

**RESEARCH OF THE CHEMICAL COMPOSITION OF PERFUMERY PRODUCTS**

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**Annotation**

A chromatographic study of 3 different samples of perfumes was identified as a result of gas chromatographic detectors and the content of their relative quantity. Depending on the type of product, the number of aromas is contained in the samples will differ. Samples 1 and 2 are studied from a combination with allergenic properties of linalal, lillial,  $\alpha$ -izomethylionon and D-lemonen.

**Keywords:** perfumery, perfume, eau de parfum, eau de toilette, mass of selective detector.

**Introduction**

The range of perfumes is diverse, and today we can divide them into the following groups [1]: Perfumes are a mixture of a perfume composition having an alcoholic or water-alcohol aroma. Perfume flavoring is characterized by a large amount of flavoring composition and long-term preservation of flavor compared to flavoring waters.

Scented water-contains 5-10% of aromatic components and has an intermediate aroma between perfume and cologne.

Cologne is a water-alcohol mixture of a perfume composition with the aroma of a flower and a fantasy direction, containing up to 2-6% of the aromatic substance.

A perfume collection is a collection consisting of a set of perfumes arranged in boxes, with a single artistic design.

Perfume products are classified according to the type, consistency, aroma, direction of the main fragrance, strength of the fragrance, as well as the gender of the users [2].

The main chemical composition of all types of perfumes is aromatic substance, ethyl alcohol and water. Dyes, fixatives and other additives are used as an auxiliary product [3].

The quality of perfumery products depends on the aromatic substances contained in it, which, according to the method of production, are divided into natural (vegetable and animal) and synthetic. Essential oils, tar and balms are mainly extracted from plants, and aromatic substances such as musk, amber, sibe, and beaver iphora are extracted from animals [4]. Synthetic flavors include lillial, D-limonene, linalol and  $\alpha$ -isomethylion.



Lilial (butylphenylmethylpropional) is actually a synthetic aromatic aldehyde used in the perfume industry to impart a pleasant smell. D-limonene has a citrus smell. Although it is safe in itself, it binds to ozone in the atmosphere, releasing formaldehyde. Therefore, it is also considered the causative agent of allergic diseases. If the amount of the above allergenic compounds exceeds 0.001% in indelible perfumes and cosmetics, their presence should be indicated on the label [5].

Currently, one of the urgent issues is the rapid and convenient determination of the qualitative and quantitative composition of perfumery products, the development of improved methods for determining physical and chemical properties, the study of the effect of the components contained in it on the human body [6].

Today, equipping laboratories with modern equipment contributes to the improvement of research work [7]. This makes it possible to carry out qualitative and quantitative analysis of perfumery and cosmetic products by chromatography-mass spectrometric method and to assess its quality in detail. Work on the determination of volatile organic substances in perfumes was carried out by chromatography-mass spectrometric method. This method uses ionization by electron impact. Because the mass spectra of organic compounds obtained when colliding with electrons primarily store information about the structure of the substance molecule, besides, the results are well reproduced. Chromatographic examination of samples using a mass-selective detector makes it possible to determine the synthetics or naturalness of the components contained in the product, to isolate volatile substances.

#### **METHODS AND MATERIALS**

The perfume product 3 was chosen as a sample. All samples taken for the study were made on the basis of GOST 31678-2012 "perfume liquid products" [8].

Sample 1: "Perfume" - Baccarat Rough 540. Maison Français Kurkdjian is made in France with a volume of 70 ml.

Example 2: "Eau de perfume" – Kaori fragrance "Perfume-Style" is produced in Russia. Volume 100 ml.

Example 3: "Eau de toilette" – Fawakeh. "AROMASQ INTERNATIONAL" is produced in Uzbekistan. Volume 50 ml.

The research work was carried out in the wiring, scanning and electron ionization pulse modes using the Agilent 5977b GX-MSD series in the Agilent 8890 GC gas chromatograph with split and undivided input current.

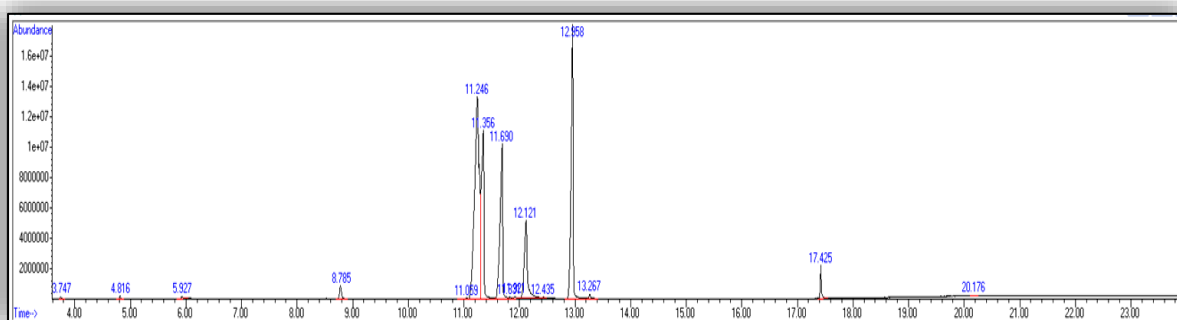
Analysis conditions: a sample with a volume of 1μl was injected into an ultra-inert HP-5ms analysis column with a size of 30m x 250μm x 0.25 microns. At the evaporation temperature of the undivided flow of 2800c, the hydrogen gas transmitter, at a constant flow of 1.2 ml/min, was kept for 1 minute at 600C, then from 250C to 1700c, increasing to 3100c every 100C for 2 minutes.

The solvent capture efficiency for the Mass spectrometer was determined as 3.5 minutes, gain 1.00, source temperature 250<sup>0</sup>C, quadrupole temperature 150<sup>0</sup>C.

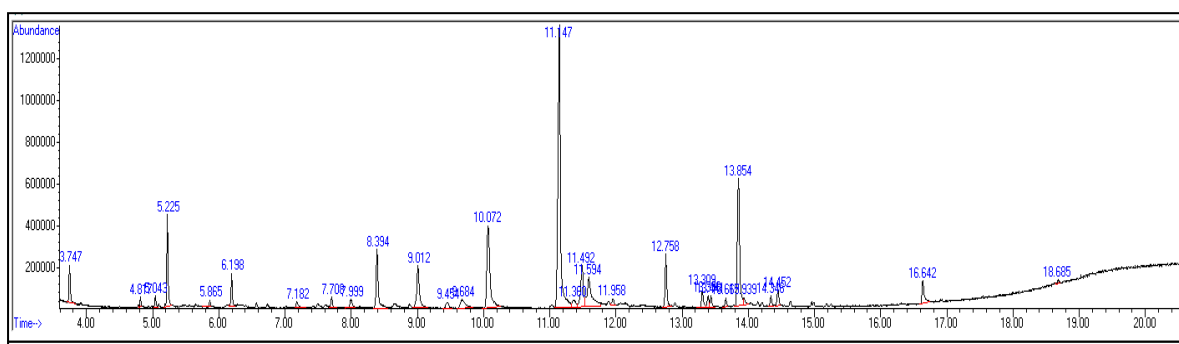
All the obtained samples were first dissolved in hexane, and then examined by the GC-MSD method [8].



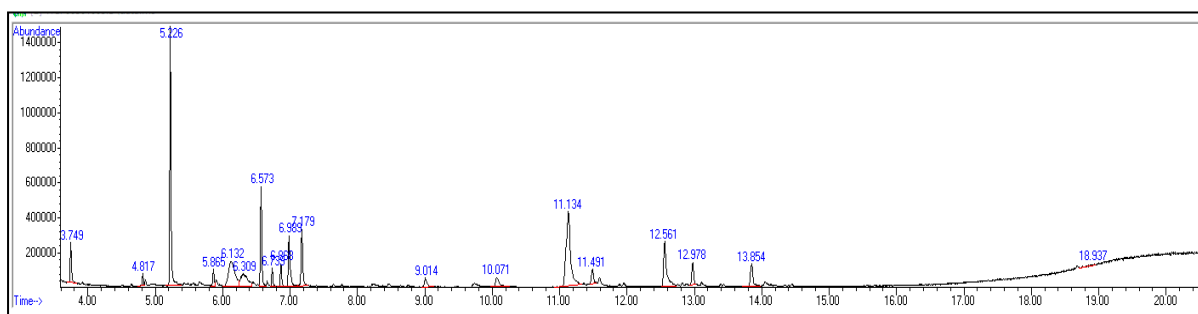
According to the results obtained, the chemical composition of the perfume product samples has chromatograms shown in Figures 1-3.



**Figure 1. Chromatogram of the chemical composition of the perfume " Baccarat" obtained in the mass selective detector**



**Figure 2. Chromatogram of the chemical composition" Kaori " (eau de parfum) obtained in the mass selective detector**



**Figure 3. Chromatogram of the chemical composition of the eau de toilette "Fawaeh" obtained in the mass selective detector**

Identification of substances isolated from samples was carried out on the basis of capture values [9], parameters of structural group-forming agents, as well as using the CX-MS mass spectrum database [10].

## Results

The exposure time, qualitative and relative quantitative composition of chromatograms of organic substances in perfumes are given in Table 1.



Table 1 Results of chromatographic analysis of perfumery products using a mass-selective detector

Ret time	Name of the substance	Модданинг нисбий миқдори		
		Sample №1	Sample №2-	Sample №3
3.747 3.749	o-xylene	0.088	2.014	3.157
4.816 4.817	Limonene	0.114	0.425	0.768
5.043	2,6-dimethyl 7-octen-2-ol		0.562	
5.225 5.226	Linalol			17.707
5.865	2-karen		0.322	
5.865	1,3,3-trimethyl tricyclo[2.2.1.0(2.6)]heptane			1.457
5.927	Ethylmaltol	0.206		
6.132	3,7-dimethyl 2,6-octadiene-1-ol			9.653
6.198	3,7-dimethyl 1,3,7-octatriene		1.542	
6.573	1,2-dimethyl 1,5-cyclooctadiene			7.913
6.739	3,10-dioxotricyclo			1.503
6.868	[4.3.1.0(2,4)]-7-en, 1.α,2.α,4.α,6.α.)			1.920
6.989	4-isobutyl			5.301
7.182	Cyclohexyl Acetate		0.603	
7.708	Cyclohexene, 1-methyl-4-(1-isopropene)-		0.778	
7.999	3-karen		0.735	
8.394	β-cymene-7-ol		5.252	
8.785	1-(4-butyl phenyl) propanone-2	0.929		
9.012 9.014	α-isomethylionone		4.697	1.356
9.454	1,1,2,3,3-pentamethyl, 1,2,3,5,6,7-hexahydro-4H-indole-4-one		0.752	
9.684	Lilial		1.669	
10.072	Bicyclo [7.2.0] undec-4-en, 4,11,11-trimethyl 8-methylene		10.294	2.100
11.059	[1r-1r*,4z,9s*)]	0.038		
11.246 11.147 11.134	2-butanone, 1-(1,3-benzodioxol-5th)	35.498	29.089	19.545
11.356	Diethyl phthalate	16.546		
11.360	2-(2-octenyl) cyclopentanone		1.037	
11.492	3-oxo-2-pentyl-cyclopentane sirka acidizing methyl ether		4.426	
11.831	Triethyl citrate	0.150		
11.958	Cyclonatriene-1,2,6		0.59	
12.121	3-oxypentanol, 5-chloro, pentafluoropropionate	8.982		
12.435	1-methyl bicyclo [3.3.0] octane-3,7-dione	0.080		
12.561	2-methyladamantane			8.392
12.958	2,4 dihydro-3,6-dimethyl benzoic acidizing methyl ether	20.524		



12.978	Tricyclo Decane [5.2.1.0(4.8)]			2.480
13.267	2-phenylmethylene octanal	0.266		
13.309	Dodecahydro 3 $\alpha$ ,6,6,9 $\alpha$ tetramethyl naphtho [2,1-b] furan		1.501	
13.396	1-(2,3,4,7,8,8a-hexahydro-3,6,8,8-tetra methyl-1H-3a,7-methanazulene-5) ethanol		0.806	
13.441	2-ethylhexylsalisilate		0.943	
13.665	1,4-diaminbenzene		0.610	
13.854	Picrin Acid		12.805	3.692
13.939	8-ethyl-4,6,6,8-tetramethyl-3,4,6,7-tetrahydro-1H-cyclopenta(G)-2-benzofuran		0.649	
14.452	1-cyclohexyl-heptene		1.100	
16.642	1,3,4,6,7,8-hexahydro, 4,6,6,7,8,8-hexamethyl cyclopentane		2.037	
17.425	2-benzofuran	1.469		
18.937	4 $\alpha$ - hexahydro			0.669
20.176	Biphenyl morpholine	0.065		

### Analysis

When perfume samples were analyzed chromatographically using a mass-selective detector, it was found that all samples contained o-xylene, limonene and methyl ester of 3-oxo-2-pentylcyclopentane acetic acid.

The analysis showed that the 16 main components of sample 1 contain 3-oxo-2-pentylcyclopentane, which is acetic acid methyl ester (35,498), dodecahydrotetramethyl (20,524), triethyl citrate (16,546) and 2,4-dihydroxy-3,6-dimethyl benzoic acid methyl ester (8,932), among the 30 main components in the sample 2. 3-oxo-2-pentylcyclopentane vinegar methyl acid ester (29,089), 1,3,4,6,7,8-hexahydro, 4,6,6,7,8,8-hexamethylcyclopentane 2-benzofuran (12,805), diethyl phthalate (10,294) and  $\alpha$ -methylion (5,252), while sample 3 contained 19 main components of 3-oxo-2-pentylcyclopentanoic acid. methyl ether (19,545), linalol (17,707). It has been studied that substances such as 2-phenyl-methylene octanal (8,392) and butylcyclohexenacetate (5,441) are relatively more common[11, 12].

When cross-comparing the samples in terms of the amount of flavor, it was found that it contains about 35.5% perfume, 29% in eau de perfume and 19% in eau de toilette.

The analysis of compounds with allergenic properties contained in perfume products was also carried out. According to him, samples 1 and 2 contained compounds with allergenic properties linalol, lilial,  $\alpha$ -isomethylion and D-limonene, and sample 3 contained lilial, D-limonene and diethyl phthalate.

### Conclusion

Thus, the use of the gas chromatographic method through a mass-selective detector in the qualitative and quantitative study of the chemical composition of perfumery products made it possible to quickly and efficiently determine.

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