Natural plant raw materials in food design

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Abstract. The article discusses the prospects of using wild berry and vegetable raw materials growing on the territory of the Far Eastern region, in order to increase diet biological value of the local population.

1. Introduction
Today, the issues of the rational use of regional plant raw materials and the development of food products for general and functional purposes with its use are especially relevant. The use of local plant materials will expand the range of products and reduce the cost of purchasing and delivering them to the place of production.

Wild berry and vegetable raw materials are a complete source of various biologically active substances, such as vitamins, polyphenolic substances, organic acids, sugars, macro- and microelements, dietary fiber and a number of others required for daily synthesis and building of cells, as well as the implementation of normal metabolic processes and other functions in the human body [2]. The chemical composition of berry and vegetable raw materials determines the possibility of forming and changing its taste, aroma and especially color as a result of technological operations in the manufacture of food products. Due to the presence of a wide range of biologically active substances (vitamins, macro-, microelements, bioflavonoids, dietary fiber, organic acids, etc.), the raw material has the ability to strengthen the immune system and increase the antioxidant defense of the human body.

2. Materials and methods
The study used data for the Far East region for 2015-2020. A review of wild berry and vegetable raw materials growing in the territory of the Far East is made. The research theoretical basis is formed by regulatory documents and scientific publications. The information base is the data of the Federal State Statistics Service and the Unified Interdepartmental Information and Statistical System.

The research used methods: analytical and statistical.

3. Results
Vegetables, berries, wild plants are a source of many nutrients. Such nutrients as sugars, starch and mineral components a person can get by eating not only vegetables, whereas dietary fiber, various...
enzymes, polyphenol compounds are contained only in vegetables, fruits and berries. This circumstance makes vegetable raw materials one of the main sources of vitamins and many biologically active substances.

The dynamics of fruits, berries and vegetables consumption by the population, presented in Figure 1, indicates a persistent shortage of these types of products in the diet of residents of the Amur Region (figure 1) [1].

For the Far Eastern region population, an insufficient consumption of vitamin C has been acutely revealed. Due to the unfavorable environmental situation in the region, there is a need to increase the polyphenolic substances rich in antioxidants consumption.

Processing and assessing the quality of vegetable and wild berry raw materials of the Far Eastern region and products based on them is an important direction in providing the population with adequate nutrition.

At the same time, the possibility of using local vegetable and wild-growing berry raw materials in the development of general and functional food products with their use is of particular importance. This is due to the widespread prevalence of diseases associated with nutritional deficiencies of vitamins, micro - and macronutrients.

The content of biologically active substances in vegetable and wild berry raw materials determines its value. Ensuring the main indicators of the quality and safety of vegetable and wild berry raw materials used in the development of functional products is one of the most important tasks of food production. Food, gustatory, dietary and functional properties are determined by the biochemical composition of raw materials [2].

The chemical composition of raw materials is determined by the content of sugars, vitamins, physiologically active substances and mineral elements. The presence and ratio of chemical elements affect the taste and nutritional value [3].

When developing functional products, including drinks, it is necessary to take into account the climatic conditions of wild plant and vegetable raw materials growth region.
Food plants of the Far Eastern region represent a wide range of food plants with a huge potential of biologically active substances. Table 1 shows the results of evaluating the chemical composition of vegetable and wild-growing berry raw materials.

**Table 1.** Chemical composition of vegetable and wild berry raw materials.

| Raw material                   | dry matter, % | titratable acids, % | Sugars, % | pectin substance, | Polyphenols, Mg/100g | vitamin C, mg/100g |
|--------------------------------|---------------|---------------------|-----------|-------------------|-----------------------|---------------------|
| Chinese schisandra             | 17.71±0.01    | 3.4±0.1             | 3.3±0.1   | 1.44±0.04         | 594.7±0.2             | 136.1±0.4           |
| Common mountain ash            | 20.85±0.04    | 1.3±0.2             | 4.8±0.2   | 0.77±0.13         | 349.3±0.1             | 44.7±0.1            |
| Rosehip                        | 29.97±0.04    | 1.6±0.2             | 9.3±0.3   | 1.77±0.05         | 825.6±0.1             | 165.6±0.5           |
| Actinidia kolomikta            | 21.73±0.03    | 1.8±0.4             | 11.7±0.5  | 0.88±0.06         | 405.6±0.3             | 112.5±0.2           |
| Losinoostrovskaya carrots 13   | 12.46±0.04    | 0.26±0.32           | 9.2±0.1   | 0.77±0.05         | 166.1±0.2             | 6.3±0.1             |
| Chartane carrots               | 12.73±0.04    | 0.23±0.32           | 9.7±0.1   | 0.77±0.05         | 157.1±0.2             | 7.7±0.1             |
| Bordeaux beets 237             | 10.13±0.04    | 0.44±0.32           | 18.9±0.1  | 1.53±0.05         | 157.1±0.2             | 7.7±0.1             |
| Beet Cylinder                  | 11.25±0.04    | 0.46±0.32           | 9.3±0.1   | 1.33±0.05         | 166.1±0.2             | 11.9±0.1            |

The data analysis shown in table 1 proves that the presented vegetable and wild plant raw materials have a high content of biologically active substances and vitamin C, which makes it possible to use them as functional ingredients for the development of functional products.

Micro and macronutrients play an irreplaceable role in the organization of the body's nutrition. Table 2 shows the average value of micro- and macronutrients content in the considered vegetable and wild plant raw materials.

**Table 2.** The average value of micro- and macronutrients content of in vegetable and wild plant raw materials.

| Raw material                   | Iron  | Z inc | Manganese | Raw material | Microelements, mg/100g | Macroelements, mg/100g |
|--------------------------------|-------|-------|-----------|--------------|------------------------|-------------------------|
| Chinese schisandra             | 1.26±0.04 | 0.28±0.04 | 0.45±0.01 | 380.3±0.2 | 133.2±0.1 | 33.9±0.5 |
| Common mountain ash            | 1.18±0.06 | 0.34±0.09 | 1.16±0.02 | 172.3±0.4 | 253.6±0.5 | 62.2±0.1 |
| Rosehip                        | 1.46±0.09 | 0.36±0.04 | 4.33±0.09 | 256.4±0.3 | 592.7±0.8 | 161.6±0.5 |
| Actinidia kolomikta            | 2.42±0.04 | 0.16±0.07 | 1.93±0.06 | 213.6±0.3 | 621.3±0.3 | 61.8±0.7 |
| Losinoostrovskaya carrots 13   | 1327.5±0.1 | 92.6±0.4 | 63.5±0.1 | 215.8±0.2 | 21.4±0.3 | 26.5±0.1 |
| Chartane carrots               | 1355.6±0.1 | 64.4±0.4 | 72.7±0.1 | 225.4±0.2 | 32.3±0.3 | 32.3±0.1 |
| Bordeaux beets 237             | 1408.3±0.1 | 84.5±0.4 | 82.3±0.1 | 302.2±0.2 | 35.2±0.3 | 19.9±0.1 |
| Beet Cylinder                  | 1389.5±0.1 | 31.8±0.4 | 29.6±0.1 | 269.5±0.2 | 32.5±0.3 | 15.8±0.1 |

The study’s results, presented in table 2, indicate that the investigated vegetable and wild berry raw materials are a valuable source of microelements and macronutrients.

4. Discussion
The leading factor influencing the nation health and contributing to the preservation of its genotype is the quality and safety of the foodstuffs consumed. In connection with the prevailing nutritional structure of modern humans, nutritional status disorders have been identified [9]. On average, about 70% of the population is deficient in vitamin C, 60% to 75% are deficient in B vitamins and folic acid. There is a shortage of many minerals such as potassium, iron, iodine, selenium, zinc.
This paper shows a promising possibility of using plant materials growing in the region in the development of functional food products. The analysis of the chemical composition of vegetable and wild plant raw materials has been carried out. In the current economic situation, there is a need to create high-quality and affordable food and drinks aimed at meeting the needs of the population in biologically active substances and having functional raw properties. Therefore, the scientifically grounded and rational use of wild plant and vegetable raw materials as a source of functional ingredients is acquiring special relevance.

The objects of the study were vegetable and wild plant raw materials growing in the Amur region of the Far East region: Losinoostrovskaya 13 carrots, Chartane carrots, Bordeaux 237 beets, Cylindrika beets, Chinese magnolia vine, common mountain ash, rose hips, actinidia kolomikta. Based on the results of physicochemical and organoleptic assessment, the expediency of using the presented raw materials as a source of vitamin C, polyphenolic compounds, micro- and macroelements is shown.

5. Conclusion
Thus, the analyzed raw material, growing in the territory of the Far Eastern region, is distinguished by a wide vitamin and mineral composition, which indicates its biological value and allows it to be used in the development of food products aimed at saturating the population's diet with necessary nutrients, macro and microelements.

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