

## **Influence of Dietary Supplement Assortment on the Population's Quality of Life**

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### **Abstract**

*Since the appearance of the skin is an important attribute of the modern person, various methods can be used to achieve the desired. The most effective is often the simultaneous use of drugs “inside and outside”. The object of this research is dietary supplements, one of the methods for improving the appearance of the skin. The market situation for functional dietary supplements has been studied. The assortment of dietary supplements according to their purpose has been systematized (“cleansing”, “nutrition”, “protection”, “improvement of skin functions”). The results will help to make timely decisions about the need to develop products of this type.*

**Key-words:** Assortment, Dietary Supplements, Skin Appearance, Market.

### **1. Introduction**

For a modern person, the appearance, including the condition and health of the skin, is an important component of lifestyle (Jenkins et al.: 2014). The state of health can be judged by the appearance of the skin. For example, swelling of the face appears with renal pathology; the earthy-gray complexion is characteristic of people suffering from diseases of the gastrointestinal tract; in case of nervous strain, the skin is covered with a network of fine wrinkles. Thus, the appearance of the skin reflects the condition of the whole organism and may indicate the presence of

certain diseases. The functional state and appearance of the skin are closely related to the general functioning of the body and it is important to consider skin manifestations as a reaction of the whole organism (Arkhangelskaya et al.: 1975; Jenkins et al.: 2009). In addition, adverse environmental conditions and improper lifestyle (stress, fatigue, smoking, unbalanced nutrition, etc.) are the main causes of deterioration in appearance and aging of the skin (Kligman: 2005; Meinke et al.: 2017; Hamułka, Nogal: 2008).

Currently, people can use the following skincare options: healthy lifestyle; use of functional products and/or vitamin-mineral complexes to maintain the normal state of the body as a whole and, as a result, the condition of the skin (Spiro, Lockyer: 2018); professional care system based on beauty salons using professional cosmetics; traditional remedies; use of cosmetics.

A healthy lifestyle usually includes a safe and healthy environment, varied balanced nutrition, physically active life, rejection of bad habits, a personal value system of a person, standardization of everyday life, and psycho-emotional state.

Evidently, it is not fully possible to follow the principles of a healthy lifestyle in modern living conditions.

The use of vitamin complexes has several disadvantages. Vitamin complexes are generally distributed through pharmacies and consumers who see themselves as healthy do not see the need for their use.

Beauty salons use professional cosmetics with a high content of active substances. It is recommended to use such cosmetics as a part of a regimen. In addition, prices for the services of beauty salons are too high for most consumers.

The use of traditional homemade remedies (for example, various decoctions, natural products) implies the presence of a sufficiently large amount of free time, which is practically unrealizable at the current pace of life.

Today, a wide range of cosmetic products is available for consumers that are satisfactory in terms of composition, price, and effectiveness and there are therapeutic and preventive products in the pharmaceutical market that can solve or reduce skin problems. However, the external condition of the skin is more dependent on the internal state of the entire human body. Thus, just choosing the right skincare products is not enough for the modern consumer.

Dietary supplements are quite effective in terms of ensuring a healthy, attractive appearance due to the regulatory effect on metabolic, immune, and other processes of the whole organism, on the one hand, and targeted positive effect on the structure and functional activity of the skin and its derivatives, on the other hand (Meinke et al.: 2017; Hamułka, Nogal: 2008; Szyszkowska et al.:

2014). In addition, they are quite accessible to consumers and developed mainly on the basis of natural plant, animal, and mineral raw materials, which is attractive to consumers.

Depending on the route of action on the skin, dietary supplements can be divided into two groups: those that directly improve the appearance of the skin and those that affect the skin indirectly, through the improvement of the functions of other systems, organs, and tissues, through the normalization of metabolism.

The widespread use of parapharmaceutical dietary supplements can be considered an attempt by modern people to come to harmony with nature once again and significantly expand their adaptive capabilities in conditions of constantly growing technogenic, physical, chemical, and emotional stress (Martinchik et al.: 2005; Spirichev et al.: 2005; Vekovtsev et al.: 2005).

In any case, it is necessary to take into account the most effective systemic use of alternative methods to improve the appearance of the skin.

According to the concept of simultaneous “inside and outside” use of products, comprehensive skincare through the use of dietary supplements (Vollmer et al.: 2018) with targeted functional properties and cosmetics on a phased basis may be the most effective and desirable.

While external preparations compensate for the lack of nutrients in the surface layers of the skin, balanced complexes of biologically active substances deliver them to the cells through the blood. Such a dual-action system is most effective and provides the best result in nutrition, stimulation of skin regeneration, and improvement of its appearance. In addition, the use of dietary supplements enhances the activity of cosmetic creams.

In this article, the object of study was the market of dietary supplements with targeted functional properties, since market research allows to assess the condition and structure of the product range and to draw conclusions about the need for the development of new products. Natural components are of particular relevance when creating specialized products, as they are in demand by the consumer. In this regard, the inclusion of plant extracts in the compositions is a priority, as such raw materials contain a wide range of biologically active substances important for human nutrition.

The goal of this research was to study the state of the dietary supplement market in the city of Kemerovo, Russia. In accordance with the goal, the following tasks were completed:

1. To determine the structure of the trading channels of the dietary supplement market in Kemerovo;
2. To establish the relative share of producing countries, Russian and foreign enterprises producing dietary supplements;

3. To establish the relative share of Russian and imported products;
4. To study the range structure of dietary supplements by frequency of occurrence, depending on the form of release, purpose, and category of the population the supplement is intended for;
5. Determine the range structure of dietary supplements with plant extracts;
6. To study the price range of manufacturers of dietary supplements leading in the Kemerovo market by frequency of occurrence.

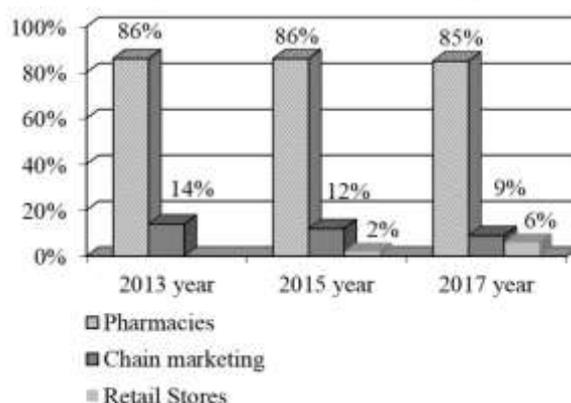
## 2. Materials and Methods

Marketing research of dietary supplements was carried out in the period from 2013 to 2017 using the retail audit method by registering the assortment in retail outlets of various types. The data was collected based on personal observation. The entire general population was studied: all outlets in Kemerovo that sold dietary supplements.

During the study of the dietary supplements range on the market in Kemerovo, 100 pharmacies (“Adonis 2000”, “World of Medicine”, “36.6 Pharmacy”, “100 Pharmacy”, “Salvin Pharmacy”, “Sentsova SP Pharmacy”, “Chernykh SP Pharmacy”, “Santi”, “Medservice Plus”, “Sladkevich A.V. SP Pharmacy”, “Health”, “Pharmacorm”, “Lesnaya”, “Yuzhanka”, “Everything for the heart”, “Nesterova SP Pharmacy”; pharmacy chains: “Kuzbass pharmacies”, “Pharmacies of Siberia”, “Avicenna”, “Edelweiss”, “Sonata pharmacy supermarket”, etc.) and 15 specialized stores (“Argo”, “Art Life”, “Vetom”, “Vivaton”, “Glorion”, “Lee West”, “NRPCRT”, “NRPCRH”, “Health Spring”, “Siberian Health”, “Amway”, “Coral Club International”, “Edelstar”, “Herbalife”, “Vilavi”), located in all areas of the city and using various selling methods, were considered as trade channels.

## 3. Results and Discussion

Figure 1- Structure of the Trading Channels of the Dietary Supplement Market in Kemerovo



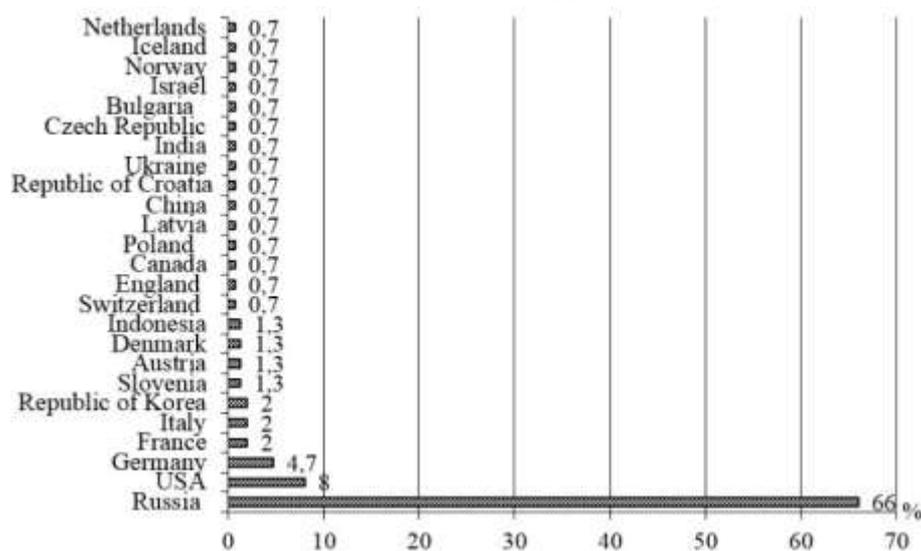
According to Russian law, dietary supplements can be sold in pharmacies, specialized stores, and special departments or sections of general stores. However, based on the data obtained, these products were mainly sold in pharmacies while the share of other channels was small (Fig. 1). Therefore, further research was focused on this distribution channel.

It should be noted that since 2015, retail stores have begun to design special zones for dietary supplements sales and this trend continues in the present.

In the Kemerovo market, 1,312 product names (articles) of dietary supplements were sold, of which 75% were made in Russia and 25% were imported. The supplements were made in 25 countries (Fig. 2 and 3) and by 150 manufacturing enterprises.

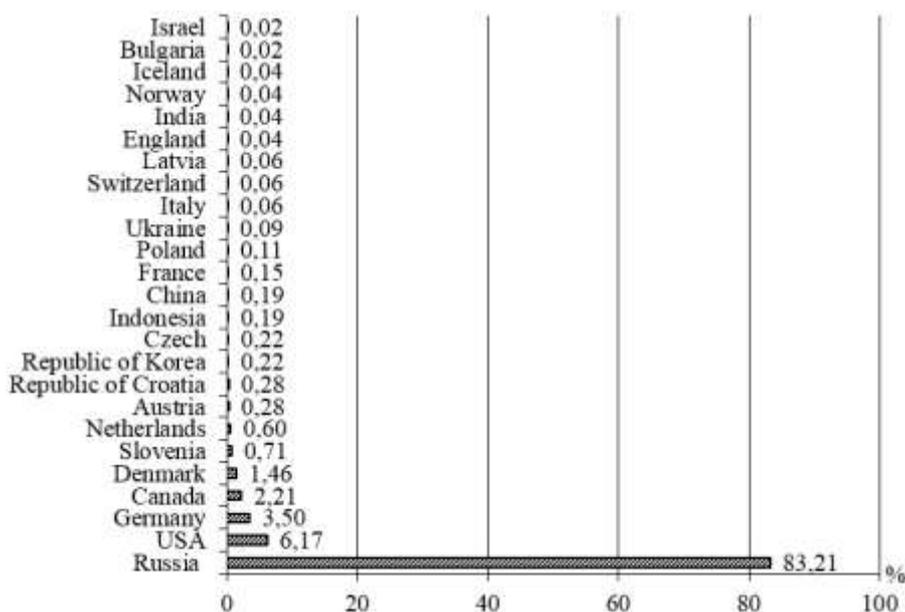
The largest share among the countries in terms of the number of manufacturing enterprises belonged to Russia (66%), the US was second (8%), followed by Germany (4.7%), France, Italy, and Republic of Korea (2% each). The following countries had the lowest specific market share of dietary supplements in Kemerovo: Switzerland, England, Canada, Poland, Latvia, China, Croatia, Ukraine, India, the Czech Republic, Bulgaria, Israel, Norway, Iceland and the Netherlands (0.7% each) (Fig. 2). Thus, we can conclude that the share of Russian producers in the dietary supplement market in Kemerovo was 66% and the share of foreign producers was 34%.

Figure 2- Relative Share of Countries Producing Dietary Supplements by the Number of Manufacturers



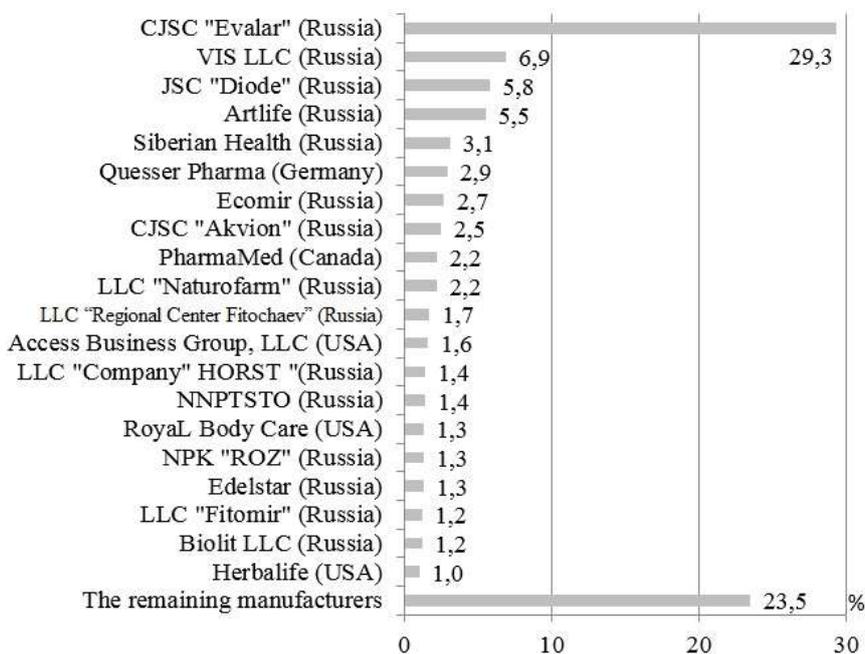
Such an indicator as the frequency of occurrence is also important in market analysis. Russia had the largest share (83%) among producer countries in terms of frequency of occurrence, and in terms of the number of manufacturers present on the market, the USA was second (6%), and Germany was third (4%).

Figure 3- Relative Share of Countries Producing Dietary Supplements by the Frequency of Occurrence

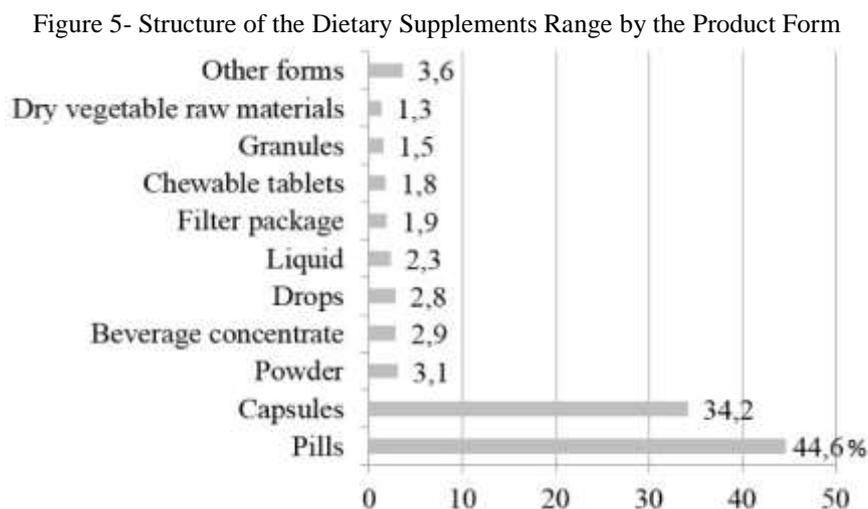


Among the dietary supplements manufacturers, whose market share in terms of frequency of occurrence was at least 1.0%, 20 had the highest market coverage (Fig. 4). The leader by the frequency of occurrence in trade channels was the Russian company “Evalar” CJSC – its share was 29.3%, “VIS” LLC was second (6.9%), followed by “Diod” (5.8%) and “Art Life” (5.5%). This situation is explained by the large volumes of products manufactured by “Evalar” CJSC, which are widely sold throughout the country.

Figure 4- Distribution of Dietary Supplement Manufacturers by Frequency of Occurrence in the Retail Network



The most common product forms were tablets (44.6%) and capsules (34.2%) (Fig. 5).

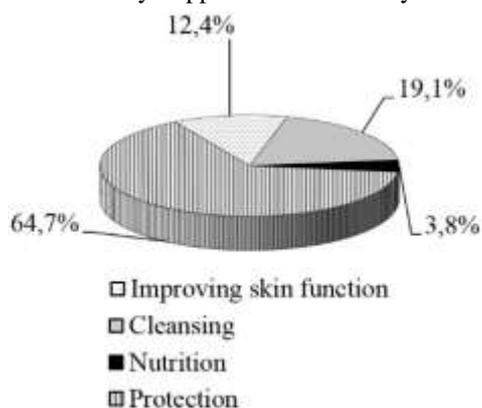


In our study of the dietary supplements range, we divided them into the following groups, depending on their purpose:

- “Cleansing” – dietary supplements based on dietary fiber: cellulose, microcrystalline cellulose, gums, pectins, bran, gum mastics, chitosan, fructooligosaccharides, etc., as well as natural minerals – zeolites;
- “Nutrition” – dietary supplements based on proteins, amino acids, and their complexes, lipids of vegetable and animal origin (animal fats, fish oil, vegetable oils, mixed fat bases), digestible carbohydrates, including honey with additives of biologically active components, syrups, etc.;
- “Protection” – dietary supplements that affect individual organs and systems of a person (cerebral and peripheral blood circulation, humoral factors of metabolism regulation, central nervous and cardiovascular systems, etc.) and support their normal functioning (digestive organs, cardiovascular system, organs of the genitourinary system, musculoskeletal system, respiratory system, etc.);
- “Improvement of skin functions” – dietary supplements that affect the skin, nails, and hair, supplements with vitamin and mineral complexes.

As a result of comparing data on the structure of the dietary supplements range by the purpose (Fig. 6), dietary supplements from the “Protection” group consistently had the largest share during the studied period (64.7%).

Figure 6- Structure of the Dietary Supplements Market by the Purpose of the Product



A more detailed study of the “Improvement of skin functions” category showed that dietary supplements, which are intended to improve the skin, nails, and hair, had a smaller market share (1.7%) than dietary supplements, which are positioned as an additional source of vitamins, mineral substances, and their complexes (10.7%). The data presented indicate the insufficiency of the range of dietary supplements for improving the skin, nails, and hair, which confirms the need to expand the range for this group of specialized products.

It was established that the “Improvement of skin functions” category of dietary supplements was offered only by 28.6% of manufacturers, among them 10.0% were foreign and 18.6% were Russian. Among these, 4.0% of products produced by foreign manufacturers (“Vitabiotics Ltd.” (England), “PharmaMed” (Canada), “Queisser Pharma” (Germany), etc.) and 9.3% of products produced by Russian manufacturers (“Ecoworld”, “Vertex” CJSC, “VeroPharm” OJSC, etc.) could be attributed to the “dietary supplements affecting the skin, nails, and hair” subcategory (Fig. 7). This situation once again indicates the need for newly developed products in this segment of nutrition science.

Figure 7- Relative Share of Manufacturers Offering Dietary Supplements of the “Improvement of Skin Functions” Category

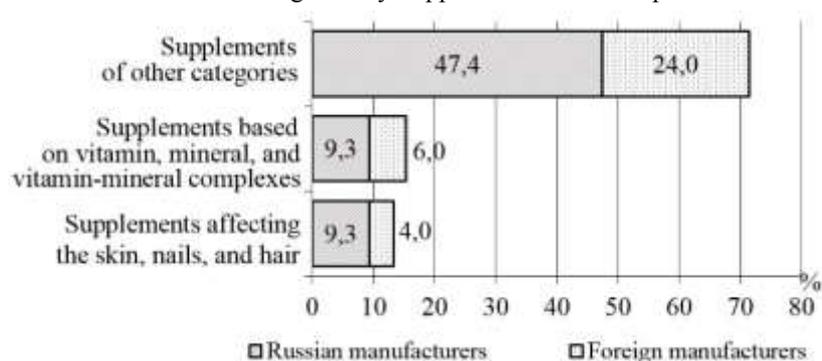
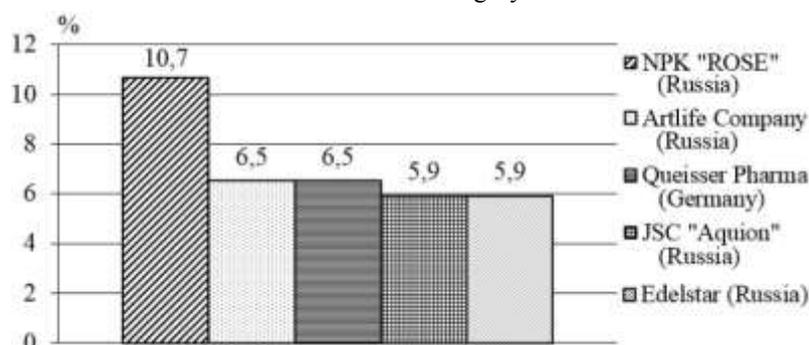


Fig. 8 shows the five manufacturers producing the largest range of dietary supplements in the “Improvement of skin functions” category. The leader in this category was the Russian “ROZ” Research and Production Complex, which produces dietary supplements that serve as an additional source of vitamins, minerals, and their complexes.

Figure 8- Relative Share of Dietary Supplements from Russian and Foreign Manufacturers in the “Improvement of Skin Functions” Category



The presented data indicates the insufficiency of the range of dietary supplements from the “dietary supplements affecting the skin, nails, and hair” subcategory, which confirms the need newly developed products in this segment.

The study of the products targeting for a certain category of the population showed that the majority of the dietary supplements range was marketed towards the adult population (43%), supplements for all categories were also widespread (36.4%). The range shares of products intended for women (10.5%), men (6.2%), and children (3.9%) were small. This is expected since it is more profitable for manufacturers to produce goods intended for a wider range of consumers.

Since the modern consumer pays attention to the presence of natural ingredients in the composition, the manufacturers should be focused on this trend. In this research, we studied the use of plant materials in dietary supplements. It was found that 76% of manufacturers used plant raw material in the formulations, 53% of them mainly in the form of plant extracts while 23% used plant raw materials in a different form (in the form of dry raw materials, oils, etc.). Analysis of the range on the market showed that 58% of the products did not contain plant extracts and 42% had extracts in their composition.

In dietary supplements, it is extracts and not the ground plants themselves, that are the most popular ingredients. The benefits of the extracts are evident: first of all, the fixed content of biologically active components, which is much higher than in the original plant material (Vekovtsev et al.: 2005). Given the need to maximize the preservation of extractable biologically active

substances and increase the shelf life of the semi-finished product, new technical solutions for obtaining plant extracts are of particular relevance. In this regard, dry plant extracts have the greatest benefits (Vekovtsev et al.: 2005). Dry extracts have a longer shelf life compared to liquid and solid extracts.

An analysis of the labeling showed that 268 types of plant raw materials were used in the dietary supplement. Fig. 9 shows the proportions of plant extracts used, the mass fraction of which was not less than 1%.

Figure 9- Proportions of plant extracts used in dietary supplements with a mass fraction of at least 1%

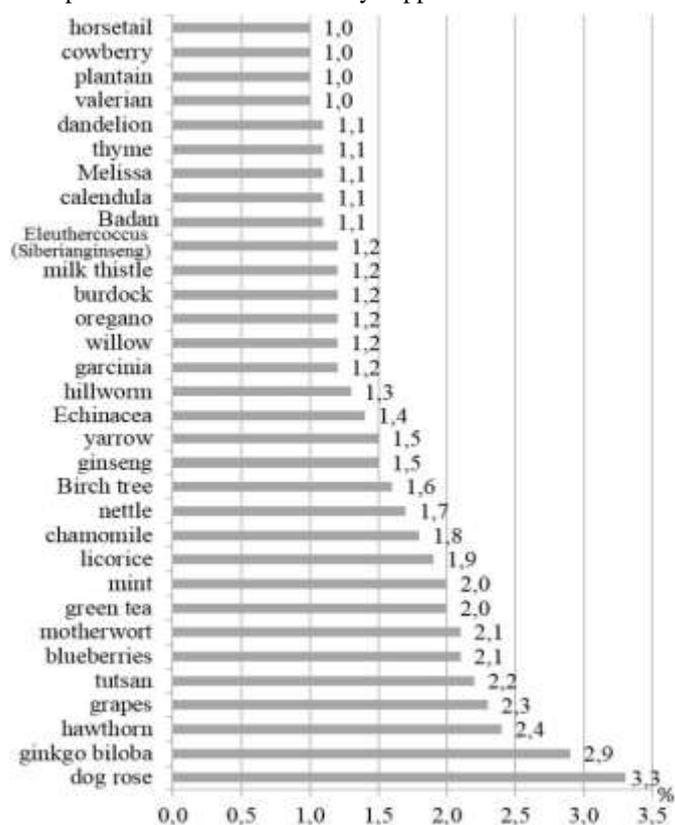


Fig. 9 shows that the most common ingredients used in dietary supplements are the following: rosehip, maidenhair tree, hawthorn, grape, St. John's wort, blueberry, motherwort, green tea, mint, etc.

#### 4. Conclusion

In the Kemerovo market, there are not enough dietary supplements that improve the condition of the skin. This indicates the need to expand the range of such products.

It should be noted that the Russian dietary supplement market is characterized by insufficient volume and range. This poses certain challenges for Russian scientists and manufacturers.

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