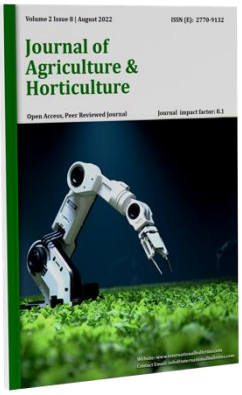


# BIOCHEMICAL EVALUATION OF SUNBERRY FRUITS

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**Abstract:** in this article, the results of the study on the biochemical evaluation of sunberry fruits are presented in the form of an in-depth scientific analysis.

**Key words:** sunberry, fruits, dry matter, fiber, pectin.

The results of experimental studies of the properties of functional raw materials are presented to substantiate the possibility of using them in the production of new products and ingredients for functional purposes.

When introducing new and rare plants used for food into culture, great attention is paid to their nutritional value, biochemical composition and taste characteristics.

Biochemical parameters of Sunberry night fruits from variants grown according to the scheme (90+50) / 2*30 cm. Since the biochemical composition of sunberry fruits grown in open ground conditions has not been sufficiently studied, according to the results of our study, the minimum, maximum and average values of the studied parameters are given (Table 1).

**Table 1. Dry matter content of sunberry fruit (2021-2022)**

| The results obtained | Total percentage of dry matter, % | Total percentage of moisture, % | Total percentage of soluble solids, % |
|---|---|---|---|
| Low | 12,8 | 87,2 | 8,5 |
| High | 15,3 | 84,7 | 11,3 |
| Average | 14,3 | 85,7 | 10,0 |

The data obtained show that the dry matter content of Sunberry night fruit has changed over the years from 12.8% (in 2022) to 15.3% (in 2021). The average dry matter content in the years of study was 14.3%, which is higher than many crops of the Solanaceae family (tomato, pepper and eggplant).

**Table 2. Sugar content, %**

| Years | The results obtained | Monosaccharide, % | Disaccharide, % | Sugar value, % |
|---|---|---|---|---|
| 2021 | Low | 0,91 | 0,27 | 1,11 |
| | High | 0,85 | 0,42 | 1,32 |
| 2022 | Low | 0,56 | 1,09 | 1,65 |
| | High | 0,90 | 1,46 | 2,36 |

**Table 3. Feed tissue composition (in % by dry matter, average for 2021-2022)**

| Naming | Fiber, % | Pectin substances, % | Water soluble pectin, % | Insoluble pectin, % |
|---|---|---|---|---|
| Sunberry fruits | 1,8 | 1,5 | 1,01 | 0,46 |

Carbohydrates are the most common organic compounds in many plants. Carbohydrates (starch, fiber, sugar and pectin substances) make up 90% of all dry matter of vegetable plants. According to their chemical composition, carbohydrates are divided into simple sugars, oligosaccharides and polysaccharides. The simple sugars of vegetable crops include monosaccharides (mainly glucose and fructose). Oligosaccharides include disaccharides (mainly sucrose), trisaccharides (raffinose), and tetrasaccharides (staxnose). The most common polysaccharides of vegetable crops include starch, inulin, cellulose, hemicellulose, pectin substances, dextrins and dietary fibers.

Analyzing the carbohydrate content of sunberry night fruits, it should be noted that the sugar content is low (1.1-2.4%). In terms of sugar content, Sunberry fruits are at the level of potatoes (1.5%), lettuce (1.7%), beans (2.0%) and other low-sugar vegetable crops.

Important components of human nutrition are indigestible carbohydrates, primarily fiber and pectin. In terms of fiber content, sunberry night fruit surpasses sweet pepper (1.4%), parsley root (1.5%), radish (1.5%) and even chicory (1.7%), which is the leader among vegetables by this indicator. Pectin substances in the alimentary tract are not digested, but play an important biological role in human nutrition, because they absorb and remove salts of strontium, cesium and other heavy metals from the body, suppress the activity of putrefactive microorganisms and help reduce cholesterol. The content of pectin substances plays an important role in processing, and therefore their content is taken into account in the raw materials intended for the production of jelly and jam.

The obtained data show that sunberry fruits are a valuable source of pectin substances. In terms of pectin content (1.5%), sunberry fruits are superior to almost all vegetable crops, including rutabaga (1.3%) and pumpkin (1.4%), and are equal to parsley root crops (1.5%).

**Table 4. Vitamin content (2021-2022 mg / 100 g of reserve substance)**

| Naming | Bvitamin C, mg/100 g | Carotenoids, mg/100 g | Anthocyanins, mg/100 g | Antioxidant activity, mg/100 g |
|---|---|---|---|---|
| Sunberry | 45,8-81,8 | 4,4 | 90 | 161-244 |

A person should consume 16 different vitamins and vitamin-like substances per day. Vegetables are a rich source of vitamins C, group B, PP, provitamins a, E, P, etc. Sunberry night fruits are a valuable source of vitamin C, carotenoids and P-active substances. In terms of vitamin C content, sunberry night fruit takes the leading place among vegetables - 48.8-81.8 mg / 100 g, and this indicator is lower than only fennel (100 mg / 100 g) and sweet pepper

(250 mg / 100 g). In terms of carotenoid content (4.4 mg/100 g), sunberry nightshade is superior to almost all common vegetable crops, second only to pumpkin (7.5 mg/100 g) and carrots (12.0 mg/100 g).

Recently, it has been scientifically proven and practically confirmed that foods with high antioxidant activity protect the human body from oxidative stress and protect it from the negative effects of free radicals. Therefore, at present, evaluation of the biological value of plant raw materials and its processing products is often carried out by antioxidant activity. Studies have shown that fresh sunberries (161 to 244 mg/100 g) have very high antioxidant activity, and carrots (15 mg/100 g), sea buckthorn (40 mg/100 g), gooseberries (46 mg/100 g), tomatoes ( 64 mg/100 g) shows that it is greater than that of mango (94 mg/100 g), red (141 mg/100 g) and raspberry (171 mg/100 g) and many other common fruit and vegetable crops.

Vegetables are one of the most important sources of minerals for the body. Minerals contained in vegetables are in the form of easily digestible physiological alkaline salts, which ensure normal metabolism and alkaline blood reaction. Vegetables contain more than 50 chemical elements. Everything necessary for the human body is divided into 3 groups: macroelements (sodium, potassium, calcium, magnesium, phosphorus, sulfur, iron) required by the body in large quantities; small amounts of necessary trace elements (fluorine, iodine, aluminum, manganese, bromine, zinc, arsenic, silicon, cobalt, nickel); ultramicroelements are found in very small amounts in ordinary food and are characterized by toxicity when consumed in large doses (gold, mercury, silver, lead, radium, rubidium). Minerals cannot be produced in the human body and are therefore an essential part of our diet. Vegetable crops contain almost all minerals necessary for human life. Vegetables differ significantly in the content of mineral salts.

The study of the minimum composition of sunberry fruits showed that they contain a set of necessary macro and micronutrients (Table 5).

**Table 5. Composition of macro and micronutrients, mg/100 g**

| Naming | K | N | C | Fe | M | M | Cu | Zn | I |
|---|---|---|---|---|---|---|---|---|---|
| Sunberry fruits | 890 | 2,9 | 27 | 1,1 | 24 | 0,15 | 0,06 | 0,07 | 0,006 |
| Minimum daily requirement, mg | 2500 | 4000 | 600 | 10 | 200 | 5 | 1 | 8 | 0,1 |
| Composition of elements, % of daily requirement | 35,6 | 0,07 | 7,5 | 11,0 | 12,5 | 3,0 | 6,0 | 0,9 | 6,0 |

A distinctive feature of sunberry nightshade from the most common fruit, berry and vegetable crops is the absence of a pronounced sour taste with a high (0.71-1.11%) titratable acidity.

**Conclusion**

The conducted analyzes and obtained experimental data show that the fruits of Sunberry nightshade grown in open ground are a valuable source of biologically active and mineral substances. Sunberry fruits contain a large amount of vitamins (C, carotenoids, anthocyanins),

dietary fiber (fiber and pectin substances), minerals (potassium, iron, calcium and magnesium). In addition, sunberry fruits have high antioxidant activity and permanent saturated color, which allows them to be recommended as raw materials for the production of functional food and natural food anthocyanin dyes.

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