дәрежелі марганецті алуды жоғарылататындығы көрсетілген. Себебі өздігінен таралатын жоғары температуралық синтездің тотықсыздану кезеңінде силуминнің екі компоненті алюминий де, кремний де синтезге қатысады. Тотықтырғышты алдын-ала активтендіру үрдісті 750-800 ^{0}*С температурада өткізуді мүмкін етеді. Жұмыс барысында металлотермиялық әдіспен металл түріндегі марганец алынды.*

SELF-SPREADING HIGH-TEMPERATURE SYNTHESIS OF METAL MANGANESE

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Institute of Combustion Problems

It is shown that the use of silumene as a reducing agent results in a high degree of manganese extraction from manganese monoxide as both component of silumene – aluminum and silicon take part in SH-synthesis with a reduction stage. Preliminary activation of the reducing agent to carry out the process at the temperature of the furnace 750 – 800 ^{O}*C. Metallic manganese has been obtained in the work by the metallothermal method in SHS-regim.*

COMPOSITION AND ANTIMALARIAL ACTIVITY OF THE VOLATILE OIL OF AERIAL PART OF HALIMODENDRON HALODENDRON.

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The chemical composition of essential oil obtained by steam distillation from the flower, leaf and stem of Halimodendron halodendron, which is endemic to Kazakhstan, were analysed by GC/FID and GC/MS. The oil has unpleasant smell indicating that the oil composition is different than regular volatile oils. The percentage of the volatile oil in the air-dried plant material is 0.013 % (w/w).The components of the oil were identified by comparing their retention time and mass fragmentation patterns with those of the available references and / or with published data as well as through GCMS library search. This is the first report of the composition of the volatile oil of Halimodendron halodendron. The Volatile oil showed antimalarial activity (Plasmodium falciparum - 50% inhibition).

Key words: Halimodendron halidendron, Family fabaceae, volatile oil composition, antiprotozoal activity.

Introduction

The genus *Halimodendron* is a monotypic genus of legume containing the single specie *Halimodendron halodendron*, which is known by several common names (*Caragana argentea*, *Halimodendron argenteum*, and *Robinia halodendron*), including common salt tree and Russian salt tree [1]. Taxonomy: the plant belong to: Kingdom: Plantae; Order: Fabales; Family: Fabaceae; Subfamily: Faboideae; Tribe: Hedysareae; Genus: *Halimodendron;* Fisch. *ex* DC. Species: *H. halodendron;* Binomial name: *Halimodendron halodendron* (Pall.) Voss. Literature search showed nothing had been done on the chemistry and pharmacology of this plant. This encouraged us to carry out in detail phytochemical and biological studies on the aerial parts of the plant *H.*

halodendron. In this manuscript, we report the chemical composition and the antimalarial activity of the volatile oil isolated from the aerial parts of above mentioned plant.

Experimental part

Plant material: The aerial part including flowers of the plant *Halimodendron halidendron* were collected on May 29, 2010 from Almaty region in mountain plain Zailiiskii Alatau. The plant was identified by Dr. Nadezhda Genadievna, professor of botany at Institute of plant Biology, Al-Farabi Kazakh National University, Almaty, to be *Halimodendron halodendron* (Pall) Voss. (Fam. Fabaceae). A voucher speceimen (№ 25) was kept at Institute of plant Biology. The plant material was air dried.

Steam distillation: The volatile oil from the aerial parts of the plant *Halimodendron halodendron* was prepared by hydrodistillation. 400 g air-dried plant material were subjected to steam distillation (5 hours) to yield 0.05 g volatile oil (0,013 % w/w yield). The oil was light yellow in color with unpleasant smell.

Reference Standards: Reference standards of different monoterpenes, sesquiterpenes, and alkanes were obtained from Aldrich Chemical Co. Inc. (Milwaukee, WI), Fluka Chemical Corp. (New York, NY), Sigma Chemical Co. (St. Louis, MO), and Varian Associates (Houston, TX). These reference standards include: tricyclene, α-pinene, sabinene, α-phellandrene, 1-decene, limonene, fenchone, α-terpineol, terpinolene, *cis*-verbenol, *cis*-and *trans*-carveol, α-cedrene, (-)-isoledene, (-)-isolongifolene, (-)-isolongifolol, α-humulene, cuparene, myristyl alcohol, citronellyl acetate, neryl acetate, geranyl acetate, camphene, alloaromadendrene, *n*-eicosane, *n*-heneicosane, and hydrocarbon references (C_9 –C_{21}). Solutions were prepared in methanol at concentrations of 1mg/mL.

Volatile Oil Solution: For GCMS analysis the volatile oil was dissolved in methanol at a concentration of 10 mg/mL.

GCMS Analysis: GCMS analysis was carried out on a HP 6890 series GC, equipped with a split/ splitless capillary injector, a HP 6890 Series injector autosampler, and a DB-5 ms column (30 m x 0.25 mm x 0.25 μm, Agilent).The GC was interfaced to a HP 5973 quadrupole mass selective detector through a transfer line set at 240 ^{0} C. The injector temperature was 250 ^{0} C, and 1 μL injections were performed in the split (1:10) mode. Column flow was set at a constant pressure of 5.66 psi, giving an initial flow of 0.7 mL/ min, using helium as carrier gas. The oven temperature was raised from 70 ^{0} C to 200 ^{0} C at rate 2 ^{0} C/minute. Then continue at 200 ^{0} C for 15 minutes. The total run was 80 minutes. The filament was operated at 70 eV, with an emission current of 35 lA. The multiplier voltage was automatically set to 2247 V. The ion source and quadrupole temperatures were 230 and 150 C, respectively. The acquisition range was m/z 30–800 at 1.95 scans per second, starting 3.5 min after injection.

Results and Discussion

The percentage of the volatile oil in the air-dried plant material is 0.013 % (w/w). The oil was light yellow in color with unpleasant smell. GCMS analysis of the oil resulted in the identification of 27 components (table 1). The components of the oil were identified by comparing their retention time and mass fragmentation patterns with those of the available references and / or with published data as well as through GCMS library search. This is the first report of the composition of the volatile oil of *Halimodendron halodendron.* The Volatile oil from *Halimodendron halodendron* showed antimalarial activity (*Plasmodium falciparum* 50% inhibition).

Five aldehydes were identified in the oil (nonanal, 2-nonenal, decanal, dodecanal and tetradecanal). They constitute 16.85% of the oil. Their presence in a high percentage in the oil could explain why the oil has an unpleasant smell. Five alcohols were identified in the oil (1-octen-3-ol, Octanol , p-Menth-1-en-8-ol , E-2-Tetradecen-1-ol , and 3,7,11,15-tetramethyl-2-hexadecen-1-ol) and together constitute 9.23% of the oil. The major constituents in the oil are: Octacosane (15.12%), Linalyl anthranilate (9.01%), Heneicosane (10.39%), α-farensene (3.37%), and hexahydrofarnesyl acetone (3.11%).

Acknowledgment

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Table 1- Chemical Composition of the volatile oil of *Halimodendron halodendron*

Peak#	Retention time, min	% of each peak	Molecular formula	Identification
1	6.708	2.85	$C_8H_{16}O$	1-octen-3-ol
2	6.914	1.12	C_8H_16O	3-heptanone,5-methyl
3.	7.077	2.72	$C_9H_{14}O$	Furan, 2-pentyl
4	7.68	0.90	$C_8H_{16}O$	Octanol
5	8.54	0.9	$C_{10}H_{14}$	m-Cymene
6	10.8	2.29	C_8H_{16}	Cyclopropane, pentyl
7	12.41	9.01	$C_{17}H_{23}NO_2$	Linalyl anthranilate
8	12.7	4.899	$C_9H_{18}O$	Nonanal
9	15.94	2.102	$C_9H_{16}O$	2-Nonenal
10	18.05	1.789	$C_{10}H_{18}O$	p-Menth-1-en-8-ol
11	18.85	2.201	$C_{10}H_{20}O$	Decanal
12	24.44	4.842	$C_{13}H_{22}O$	2,6,10,10-tetramethyl-1-oxa-spiro[4.5]dec-6-ene
13	28.05	2.184	$C_{13}H_{16}$	Naphthalene, 1,2-dihydro-1,1,6-trimethyl
14	29.85	1.786	$C_{13}H_{18}O$	beta-Damascenone
15	32.13	3.873	$C_{12}H_{24}O$	Dodecanal
16	34.45	1.586	$C_{13}H_{22}O$	cis-Geranylacetone
17	36.21	1.588	$C_{13}H_{20}O$	beta- Ionone
18	41.45	3.374	$C_{15}H_{24}$	alpha-Farnesene
19	44.68	1.292	$C_{14}H_{28}O$	E-2-Tetradecen-1-ol
20	50.57	3.774	$C_{14}H_{28}O$	Tetradecanal
21	57.38	3.107	$C_{18}H_{36}O$	Hexahydrofarnesyl acetone
22	70.63	2.396	$C_{20}H_{40}O$	3,7,11,15-tetramethyl-2-hexadecen-1-ol
23	77.00	10.393	$C_{21}H_{44}$	Heneicosane
24	77.79	0.543	$C_{17}H_{36}$	Tetradecane, 2,6,10-trimethyl
25	77.91	0.651	$C_{21}H_{44}$	Heptadecane, 2,6,10,15-tetramethyl
26	78.96	15.123	$C_{28}H_{58}$	Octacosane
27	79.36	0.380	$C_{17}H_{36}$	Tetradecane, 2,6,10-trimethyl

СОСТАВ И ПРОТИВОМАЛЯРИЙНАЯ АКТИВНОСТЬ ЭФИРНЫХ МАСЕЛ ИЗ НАДЗЕМНОЙ ЧАСТИ HALIMODENDRON HALODENDRON.

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Эфирные масла получены дистилляцией водяного пара из цветков, листьев, стебельков растения Halimodendron halodendron, который является эндемиком произрастающим в Казахстане и был проанализирован с помощью ГХ/FID и ГХ/МС. Полученная маслообразная жидкость, была идентифицирована как эфирные масла, которые имели неприятный запах, отличающийся от регулярного состава эфирных масел. Процентное содержание масла составляло 0.013 % (w/w) от сухого остатка высушенного растения. Компоненты масел идентифицированы с помощью фрагментации структуры массы и получены в сравнении со стандартами, соответствующими временами удерживания и определены с помощью базы данных ГХ/МС. Впервые выделен и определен состав эфирных масел из растения Halimodendron halodendron. Эфирные масла показали противомалярийную активность (Plasmodium falciparum- 50% ингибирования).

HALIMODENDRON HALODENDRON ЖЕРАСТЫ БӨЛІГІНЕН АЛЫНҒАН ЭФИРЛІК МАЙЛАРДЫҢ ҚҰРАМЫ ЖӘНЕ БЕЗГЕККЕ ҚАРСЫ БЕЛСЕНДІЛІГІ

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Эфирлік майлар Қазақстанда өсетін эндемик болып табылатын Halimodendron halodendron өсімдігінің гүлі, жапырағы және сабағынан алынған су буын дистилляциялау арқылы алынған және құрамы ГХ/FID және ГХ/МС әдістерімен талданған. Алынған май тәрізді сұйықтық эфирлік май деп танылды және оның қалыпты эфирлік майларға тән емес жағымсыз иісі бар. Майдың пайыздық мөлшері кептірілген өсімдіктің құрғақ қалдығынан 0.013 % (w/w) құрайды. Май компоненттері массаның құрылымын фрагменттеу арқылы идентификацияланған, ұсталу уақытына сәйкес стандарттармен салыстыру нәтижесінде алынған және ГХ/МС мәліметтер қорының көмегімен анықталған. Halimodendron halodendron өсімдігінен эфирлік май алғаш рет бөлініп алынған және құрамы анықталған. Эфирлік майлардың безгекке қарсы белсенділі бар екендігі белгілі болды (Plasmodium falciparum- 50% ингибирлеу).

УДК 547.94

КОНДЕНСАЦИЯ 1-ИЗОТИОЦИАНО-1-ДЕЗОКСИ-2,3,4,6-ТЕТРА-О-АЦЕТИЛ-β-D-ГЛЮКОПИРАНОЗЫ С АЛКАЛОИДОМ АНАБАЗИНОМ

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Осуществлена реакция нуклеофильного присоединения алкалоида анабазина к 1-изотиоциано-1-дезокси-2,3,4,6-тетра-О-ацетил-β-D-глюкопиранозе. Структура синтезиро–ванного соединения установлена с помощью данных ИК- и ЯМР ^{1}Н- спектроскопии, масс-спектрометрии и рентгеноструктурного анализа.