NATURAL SOURCES OF ESSENTIAL OILS AND CHEMICAL ANALYSIS OF SOME PLANTS

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Abstract: *This article describes the natural sources of essential oils and their uses.*

Key words: *Essential oil plants, common oleander, dandelion and alomatchoy plants, mass spectrometric, medicinal plants, pharmaceutical enterprises.*

The forests of Uzbekistan are distinguished by the abundance of various trees, shrubs and grasses. Human life is inextricably linked with the world of plants, because they fed, challenged, treated people, served as a source of construction, pharmaceutical and technical raw materials. Plants were widely used not only as food, but also as a source of biologically active substances.

According to the UN, the world's population has increased from 3.7 billion in 1970 to 7.8 billion by 2021, and is expected to exceed 15 billion in 2075. The largest growth is accounted for by the Asian continent. Due to population growth, the demand for industrial and agricultural, food, and pharmaceutical products will be high.

In Central Asia, a unique oriental folk medicine has been formed for centuries, based on the experience of using medicinal plants for thousands of years. Medicinal products prepared on the basis of medicinal plants and their raw materials are considered the main tool of folk medicine.

From the Middle Ages, many scientific works on the description of medicinal plants and their use in improving human health have reached us. Our compatriot Abu Ali ibn Sina (980-1037), who made a great contribution to the development of world medical science, devoted more than 20 scientific works to medical issues. The scientist created the 5-volume work "Al-Qanun" ("Laws of Medicine") based on the experiences he had spent in medical practice for many years. This work served as a guide not only for Arabs, but also for European doctors.

It is known that approximately 50% of drugs produced in pharmaceutical enterprises worldwide are made from medicinal plant raw materials. In particular, 77% of medicinal preparations used in the treatment and prevention of cardiovascular diseases, 74% of medicinal preparations used in the prevention and treatment of liver and gastrointestinal diseases, 73% of expectorant drugs, and 60% of hemostatic drugs are produced on the basis of raw medicinal plants.

Plants containing essential oil are mainly grown in Ukraine, Moldavia, Georgia, Tajikistan, Kyrgyzstan, Uzbekistan, North Caucasus, Crimea, Voronezh regions. Almost all the organs of plants contain essential oil. It accumulates in the underground organs of flowers and fruits, leaves, and the entire above-ground part of plants. Sometimes different parts of the same plant can contain essential oils of different composition.

The analysis of the literature data on the physico-chemical description of essential oils obtained from the common oleander plant shows that the physico-chemical properties of the essential oil, such as density, refractive index, and boiling point, depend on its component composition. Below are the results of extracting the essential oil from the common oleander plant, determining its component composition and comparing it with the chemical compounds contained in plants such as dandelion and sorghum. The results of the conducted research show that the essential oil is fully released from the raw material of the common oleander plant during extraction by the hydrodistillation method within 5-7 hours from the time of extraction. The resulting oil is dark purple in color and has a boiling point of 166^{0}C. Because the color of the essential oil is dark purple, its refractive index cannot be determined using a URL refractometer.

Gas-liquid chromatography and chromato-mass spectrometry methods were used to identify individual components of the obtained essential oil. The results of chromatography of the essential oil of the common oleander plant in the FFAP column in different modes showed that its low-temperature boiling fraction contained terpene hydrocarbons consisting of α- and β-pinenes. Chromato-mass spectrometry method was used to identify individual components of essential oil fractions boiling at high temperatures. As a result, it was found that the essential oil contains 47 different components, and the concentration of 22 of them is more than 1%. The main components of essential oil are: caryophyllene, caryophyllene oxide, linaclyl propanoate, eucalyptol, tuyol, bizabolol, azulenes.

In the laboratory, the dependence of essential oil extraction from plant raw materials on various conditions, for example, the gravity of the raw materials, the level of its crushing and the duration (time) of driving, was studied. A steam distillation method was used to determine the amount of essential oil. As a result, it was found that the essential oil was separated with the highest yield (1.140±0.025%) when the weight was 25.0 g, the grinding level of the raw material was 3 mm, and the driving time was 2 hours (Table 3.5). The qualitative composition of the obtained essential oil was determined by the method of chromato-mass spectrometric analysis on the NR 6890 gas chromatograph with the NR 5973 mass-selective detector.

The separation was carried out on a quartz capillary column (30m x 0.25mm x 0.25mm) packed with methylphenylsilicon. The speed of the gas carrier (helium) is 1 ml/min, temperature: at the injector - 280^{0}C, at the interface - 290^{0}C, at the mass-selective detector - 230^{0}C. Identification was carried out using the "HP Chem Station" software, taking into account the analytical parameters of the essential oil components, and the name of the compounds, the retention time, the quantitative share in the mixture, the similarity index of the library and obtained spectra were recorded (1 -table).

1 -table

Dependence of essential oil yield on driving conditions

Raw material, g	Product of essential oil, %								
	Grinding level and driving time								
	1 mm			2 mm			3 mm		
	1 hour	2 hour	3 hour	1 hour	2 hour	3 hour	1 hour	2 hour	3 hour
10.0	0.136	0.184	0.230	0.382	0.531	0.593	0.438	0.644	0.627
15.0	0.184	0.241	0.345	0.442	0.780	0.838	0.555	0.888	0.893

20.0	0.208	0.316	0.481	0.574	0.908	0.945	0.610	0.972	0.961
25.0	0.285	0.363	0.548	0.659	1.082	1.070	0.781	1.140	1.128
30.0	0.321	0.436	0.665	0.764	1.064	1.081	0.846	1.129	1.131

Based on the values of these parameters and the results of the mass spectrometric study of the sesquiterpene dissociation process, 33 components of the essential oil obtained from the plant were identified. The obtained sample contains the following compounds in the largest quantity: [30.68%] – n-allyl-anisole (6.45 min); [8.36%] – eudesma-5,11(13)-diene-8,12-olide (11.79 min); [7.33%] – cis-5-methyl-2-(1-methylethyl)-cyclohexanone (6.18 min); [5.56%] – naphtho(2,3-b)furan-2[3H]-one (12.15 min); [4.71%] – azulene (9.19 min); [3.41%] – menthol (6.28 min); [3.60%] – α-1-naphthalenepropanol (13.03 min); [2.78%] – pulegon (6.73 min); [2.74%] – camphor (6.14 min); [2.92%] – 1,5-cyclodecadiene (9.62 min); [2.04%] - thionine (5.91 min) and in small quantities: caryophyllene, cadinol, copaene, spathulenol, α-bisabolene substances are found.

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