

GC-MS ANALYSIS OF VOLATILE SUBSTANCES EXTRACTED FROM THE SURFACE OF THE PLANT *MEDICAGO SATIVA L.*

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ABSTRACT

Alfalfa is one of the most widely grown perennial legumes in irrigated lands of Uzbekistan and Central Asia. Medicago sativa L. growing in the village of Gova, Chust district was selected for research. Samples of dried alfalfa leaves and stems were extracted in petroleum ether and hexane in a soxlet apparatus. According to the results of the chromatomass spectrum, the amounts of substances obtained from the extract of the stem and leaf parts of alfalfa in hexane and petroleum ether were compared. The analysis of volatile substances found in alfalfa was first studied using the chromatomass spectrum.

KEYWORDS: alfalfa, chromatomass spectrum, hexane, petroleum ether.

INTRODUCTION

The flora of Uzbekistan describes 577 species of medicinal plants, which belong to 381 genera and 93 botanical families. In general, more than 120 species of medicinal plants are used in scientific medicine. Herbal medicines have a number of advantages over organic synthetics. Firstly, the physiological effects of herbal medicines are so high that they are selective and subtle, with almost complicated and non-allergenic properties.

The genus Alfalfa (*Medicago L.*) includes more than 100 species. It has annual and perennial, cultural and wild species. There are 36 species of alfalfa in our country, of which 20 species are perennials. The most widely grown and distributed species: blue alfalfa - *Medicago sativa L.*, yellow alfalfa (sickle) - *Medicago falcata L.*, hybrid alfalfa - *M. media L.*, light blue alfalfa - *M. coerulea L.*

Alfalfa drugs are used for colds, obesity, IBS, vascular fragility, bronchial asthma, anemia, rheumatism, osteoporosis, diabetes, intestinal ulcers, duodenal ulcers, urinary tract diseases, dysfunction, surgery in subsequent healing processes.

Alfalfa contains calcium, phosphorus, easily digestible protein and vitamins necessary for animal life. Minerals, many vitamins (C, D and K) and B vitamins, carotene are found in the surface. It also contains carbohydrates, essential and saturated fats, saturated organic acids, glycerides, anthocyanins, bioflavonoids. The chemical composition of alfalfa contains elements Mg, Si, Fe, Mn, P, Zn, and magnesium and phosphorus are the most common. Green alfalfa contains high quality plant proteins. Lysine from amino acids in alfalfa - 9.8;

methionine - 1.8; cysteine - 3.2, tryptophan - 2.4; arginine - 8.2 mg%.

The blue mass of alfalfa contains amines, lipids, sterols, starch, pectin, mono- and oligosaccharides, carotenoids (b-carotene, neo-b-carotene, etc.), cryptoxanthin, zeaxanthin, violaxanthin, flavoxanthin, carbonic acids (malonic, dioxymaleic, ketoglutaric, sinapic, ferulic) triterpene saponins, flavonoids (trisin, etc.), isoflavones and other substances have been found. Anthocyanins (malvidin, dolphinidine, petunidine-3,5-diglycoside), cyanidine, leukocyanidins were found in blossoming periods. The seeds contain 9.5-11% of saturated fats and 18.7% of proteins.

MATERIALS AND METHODS

An alfalfa plant was selected to grow in the village of Gova, Chust district, Namangan region. Alfalfa is one of the most widely grown perennial legumes in irrigated lands of Uzbekistan and Central Asia. In order to continue the study of alfalfa, samples of dried alfalfa leaves and stems were extracted in petroleum ether and hexane in a soxhlet apparatus. Chromatomass spectra were obtained by Agilent 7890 spectroscopy at the Institute of Plant Chemistry of the Academy of Sciences of the Republic of Uzbekistan to study the composition of the extracted samples.^[1-4]

RESULTS AND DISCUSSIONS

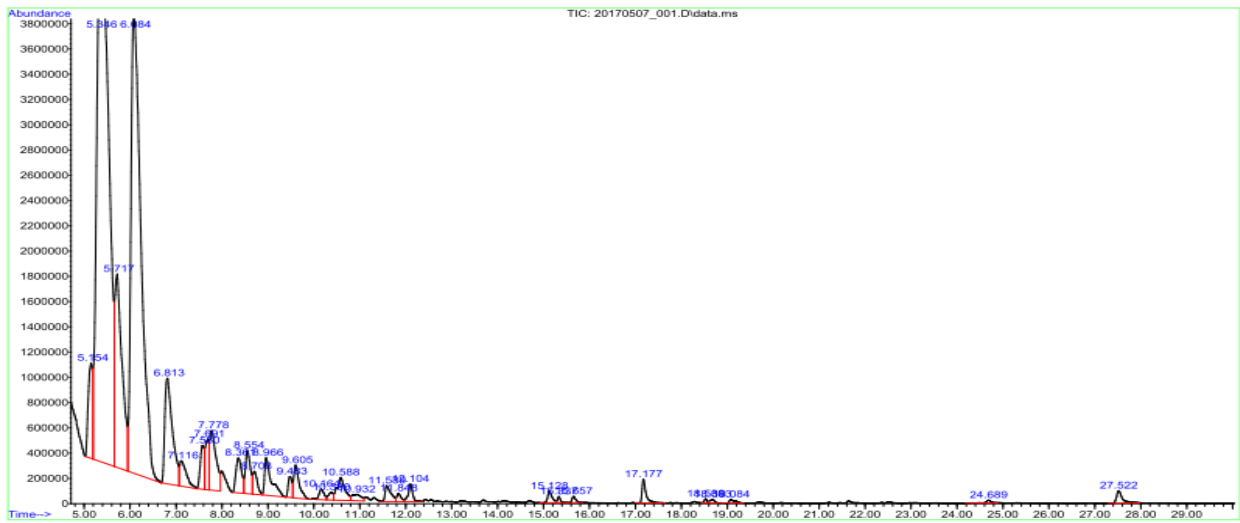


Figure 1: Chromatogram spectrum of petroleum ether extract of alfalfa leaf.

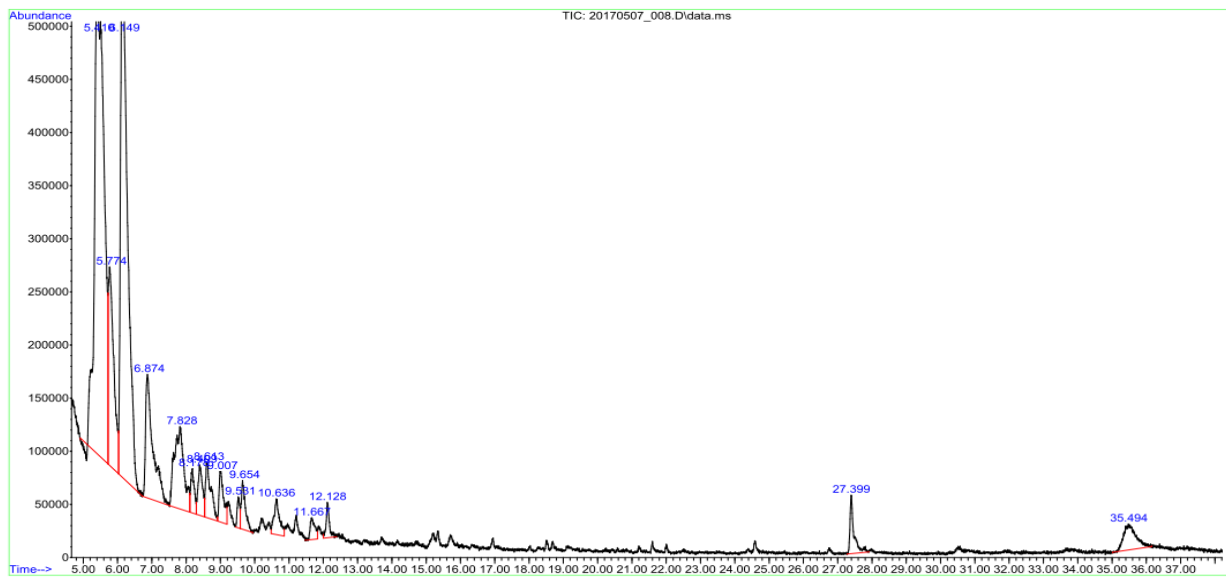


Figure 2: Chromatogram spectrum of hexane extract of alfalfa leaf.

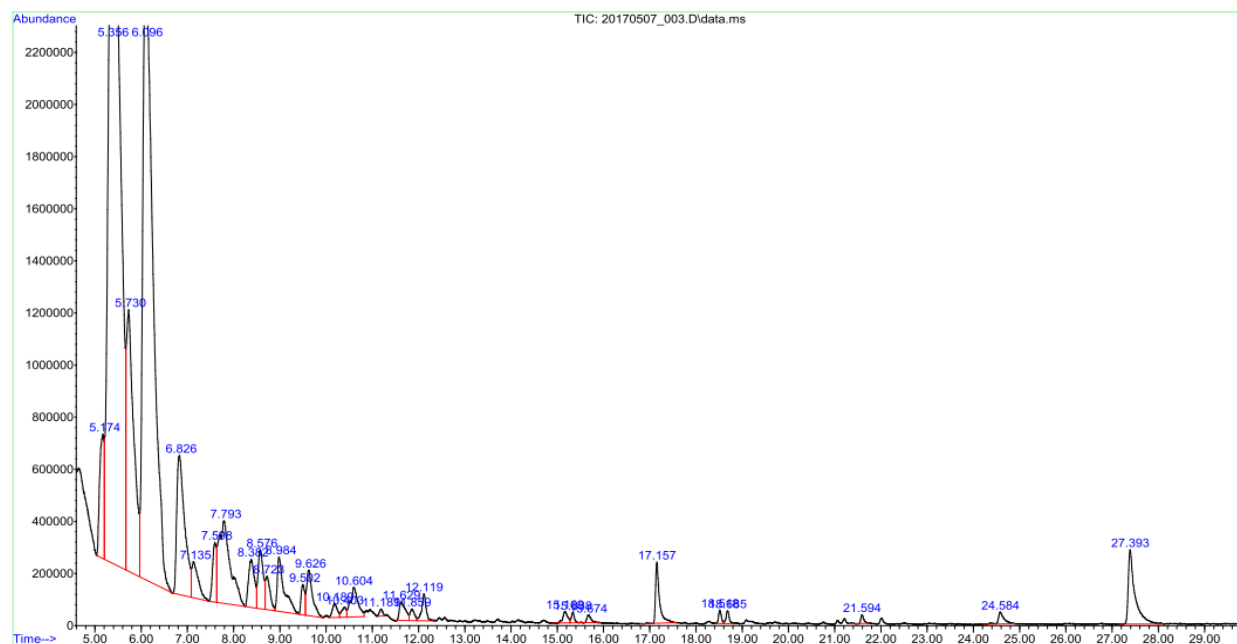
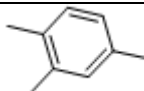

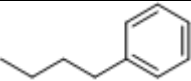
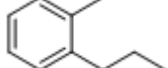
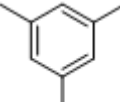
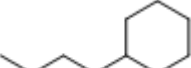
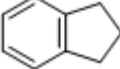
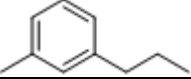
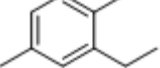
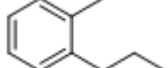
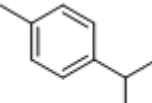
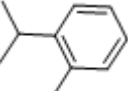
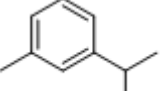


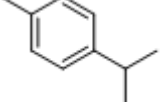
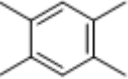
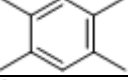
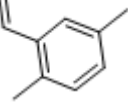
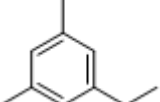
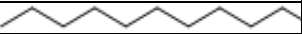


Figure 3: Chromatogram spectrum of hexane extract of alfalfa stalk.

The following table analyzes the chromatogram spectra of alfalfa leaf and stem extracts in hexane and petroleum ether.

Table 1: Comparison of chromatogram spectra of substances found in the surface of alfalfa.

№	Names of the substances	Structural formula of substances	Productivity		
			Extract of the leaf in petroleum ether	Hexane extract of the leaf	Hexane extract of the stem
1	1-methylethyl benzene		3.33	2.16	2.32
2	2,6-Dimethyloctane		3.13	4.49	5.08
3	2-Methyl-3-ethylheptane		1.20	1.83	-
4	1,3-dimethyl-2-methylene		0.48	-	-
5	n-Propylbenzene		6.11	6.44	6.97
6	1-ethyl-2-methyl-Benzene		26.31	26.92	28.93
7	1,3,5-Trimethylbenzene		9.78	3.84	11.86
8	1-ethyl-2-methyl-Benzene		5.75	5.96	28.93
9	1-Decene;		1.28	0.94	0.87

10	1,2,4-Trimethylbenzene		18.83	-	-
11	n-Decane		4.78	5.61	6.01
12	n-Butylbenzene		0.31	-	-
13	1-Methyl-2-propylbenzene		0.81	0.77	-
14	1,3,5-Trimethylbenzene		4.17	3.84	3.69
15	n-Butylcyclohexane		0.35	-	-
16	1,2-hydrindene		1.37	1.47	1.17
17	1-Methyl-3-propylbenzene		1.98	1.68	1.22
18	1,4-Dimethyl-2-ethylbenzene		1.40	0.97	0.87
19	1-Methyl-2-n-propylbenzene		0.66	0.51	-
20	1-Isopropyl-4-methylbenzene		0.55	0.82	-
21	1-methyl-2-isopropylbenzol		0.76	-	-
22	1-methyl-3-isopropylbenzene		1.11	-	-
23	n-1-Undecene		0.48	-	-
24	n-Hendecane		1.20	0.82	0.76
25	1-Isopropyl-4-methylbenzene		0.35	0.82	-
26	1,2,4,5-Tetramethylbenzene		0.44	0.35	-
27	1,2,4,5-Tetramethylbenzene		0.50	0.35	-
28	2-ethenyl-1,4-dimethylbenzene		0.17	-	-
29	1,3-Dimethyl-5-ethylbenzene		0.31	0.31	-
30	n-Dodecane		0.27	-	-

According to the table, the petroleum ether extract of the alfalfa leaf contains 30 substances, the hexane extract of the leaf contains 21 substances, and the hexane extract of the stem of the alfalfa plant contains 14 substances.

CONCLUSION

According to the results of the chromatomass spectrum, the amounts of substances obtained from the extract of the stem and leaf parts of alfalfa in hexane and petroleum ether were compared. Based on this, it was found that 1-ethyl-2-methylbenzene in the examined parts was 26.31% in the petroleum ether part of the alfalfa leaf, 26.92% in the hexane part of the alfalfa leaf, and 28.93% in the hexane part of the alfalfa stem. The remaining 13 (2,6-Dimethyloctane, n-Propylbenzene, 1-ethyl-2-methyl-Benzene, 1,3,5-Trimethylbenzene, 1-ethyl-2-methyl-Benzene, 1-Decene, n-Decane, 1,3,5-Trimethylbenzene, 1,2-hydrindene, 1-Methyl-3-propylbenzene, 1,4-Dimethyl-2-ethylbenzene, n-Hendecane) were found to have different amounts of repetition in the above solvents.

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