УДК 543.61:581.135.51:665.52:582.475

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DEVELOPMENT OF A NEW SHAMPOO TYPE WITH FIR ESSENTIAL OIL ADDITIVE

Samples of 6 shampoos with the addition of experimentally developed fir fragrances were developed in the laboratory. Softwood essential oil of fir (20%) and synthetic fragrances were used as the main component for the development of new fragrances. Physical-chemical tests have been carried out in order to confirm the quality and safety of new types of shampoos. Consumer evaluation of the developed samples of shampoos was carried out by organoleptic method. The sample of shampoo was defined, its development is reasonable as a tasting item, and in terms of quality and safety.

Key words: shampoo, essential oil, fragrance, fir, testing, index, consumer valuation.

Introduction. Shampoos as a group of hair care products raise a considerable interest among a wide variety of cosmetic products. The high demand for these means contribute to the expansion of their product range. A promising area is the development of shampoos with natural ingredients. It is due to the wide variety and curative properties of the components.

Choosing the right perfume largely determines the high demand for this type of product. Fragrances are introduced into the shampoo in the amount of up to 2%, and in baby shampoos introduced perfume percentage ranges from 0.2 to 0.5% [1].

Modern washing hygiene cosmetic products have complex, optimized in many ways formulations. The components of any shampoo can be divided into major and minor ones. The major components are designed to perform the main function of shampoos, i.e. to effectively cleanse hair and scalp from dirt and fatty film. They include surfactants (hereinafter – SAS). Auxiliary components shampoos are thickeners, preservatives, antistatic agents, pH regulators, perfumes, solvents, antioxidants, sequestrates, “pearlescent” additives and dyes [2].

The purpose of adding fragrances in shampoos is to mask the odor of basic ingredients.

Perfumes based on synthetic fragrance substances with essential oils are widely used in the production of detergents because these hygienic products are of acceptable quality and of relatively low cost if compared with essential oils. Fragrances are developed individually for each type of shampoo.

One of the essential oils that can be used as a main component for perfumes is fir essential oil. This essential oil helps in hair loss, seborrhea, alopecia, and also strengthens and protects hair from climatic influences. The objects of our study are types of shampoos; their development was based on new coniferous fragrances.

The aim of the study is to develop formulations, fragrances, synthetic fragrance compounds with the addition of essential oils of fir and combined with SAS, which would be acceptable to the consumer.

To achieve this goal it is necessary to solve the following tasks:

1) to make the shampoo foaming base;

2) to develop a formulation and prepare the perfume based on synthetic fragrances with the addition of essential oil of fir;

3) to produce samples of shampoos with fir fragrances;

4) to define the quality indicators of the developed shampoo samples by carrying laboratory tests;

5) to carry out the consumer assessment of the odor of the developed samples.

Main part. 6 shampoo samples with the addition of experimentally developed fir fragrances were obtained under laboratory conditions. The first sample is a shampoo foaming base without the addition of any flavorings; it was selected as an object of study as a “base”. The composition of the second sample is a shampoo foaming base with the addition of essential oil of fir. The third sample acted as a reference one; it is a variant of fir shampoo with the addition of the widely used softwood perfume “Galbor”. The shampoos samples four, five, six were prepared with addition of the developed fragrances. As a main component for the development of new softwood fragrances “Fir 1”, “Fir 2” and “Fir 3”, fir essential oil (20%) and synthetic fragrances were used.

Essential oil of fir was introduced in accordance with the perfume formulations for production of similar types of fragrances. The perfume component composition is shown in Table 1.

After selecting and developing the perfumed composition compounds, the shampoo foaming base was made, its formulation is shown in Table 2.

At the second stage 22 g of coconut acid diethanolamide and 3 g of a preservative were added into the solution; it was also subjected to mechanical abrasion to obtain a homogeneous solution.

At the third phase 200 g of the obtained shampoo foaming base with the addition of appropriate

fragrances were prepared. To do this 200 g of the base was weighed, each sample was added to 0.4 g of perfume, 0.2 g of citric acid, 4–5 g of dye, and 4 g of the sodium chloride.

Table 1

Component composition of fragrances based on synthetic aromatic substances

Component	Quantity, %
Fragrance “Fir 1”	
Hedione	10.0
Fir essential oil	20.0
Cis-3-hexenol	1.0
Cyclal C	1.0
Dipropylenglycol	68.0
Fragrance “Fir 2”	
Hedione	20.0
Fir essential oil	20.0
Allyl amyl glycolat	0.3
Dipropylenglycol	59.7
Fragrance “Fir 3”	
Hedione	10.0
Fir essential oil	20.0
Allyl amyl glycolat	1.0
Stemona	0.5
Hanon watermelonketon	0.1
Dipropylenglycol	68.4

Table 2

Formulation of the shampoo base

Component	Quantity, %
Polyquaterium 39	1.0
Glycerine	1.0
Sodium layryl sulphate	12.0
Water	81.0
Coconut acid diethanolamide	2.2
Perfume based on fir essential oil	0,4
Roconsal (preservative)	0.3
Citric acid	0.1
Sodium chloride (“Polesye”)	2.0

Thus, pine perfumes based on synthetic fragrances, shampoo foaming based samples of new shampoos were developed and produced in the laboratory.

To determine the quality parameters of new types of shampoos, the physical-chemical tests were carried out in accordance with relevant technical regulations [3, 4, 5]. Determination of the pH value was carried out in accordance with the requirements of GOST 29188.2 “Cosmetic products. Determination of the pH value” Mass fraction of chlorides in shampoos is determined in accordance with the requirements of GOST 26878 “Shampoos for hair care and bath. Methods of chloride determination”. Determination of foaming ability of the shampoos was carried out in accordance with GOST 22567.1 “Synthetic detergents. Method for determining foaming ability”. The test results are shown in Table 3.

It can be concluded basing on the results that all the physical-chemical parameters of the investigated samples correspond to the requirements of technical regulations [6].

Consumer estimation of the developed shampoo samples was conducted by organoleptic method in accordance with the requirements of technical regulations [7].

The shampoo samples with the addition of fir essential oil (shampoo 2) and fir essential oil and perfumes “Galbor” (shampoo 3) were used as reference samples. Shampoo 2 allows the consumer to compare its natural aroma with flavors of the developed samples. Shampoo 3 was used as a reference sample to the softwood perfumed shampoo. The shampoos samples 2 and 3 were subjected to shampoos expert evaluation; the results are shown in Table 4. The results of consumer estimation of the developed shampoo samples are given in Table 5.

Table 3

Investigation results of the shampoo samples

Shampoo sample	pH value	Chlorides,wt, %	Foam stability
Shampoo “base”	5.2	2.1	1.0
Shampoo 2	5.4	2.1	1.0
Shampoo 3	5.4	2.0	1.0
Shampoo “Fir 1”	5.4	2.1	1.0
Shampoo “Fir 2”	5.5	2.0	1.0
Shampoo “Fir 3”	5.4	2.1	1.0

Table 4

Results of the expert evaluation of reference shampoo samples

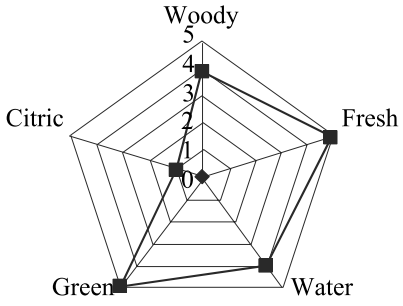
Shampoo samples	Odour, marks				
	Woody	Fresh	Water	Green	Citric
Shampoo 2	4	5	4	5	1
Shampoo 3	4	4	3	5	1

Table 5

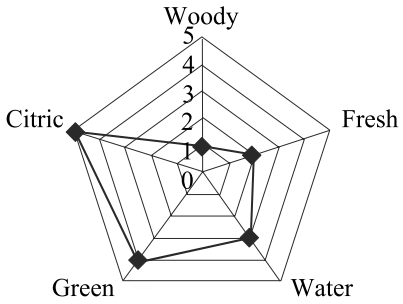
Results of the consumer estimation

Shampoo samples	Total sum of marks	Sum of positive answers, %	Sum of negative answers, %
Shampoo “Fir 1”	215	60.0	40.0
Shampoo “Fir 2”	202	33.3	66.7
Shampoo “Fir 3”	205	46.7	36.6

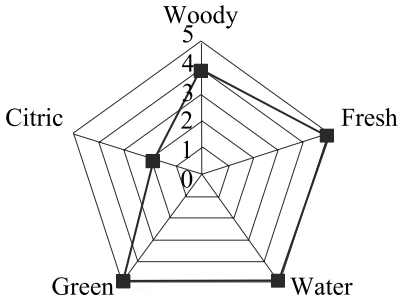
As the results of the consumer survey, 60% of them preferred the sample with the addition of flavoring “Fir 1”. 33.3% chose the sample with the addition of flavoring “Fir 2”, and 46.7% chose the shampoo with the addition of flavoring “Fir 3”.



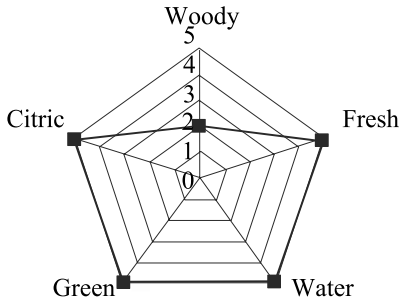
Shampoo sample
with fir essential oil addition



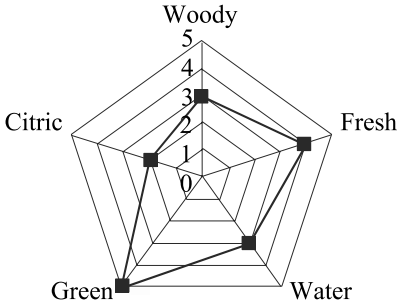
Shampoo sample with fir essential
oil addition and perfume “Galbor”



Shampoo with perfume “Fir 1”



Shampoo with perfume “Fir 2”



Shampoo with perfume “Fir 3”

Profilograms of the shampoos with the addition of experimentally developed perfumes

Thus, the most preferable shampoo sample out of the three proposed shampoos proved to be the shampoo with added fragrance “Fir 1”. Consumers in this sample mostly evaluated the flavors of fresh, aquatic and green notes.

The average number of points for the reference samples and new shampoos are depicted for a visual representation in the form of specialized charts which is shown below.

Conclusion. In the course of the experimental part of the following problems were solved:

1) the formulation of the foaming shampoo base was developed;

2) the formulations of new fragrances for new shampoo samples were developed.

The results of laboratory tests were: 1) preparation of the shampoo samples with addition of the developed fragrances; 2) physical-chemical testing of the shampoo samples.

To determine the acceptability of the developed samples of shampoos, the tasting evaluation was conducted which resulted in the highest number of points scored shampoo with the addition of fragrance “Fir 1”. The following conclusions were made on the base of this work:

1) the developed shampoo samples according to the physical-chemical indicators meet the requirements;

2) the greatest demand among consumers gained the shampoo with the addition of fragrance “Fir 1”;

3) the profilogram of the shampoo “Fir 1” is similar to those of the reference samples, i.e. its fragrance is comparable to the fragrance of shampoo 2 and shampoo 3.

Thus, it was possible to identify the developed shampoo sample which is suitable both in the tasting item and in the quality indicators of the developed shampoo.

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Received 20.02.2015