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The Fungicide Feature of Some Essential Oil Plants used in the Folk Medicine

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A B S T R A C T

The purpose of the presented work is to study impact of some essential oil plants (using in the traditional medicine and food purposes) - *Anisum vulgare Gaertn, Apium graveolens L, Artemisia absinthium L, Glyeyrrhiza glabra L., Ocimum gratissimum L, Mentha piperita L.* and *Thymus cucasius L.* to the growth of some toxsigen fungi as *Aspergillus niger, A.ochraceus, A. fumigatus, P. cyclopium* and *C.herbarum.* In the studies, was found that essential oil of plant *Artemisia absinthium* and *Th. cucasius* has a strong fungicide properties and it completely stops the growth of all toxigenic fungi which were used in research.

Introduction

Nowadays, in the world and in our country increasingly expanding the areas of application of essential oil plant and essential oils obtained from them. Previously, essential oil plants and essential oils were used as food and in the folk medicine for treat of various diseases, but now its application areas has expanded, for excemple in the modern medicine, in the food industry, cosmetics, aromatherapy and pharmaceutical areas (4, 13, 15). The reason to have a wide impact areas of essential oils are related to the biologically active compounds in the content of essential oil and this biologically active substances of plant origin are used as a medicines in different directions against the diseases. Thus, most of them has features such as bactericide, fungicide and others (2, 6, 14). Therefore, in recent years wide spreading the biopreparation, prepared in the form of biologically active addition.

It should be noted that, Azerbaijan flora rich with resources of essential oil plants. According to the literature data, Azerbaijan flora has about 4,500 species of plant and wild and cultivated form of plants includes 1547 species of essential oil-medicinal plant

of which nearly 800 are essential-oil plants (7). Despite such as wide range of species, bactericide and fungicide properties of many essential oil plants had not become special subject of research, although conducted extensive research concerned to study the essential-oil plants.

Therefore, the purpose of the presented work is to explore the antifungal features of plant materials, precisely essential oils of *Anisum vulgare Gaertn, Apium graveolens L. Artemisia absinthium L, Glyeyrrhiza glabra L., Ocimum gratissimum L, Mentha piperita L.* and *Thymus cucasius L.* which included in flora of Azerbaijan.

Materials and Methods

As noted, in research were used 7 essential oil plants include in the flora of Azerbaijan and some information about them were given below:

Anisum vulgare Gaertn- is a flowering plant in the family: Apiaceae, genus: Pimpinella widely grown in Mediterranean countries such as Egypt, Greece, Cyprus. In Azerbaijan cultivates only one species. *Anisum vulgare Gaertn* which grow in Absheron has 1,5-6% essential oil, this essential oil holds 80-90% anetol. In addition have been identified aldehyde anise, ketone anise, anise acid, anise alcohol(5).

Apium graveolens L. - an annual or biennial herbaceous plant with a fleshy short rhizome and juicy napiform root. Flowers are white, gathered in a complex umbrella on short umbrellas. Fruits are bifid achenes, ovoid-globose, very small, with sharp protruding ribs. Flourishes in June-July. In Azerbaijan grows in Absheron, Lankaran lowland, wildly growing along the seashore, on the sands, solonetz-like and weedy places. The leaves of celery contain glycoside apiin, essential oil (1%), albumen, vitamin (6.17%), carotene (32-75 grams per 1 g). The fruits contain essential oil (2.5-3%), in addition, fatty oil (12%), common ash (6.5%) (5).

Artemisia absinthium L.- a perennial herb, growing from the base by several high flowering stems. Tsvetet in June-August (5). Flourishes in August-September. It is spereaded in Azerbaijan on the slopes of the Greater Caucasus and Caucasus Minor. The herb contains essential oil (0.5-2.0%), blue-green and contains tuyol alcohol, ketone thujone, cadinene, phellandrene, caryophyllene, Sabine, bizabolen and esters tuilovogo alcohol with acetic acid, isovaleric and palmitic acids. Essential oil of sage has antibacterial, bakretiostaticheskimi, deodorizing and antiparasitic properties.

Glyeyrrhiza glabra L.- has been used in Europe since prehistoric times(5). It is well documented in written form starting with the ancient Greeks. Glycyrrhizin is the major active constituent obtained from liquorice roots, one of the most widely used in herbal preparations for the treatment of liver complaints. The plant is used as anti-inflammatory, spasmolytic, laxative, anti-depressive, anti-ulcer and anti-diabetic.

Ocimum gratissimum L.-is a plant in the family: Lamiaceae, genus: Ocimum. Its composition has very useful elements, sugar, mineral salts with alkali properties, many vitamins and essential oils. Its leaves have 0.5 - 0.8%, flowers, 0.4 - 0.9% essential oils. The main part of the oil is 70% evgenol(5).

Mentha piperita L. is a plant in the family: Lamiaceae, Genus: Mentha L. Its young shoots and leaves has 2 - 3%, in the group of flowers 6% and in the trunks 0.2 - 0.4% essential oil of which 42 - 92% is menthol. Contains have carotene (40mg%), ursol and olean acids, triterpenes, pulegone, hesperidin, flavonoids and betaine items(5).

Thymus cucasius L. – is a plant in the family: Lamiaceae, Genus: Thymus. Its composition has essential oil (0,5-15%), which is the main ingredient timol, flavonoids, tannin and bitter substances, arganic acids, kamid, mineral salts, etc (5).

During the research, essential oils of plants *Anisum vulgare Gaertn, Apium graveolens L., Artemisia absinthium L, Glyeyrrhiza glabra L., Ocimum gratissimum L, Mentha piperita L.* and *Thymus cucasius L.* were preparat by methods of different authors (8-12). Essential oils were used in 0.3% and 0.5% concentrations.

As the test cultures have been used fungi like as *Aspergillus niger, A. ochraceus, A. fumigatus, Penicillium cyclopium* and *Cladosporium herbarum*. Thise fungi includes to the dominant species of toxigenic mycobiota, which widely distributed in nature of Azerbaijan (1).

As a control were used Chapek medium. The impact of essential oil plants to the growth of toxigenic fungi has been identified according to the dry weight of formed biomass (3).

Results and Discussion

The results, obtained during the research has been noted in the table 1. As seen from the table 1, influence at the 0,3% and 0,5% concentrations of essential oil of *A.vulgare, A.graveolens, A.absinthium, G.glabra, O.gratissimum, M.piperita* and *Th.cucasius* to the toxigenic test culture shuc as *As.niger, As.ochraceus, As. fumigatus, P. cyclopium* and *C.herbarum* shown that the best fungicide feature were on the essential oils of *M. piperita* and *Th.cucasius*.

Thus, if compare fungicide effect of essential oil of this plants with control (Table 1) we see that, all essential oil have enough fungicide affects to the chosen fungi, but at the same time, if compare fungicide effect of those essential oils with one another it becomes clear that, essential oils of *A. vulgare* and *A. graveolens* have less but *M.piperita* has a little more impact effects.

Essential oil of *Mentha piperita L*. at the 0,3% and 0,5% - consetration have quite strong antifungal effects against to the *A. niger, A.ochraceus, A. fumigatus, P. cyclopium* and *C.herbarum* (Table 1). So, the growth of fungus *A. niger* at the 0,3% concentration was 0,9 g / l, but 0,5% it was 0,6 g / l.

This indicator for *A. ochraceus* at the 0,3% consetration was 0,7 g / l, 0,5% - 0,5 g / l, for *As. fumigatus* at the 0,3% - 0,8 g / l, 0,5% - 0,5 g / l, for *P.cyclopium* 0,3% -0,5 g / l, 0,5% - 0,2 g / l, and for *C.herbarum* 0,3% -0,3 g / l, 0,5% - 0,2 g/l.

As seen, compared with control and other plants essential oil of *Mentha piperita L*. at the 0,3% and 0,5% consetration in the solution of alcohol once again allows to record that this essential oil has powerful fungicide affects. But if compare thes results with the result of essential oil of thyme we can see that essential oil of *A.absinthium* and *Th. cucasius* has more powerful fungicide influence than *Mentha piperita*. So, in the experiments at the 0,3%, and 0,5% consetration of essential oil of *Th. cucasius* and *A.absinthium* were not noted fungus growth. It again allows us to say that, *A.absinthium* and *Th. cucasius* has more powerful fungicide influence than mentha, although essential oil of mentha also had strong fungicide effect.

Table.1 Antifungal effect of essential oils at different concentrations to the toxigenic fungi

Plant species	Fungi species	Essential oli (%-)	Biomass (g/l)
Anisum vulgare Gaertn	*A.niger*	0,3/0,5	2,7/2,1
	A. ochraceus		3,2/2,0
	A. fumigatus		2,6/1,9
	P. cyclopium		3,3/1,7
	C.herbarum		2,4/1,5
Ocimum gratissimum L	*A.niger*	0,3/0,5	2,6/1,4
	A. ochraceus		2,8/1,6
	A. fumigatus		2,8/1,9
	P. cyclopium		2,9/2,2
	C.herbarum		2,8/1,9
Glyeyrrhiza glabra L	*A.niger*	0,3/0,5	1,2/0,1
	A. ochraceus		1,3/0,2
	A.fumigatus		1,0/0
	P. cyclopium		1,1/0,1
	C.herbarum		0,9/0
Mentha piperita L.	*A.niger*	0,3/0,5	0,9/0,6
	A. ochraceus		0,7/0,5
	A. fumigatus		0,8/0,5
	P. cyclopium		0,5/0,2
	C.herbarum		0,3/0,2
A.absinthium L	*A.niger*	0,3/0,5	0
	A. ochraceus		0
	A. fumigatus		0
	P. cyclopium		0
	C.herbarum		0
Apium graveolens L	*A.niger*	0,3/05	3,2/2,4
	A. ochraceus		3,6/2,7
	A.fumigatus		3,1/1,8
	P. cyclopium		3,7/2,1
	C.herbarum		3,3/1,9
Thymus cucasius L.	*A.niger*	0,3/05	0
	A. ochraceus		0
	A.fumigatus		0
	P. cyclopium		0
	C.herbarum		0
Control(Chapek medium)	*A. niger*	0	4,5
	A. ochraceus		5,2
	A.fumigatus		5
	P.cyclopium		5,6
	C.herbarum		4,6

Thus, from experiments it became clear that, essential oils of *M. piperita* especially *A.absinthium L* and *Th. cucasius* with different concentrations have strong fungicide effect. Up to now this essential oil plants were used in folk medicine for treats different diseases and as food, but at the same time, it can be used against of pathogenic fungi. So, the essential oil of *A.absinthium* and *Th. cucasius* may be considered as a promising results for the receive the bioperepats against the toxigenic fungi (*As.niger, As.ochraceus, As. fumigatus, P. cyclopium* and *C.herbarum)* which produce a lot of mycotoxins, which considered dangerous to the human health. It should be also noted that, the natural resources of these plants are enough in our country.

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