial Agents and Chemotherapy, 46*(8), 2720–2722. https://doi.org/10.1128/AAC.46.8.2720-2722.2002

18 Wayne, P.A. (2002). *Approved standard*, 2nd ed. NCCLS document M27–A2.: National Committee for Clinical Laboratory Standards.

19 Gemechu, A., Giday, M., Worku, A., & Ameni, G. (2013). In vitro anti-mycobacterial activity of selected medicinal plants against *Mycobacterium tuberculosis* and *Mycobacterium bovis* strains. *BMC Complementary and Alternative Medicine, 13*, 291. https://doi.org/10.1186/1472-6882-13-291

20 Maurya, R., Gupta, P., Chand, K., Kumar, M., Dixit, P., Singh, N., & Dube, A. (2009). Constituents of *Tinospora sinensis* and their antileishmanial activity against *Leishamina donovani*. *Natural Product Research, 23*(12), 1134–1143. https://doi.org/10.1080/14786410802682239

Е.М. Сүлеймен, Г.К. Мамытбекова, Г. Серікбай, Д.А. Бірімжанова,
Р.В. Дудкин, П.Г. Горовой, С. Росс, К.Х.Г. Мартинс

Artemisia messerschmidtiana эфир майының құрамы мен биологиялық белсенділігі

Дәрілік өсімдіктердің жаңа көздерін іздеу аясында эфир майларының химиялық құрамын зерттеу және олардың биологиялық белсенділігін бағалау маңызды міндет. Мақалада Қиыр Шығыстың *Artemisia messerschmidtiana* флорасынан бөлінген эфир майының құрамы мен биологиялық белсенділігін бағалау нәтижелері талқыланған. Эфир майы гидродистилляция арқылы бөлініп алынды. Алынған эфир майының микробқа, зеңге, безгекке, цитотоксикалық, туберкулезге және лейшманриозға қарсы белсенділігі тексерілді. Эфир майының құрамын хроматография-масс-спектрометрия көмегімен талдау 43 компоненттің бар екенін көрсетті. Максималды құрам 1,8-цинеол, камфора және α-камфоленал үшін белгіленді. Эфир майын сынау әлсіз микробқа, фунгицидтік пен безгекке қарсы және жоғары цитотоксикалық белсенділікті анықтауға мүмкіндік берді. Эфир майының туберкулезге қарсы немесе лейшманияға қарсы белсенділігі анықталған жоқ. Алынған нәтижелер *Artemisia* L. туысының компоненттерінің биологиялық белсенділігін білуге ықпал етеді.

Кілт сөздер: Artemisia messerschmidtiana, эфир майы, биологиялық белсенділік, хроматографиялық масс-спектрометрия

Е.М. Сүлеймен, Г.К. Мамытбекова, Г. Серикбай, Д.А. Биримжанова,
Р.В. Дудкин, П.Г. Горовой, С. Росс, К.Х.Г. Мартинс

Состав и биологическая активность эфирного масла *Artemisia messerschmidtiana*

Изучение химического состава эфирных масел и оценка их биологической активности является важной задачей в свете поиска новых источников лекарственных растений. В настоящей статье рассматриваются итоги оценки состава и биологической активности эфирного масла, выделенного из *Artemisia messerschmidtiana* флоры Дальнего Востока. Эфирное масло было выделено методом гидродистилляции. Полученное эфирное масло было исследовано на антимикробную, антифунгальную, противомалярийную, цитотоксическую, антитуберкулезную и антилейшманиозную активность. Анализ состава эфирного масла с помощью хромато-масс-спектрометрии показал присутствие 43 компонентов. Максимальное содержание отмечено для 1,8-цинеола, камфоры и α-камфоленаля. Тестирование эфирного масла позволило установить слабую антимикробную, фунгицидную и противомалярийную активность, а также высокую цитотоксическую. Противотуберкулезная и противолейшманиозная активность эфирного масла не выявлена. Полученные результаты вносят вклад в знание биологической активности компонентов рода *Artemisia* L.

Ключевые слова: Artemisia messerschmidtiana, эфирное масло, биологическая активность, хромато-масс-спектрометрия

Information about the authors

Suleimen Yerlan Melsuly — Candidate of Chemical Sciences, PhD, Leading Researcher, K. Kulazhanov Kazakh University of Technology and Business, Astana, Kazakhstan; Laboratory of Engineering Profile NMR Spectroscopy, Sh. Ualikhanov Kokshetau University, Kokshetau, Kazakhstan; KazMunaiGas Engineering LLP, Astana, Kazakhstan; Institute of Applied Chemistry LLP, Astana, Kazakhstan; e-mail: syerlan75@yandex.kz, ORCID: 0000-0002-5959-4013

Mamytbekova Gulnur Kurbanalievna — PhD, Senior Researcher, K. Kulazhanov Kazakh University of Technology and Business, Astana, Kazakhstan; Institute of Applied Chemistry LLP, Astana, Kazakhstan; e-mail: gulnur4284@mail.ru; ORCID: 0000-0002-3866-5003

Serikbai Gulzhanat — Senior Researcher, K. Kulazhanov Kazakh University of Technology and Business, Astana, Kazakhstan; e-mail: gserikbaykyzy@inbox.ru; ORCID: 0000-0002-9569-5209

Birimzhanova Dinara Asylbekovna — PhD, Leading Researcher, K. Kulazhanov Kazakh University of Technology and Business, Astana, Kazakhstan; Institute of Applied Chemistry LLP, Astana, Kazakhstan; e-mail: dinarabirimzhanova@gmail.com; ORCID: 0000-0002-5572-9339

Doudkin Roman Vasilievich — G.B. Yelyakov Pacific Institute of Bioorganic Chemistry, Far Eastern Branch of the Russian Academy of Sciences, Vladivostok, Russian Federation; Botanical Garden-Institute of the Far Eastern Branch of the Russian Academy of Sciences, Vladivostok, Russian Federation; e-mail: r_doudkin@mail.ru; ORCID: 0000-0002-5528-7729

Gorovoy Petr Grigorjevich — G.B. Yelyakov Pacific Institute of Bioorganic Chemistry, Far Eastern Branch of the Russian Academy of Sciences, Vladivostok, Russian Federation; e-mail: petrgorovoy@gmail.com; OCID: 0000-0003-3433-7421

Ross Anis Samir — National Center for Natural Products Research and Department of Pharmacognosy, School of Pharmacy, University of Mississippi, Oxford, USA, e-mail: sross@olemiss.edu; ORCID: 0000-0002-3807-1299

Martins Carlos Henrique Gomes — PhD, Institute of Biomedical Sciences (ICBIM), Federal University of Uberlândia, Uberlândia, Brazil; e-mail: rglveira@bol.com.br; ORCID: 0000-0001-8634-6878