

UDC 633.88:576.8

Botany**ESSENTIAL OIL AND ANTIMYCOTIC PROPERTIES OF
MATRICARIA RECUTITA L.****S.J.Mustafayeva¹, K.F.Bakhshaliyeva²**

(Presented by Academician of NAS of Azerbaijan M.A.Salmanov)

This article is devoted to studying the essential oil and antimycotic effect of Matricaria recutita L. that has extensive medicinal values and distributed in flora of Azerbaijan. In Guba for the first time is found that M. recutita L. has new distributed place there, determined the content of essential oil, chemical composition and antifungal activity against fungal cultures of Trichoderma lignorum, Fusarium oxysporium and Aspergillus niger.

Keywords: *Matricaria recutita*, essential oil, chemical composition, Chamazulene, α -Bisabololoxid A, Farnesene, antifungal, fungal cultures of *Trichoderma lignorum*, *Fusarium oxysporium* and *Aspergillus niger*

One genus family *Asteraceae* Bercht. et J.Presl tribus *Anthemideae* Cass. it is *Matricaria* L.- Chamomile. Genus in Europe, Asia and Africa, spread 50 species, the Caucasus and Azerbaijan - can be found in 3: *M.aurea* (Loefl.) Sch.Bip., *M.recutita* L., **M.matricarioides* (Less.) Porter [2, 5, 11].

M. recutita L. is one of the most useful species of Chamomile genus and is one of the most important scientific and folk medicine for ancient time up to date. It is also used as essential oil, technical, decorative and fodder plants. It also related to the rich composition of the biological active substances of a plant. Chamomile has been determined carbohydrates, polysaccharide, essential oil, carotinoide, nitrogen and poliasetilen compounds, immunization items, coumarin, flavonoids, alipatic alcohols, higher fatty acids, vitamin C.

The *M.recutita officinalis* was included to Russia and world pharmacognosy. It used in homeopathy, science, practice and folk medicine, especially flowers are used in infusion or cream as sweat and bile extracted, anti-spasm, antiseptics, astringent, against convulsion. It widely used inflammation of the respiratory tract, gastrointestinal, genicological diseases and malignant tumors, gall and kidney stones. *M. recutita* extract is used at the perfumery in-

dustry for production soaps, cream, shampoos and lotions [6, 8, 12].

According to the literature information there is 0,025-1,9% essential oil in *M.recutita*. Its main components are sesquiterpenoids - bisabolol, its oxides A and B, farnesene, aromatic terpenoid - chamazulene, monoterpenes - kadinene, mircene and others. The sky-blue colour at the essential oil and causing increasing valuable component of chamazulene has been formed matrisin and matrikarin lactones by hydrodistillation. It has anti-inflammatory, soothing, antioxidant, antiallergic, antibacterial, antimycotic, radioprotective and local anesthetic properties [4, 7, 11, 13, 14, 15].

This article has been devoted to study quantity and quality essential oil of *M.recutita*, as well as antifungal activity of the plant and aqueous extract.

The investigated materials of species *M.recutita* were gathered in flowering phase on 27 July, 2007 in the village Vladimirovka of Guba region. It is new spreading area for *M.recutita*. The essential oil of the above-ground part of plant was obtained by hydrodistillation.

The chemical composition of essential oil of *M.recutita* were analyzed by gas chromatography and chromatography-mass spectrometry methods.

Gas Chromatography (GC) was conduc-

ted using a Shimadzu 17A gas chromatography (Shimadzu, Japan) with equipped a capillary CP-SIL 8 CB column (15 m x 0.25mm, film thickness - 0.39 μ m). Nitrogen was used as the carrier gas at the constant flow rate of 5 ml/min. The oven temperature was held at 60°C for 2 min, then programmed to 250°C at a rate of 6°C/min for 5 min, and then held to 280°C of 15°C/min for 6 min. The injector and detector (FID) temperatures were kept at 280°C and 300°C, respectively.

Gas Chromatography/Mass Spectroscopy (GC/MS) was carried out using an Agilent 6890N Network CG system combined with an Agilent 5975 (Agilent, USA) inert Mass Selective Detector. The GC conditions were: capillary column Agilent 19091S-433 HP-5MS 5% Phenyl Methyl Siloxane (30.0 m x 0.25 mm, film thickness - 0.25 μ m); oven temperature was held at 70°C for 2 min, then programmed to 280°C at a rate of 5°C/min, and then held for 6 min. Helium was used as a carrier gas; nominal unit pressure 7.64 psi; average velocity 36 cm/sec; initial flow 1.0 mL/min; split ratio 40:1; injected volume, 0.50 μ L. The compounds of the essential oil were determined by comparison of the mass spectral data using the Wiley and Nist electronic libraries [1]. The percentage

of the components was calculated from the GC peak areas, using the normalization method.

To determine the antifungal activities tested dried (air-dry) the aerial parts and of the aqueous extract *M.recutita*. As the strain culture used *Trichoderma lignorum*, *Fusarium oxysporum* and *Aspergillus niger*, stored in the museum of the Institute of Microbiology of the National Academy of Sciences of Azerbaijan.

M.recutita is annual grass to a height between 25-40- sm. Blossoms in june-july and seeds in july-august.

M.recutita was spreaded on lowland regions of Azerbaijan, especially on the lowland of Kur-Araz and Nakhchivan's fields, around houses, gardens, roads, along the ditches and weedy locations [9]. It weeds also forest-meadow vegetation type and grows with fragments. It belongs the mezokserofit ecological group, holarptik class of boreal areal type.

Essential oil of *M. recutita* is the oil taken of the above - ground parts of the plant, it is also blue, sharp flavor, bitter taste, flexible moving fluid. Yield is 0.15%. Prescribed 7 from 27 (90,42%) components were identified (Table 1). Only 9.58% of the components have not been identified. The totality of identified components are consist 9,58%.

Table 1

Chemical composition of the essential oil from *Matricaria recutita*

№	Composition	t, min	w, %
1.	Kariofillene	16,27	4,44
2.	Farnesene	16,36	16,53
3.	γ -Kadinene	16,50	2,12
4.	α - Bisabololoksid B	17,01	3,02
5.	α -Bisabolol	17, 45	2,42
6.	α - Bisabololoksid A	17,85	19,15
7.	Chamazulene	18,13	42,74

t - minutes - retention time; w,% - percentages for components

As seen in table 1, the dominant component of essential oil is Xamazulen (42,74%) its aromatic sesquiterpenes. α -Bizabololoksid A (19.15%) (sesquiterpenoid oxide) and Farnezen (16.53%) (sesquiterpen) also is one of the main components too.

Antifungal activity was measured in two steps as follows: 1. development of fungus in solid media; 2. development of fungus in liquid media from *M.recutita*. The most common [3] methods were used on cultivating fungus. Material extracted from the thin-leaved *M.recutita* plant was crushed into small pieces ranging from 0.5 to 1 cm in size and wetted with 55–60% water. Therefore, fungi can develop in solid media. The pH level was relatively constant ranging from 6.5 to 7. The substrate, extensively washed with culture, was laid into Petri dishes and sterilized at 1 atm of pressure for 45 minutes. After sterilization, fungal biomass was equally inoculated into Petri dishes and incubated at 25–27°C. Colony counts were performed on each of the dishes at 3, 5 and 7 days

following inoculation. The results have been shown in the figure 1.

So, results are as displayed in Figure 1. Compare the fungus have been determined that *Fusarium oxysporium* (1,0; 2,6; 5,6 cm) fungus culture has been more antifungal activity than *Trichoderma lignorum* (3,0; 5,6; 7,0 cm) and *Aspergillus niger* (4,2; 6,9; 8,0 cm) in the *M. recutita*'s solid media.

For study antifungal effects of aqueous extracts from species *M.recutita* was taken various coagulation extracts (5,10,15 q) and it has been heated. The extraction pour into glass bottles. Then, extraction was cooled, filtered and poured into glass bottles. It was sterilized at 0.5 atm pressure for 30 minutes. The test was conducted at pH levels of 6, 5, and 7. Fungi strains were inoculated into an aqueous extract inside a test tube. Then, they were incubated at 25–27°C for seven days. Czapek's media was used for comparing results (Figure 2).

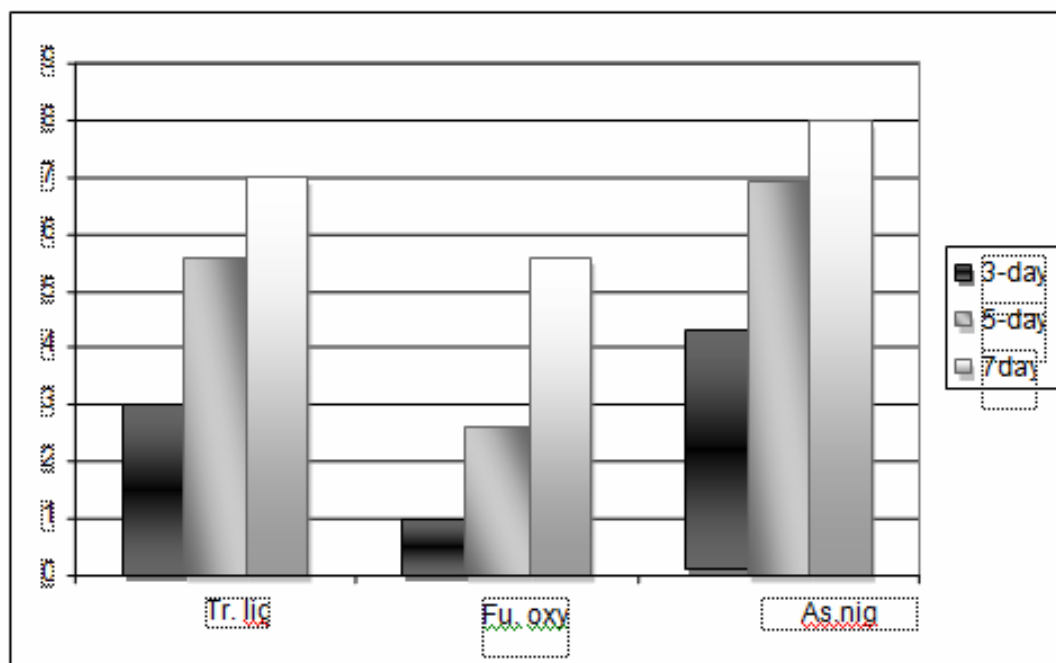


Fig. 1. Development processes for *Trichoderma lignorum*, *Fusarium oxysporum* and *Aspergillus niger* colonies in solid media prepared with *M. recutita*

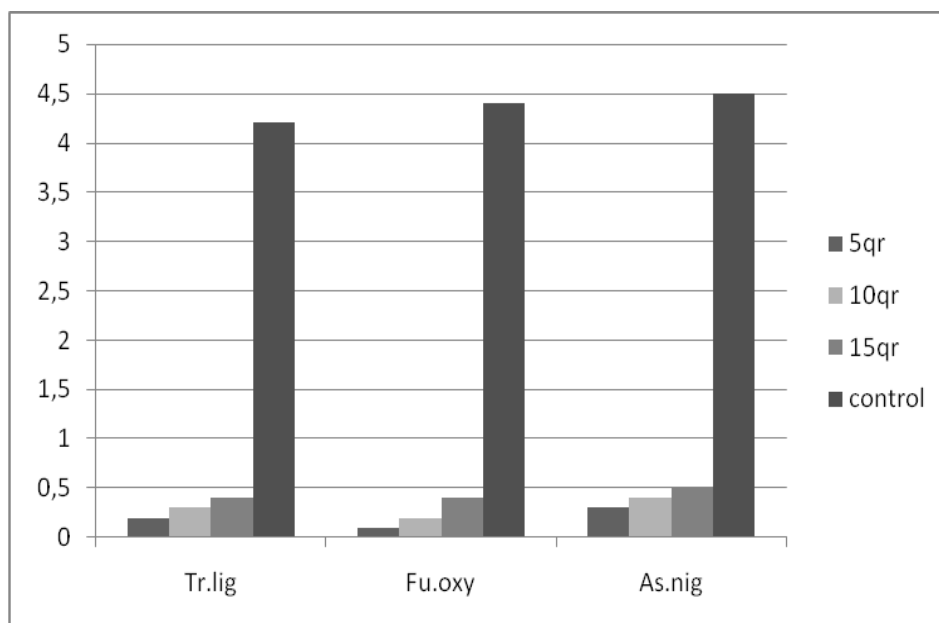


Fig. 2. Effects of aqueous extracts from *M. recutita* on *Trichoderma lignorum*, *Fusarium oxysporum* and *Aspergillus niger* fungal colonies

As seen in figure 2 it has been determined that aqueous extract from the *M. recutita* plant has strong fungistatic activity in comparison to control tests. For that reason *M. recutita* can be used as antifungal preparation.

Conclusion

1. Primary, essential oil of *Matricaria recutita* was taken of the above-ground parts of the plant, it is blue, sharp flavor, bitter taste. Yield is 0.15%.

2. One from 7 (90,42%) the prescribed components in essential oil composition is chamazulene (42,74 %) - dominant component.

3. Compare the fungus have been determined that *Fusarium oxysporum* (1,0; 2,6; 5,6 cm) fungus culture has been more antifungal activity than *Trichoderma lignorum* (3,0; 5,6; 7,0 cm) and *Aspergillus niger* (4,2; 6,9; 8,0 cm) in the *M. recutita*'s solid media.

4. The various coagulation extracts *M. recutita* has been showed a more inhibitory effect against to *Trichoderma lignorum*, *Fusarium oxysporum* and *Aspergillus niger*, for that it can be used as antifungal preparation.

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MATRICARIA RECUTITA L. NÖVÜNÜN EFİRYAĞLILIĞI VƏ ANTİMİKOTİK XASSƏLƏRİ

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Məqalə Azərbaycan florasında yayılmış qiymətli dərman bitkisi olan *Matricaria recutita* L. (aptekar çobanyastığı) növünün efiryağlılığına və antimikotik xassələrinə həsr olunmuşdur. İlk dəfə olaraq növün Quba rayonunda yeni yayılma ərazisi aşkar edilmiş, efir yağının çıxımı, komponent tərkibi müəyyən edilmiş, bitkinin və yerüstü hissəsinin ekstraktının *Trichoderma lignorum*, *Fusarium oxysporium* və *Aspergillus niger* göbələk kulturalarına qarşı antifungal təsiri öyrənilmişdir.

Açar sözlər: *Matricaria recutita*, efir yağı, komponentlər, Xamazulen, α -Bizabololoksid A, Farnezen, antifungal, *Trichoderma lignorum*, *Fusarium oxysporium*, *Aspergillus niger* göbələk kulturaları

ЭФИРНОМАСЛИЧНОСТЬ И АНТИМИКОТИЧЕСКИЕ СВОЙСТВА MATRICARIA RECUTITA L.

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Представлены сведения об исследовании эфирномасличности и антимикотических свойств ценного лекарственного растения флоры Азербайджана *Matricaria recutita* L. (Ромашки аптечной). Впервые обнаружено новое местонахождение вида в Губинском районе. Установлены содержание и компонентный состав эфирного масла. Выявлена антифунгальная активность как самих растений ромашки аптечной, так и водного экстракта из надземных частей на культуры грибов *Trichoderma lignorum*, *Fusarium oxysporium* и *Aspergillus niger*.

Ключевые слова: *Matricaria recutita*, эфирное масло, компоненты, Хамазулен, α -Бисабололоксид А, Фарнезен, антифунгальные свойства, *Trichoderma lignorum*, *Fusarium oxysporium*, *Aspergillus niger* культура грибов