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The Research of Antibacterial Activity of Tarragon and Other Species of the Genus *Artemisia* L.

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The results of the research of antibacterial activity of tarragon *Artemisia dracunculus* L. extracts are shown. The aim of this work was to evaluate the antibacterial activity of tarragon herb extracts.

Keyword: *Artemisia dracunculus* L., thick extract, antibacterial activity.

1. Introduction

Species of the genus *Artemisia* L., which have long been used in official and folk medicine in many countries of the world, are very promising for medicine and pharmacy as sources of biologically active substances (BAS) ^[9].

At the Pharmacognosy Department of the National University of Pharmacy the study of the chemical composition and pharmacological activity of the *Artemisia* L. species growing on the territory of Ukraine is carried out. Previously, we investigated the composition of essential oils, carboxylic acids and amino acid composition of several species, isolated phenolic compounds (flavonoids and hydroxycinnamic acid) of *A. absinthium* L., *A. vulgaris* L., *A. austriaca* Jacq., *A. abrotanum* L., *A. annua* L., *A. dracunculus* L., *A. scoparia* W., *A. marschalliana* Spreng., *A. nutans* Willd. ^[4, 8, 16, 17]. Presently, we continue the research of the chemical composition of herbs and extracts of these species as well as *A. caucasica* Willd., *A. arenaria* DC., *A. campestris* L., *A. taurica* Willd., *A. balchanorum* Krash., *A. cina* Berg. Essential oils of these species herbs were obtained and the specific features of their chemical composition

were established, the analysis of BAS of other groups is carried out. Component composition of essential oil of tarragon from Ukrainian flora is different from essential oil composition of tarragon from Russia, Germany, France and other countries ^[12]. In the essential oil of Ukrainian tarragon aromatics compounds dominated: estragole (methylchavicol) - 39.7%, methyleugenol-18.7%, 4-4-metoxybenzaldehyde -3.2%, eugenol-1.2%, terpenoids: humulen-1,2-epoxyde-6.8, spatulenol-6.4% and linalool-1.2% ^[1, 2, 4, 5, 6]. The lipophilic extract contains these aromatic compounds and terpenoids. In samples of various essential oils and lipophilic extract of tarragon α - and β -pinene, camphene, borneol are absent or present in small quantities. These features influence on the degree and type of antibacterial and antifungal activity.

Research of the antibacterial activity of lipophilic and phenolic thick extracts of the *A. absinthium* L., *A. vulgaris* L., *A. austriaca* Jacq. and *A. abrotanum* L. herbs obtained by liquid-liquid fractionation in a sequential series of gradually increasing solvents polarity had been carried out. The revealed antimicrobial activity against strains of *Staphylococcus aureus*, *Escherichia coli*,

Pseudomonas aeruginosa, *Bacillus subtilis*, *Proteus vulgaris*, and *Candida albicans* [3, 7]. Research of the acute toxicity and allergenic effect of *A. absinthium* L., *A. vulgaris* L. and *A. austriaca* Jacq. extracts had been carried out, whereby founded that investigated dosages (20, 500 and 5000 mg/kg) did not show acute toxicity under the conditions of a short duration with intragastric insertion and sensitizing effect on hematological parameters.

Tarragon (*Artemisia dracunculus* L.) is cultivated in many countries including Ukraine. A number of researchers have investigated the antibacterial activity of essential oils and extracts of different species of tarragon against some pathogens [11, 13-15, 18], but the study of the antibacterial properties of the lipophilic and phenolic extracts of this plant, which grows in Ukraine, was never published.

The aim of this work was to evaluate the antibacterial activity of tarragon (*Artemisia dracunculus* L.) herb extracts. The objects of

study were lipophilic and phenolic thick extracts of tarragon herb obtained analogously to the above extracts. For the experiment extracts' solutions in 96% ethanol were prepared.

2. Materials and Methods

For the cultivation of the studied strains Mueller-Hinton agar and Sabouraud growing medium were used. The activity was determined using the disc-diffusion method [10]. In order to evaluate the activity the test strains of *Staphylococcus aureus* ATCC 25923, *Escherichia coli* ATCC 25922, *Pseudomonas aeruginosa* ATCC 27853, *Bacillus subtilis* ATCC 6633, *Proteus vulgaris* ATCC 4636, *Candida albicans* ATCC 885-663 we used, which were obtained from the Collection of Mechnikov Institute of Microbiology and Immunology. Degrees of sensitivity of the studied strains to the tested extracts were evaluated by the diameter of growth inhibition zones in millimeters (mm).

The experimental results are shown in Table 1.

Table 1: The sensitivity of microorganisms to *Artemisia dracunculus* L. extracts, mm

Preparation	Test strains, diameter of growth inhibition zones (mm)					
	<i>Staphylococcus aureus</i> 25923	<i>Escherichia coli</i> 25922	<i>Pseudomonas aeruginosa</i> 27853	<i>Bacillus subtilis</i> 6633	<i>Proteus vulgaris</i> 4636	<i>Candida albicans</i> 885-663
2% solution of the lipophilic extract	30,4±0,3	10,1±0,2	18,3±0,3	20,2±0,2	14,2±0,3	x
5% solution of the lipophilic extract	32,4±0,3	12,0±0,2	20,1±0,2	22,3±0,3	15,1±0,2	x
2% solution of the phenolic extract	28,3±0,1	12,2±0,2	22,0±0,3	30,0±0,3	13,2±0,2	x
5% solution of the phenolic extract	30,2±0,2	11,1±0,1	20,2±0,3	35,0±0,2	14,0±0,1	x

3. Results and Discussion

The test preparations showed different degrees of activity against all bacterial strains, but *C. albicans* strain was insensitive to them. All test preparations showed high activity against the strain of *S. aureus*; the strain of *B. subtilis* showed high sensitivity degree relative to the preparations of phenolic extract, and relative to the lipophilic extract preparations it showed moderate sensitivity. Investigated preparations showed moderate activity against the strain of *P. aeruginosa*, low activity – against *E. coli* and

P. vulgaris strains. Increasing in the concentration of the lipophilic extract solution led to increasing of sensitivity of the studied strains, but for the phenolic extract preparations this regularity is not observed. The degree of antimicrobial activity to various strains can be explained by the differences in composition of biologically active compounds in the extracts which have different mechanisms of action against studied strains.

It can be concluded that studied tarragon extracts have pronounced antibacterial effect on *S.*

aureus, *B. subtilis* and *P. aeruginosa* and can be applied as a substances for drug.

4. References

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