

CERCETĂRI ORIENTATE SPRE APRECIEREA CALITĂȚII FRUCTELOR DE CĂȚINĂ ALBĂ

RESEARCH ORIENTED FOR THE QUALITY ASSESSMENT OF THE SEABUCKTHORN BERRIES

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Abstract

The paper presents the results of the researches carried out in the period 2015-2017 years regarding the appreciation of the quality of the white seabuckthorn fruits in the conditions of the Republic of Moldova. Introduced varieties of seabuckthorn for the study: 'Nivelina', 'Podarocsadu', 'Otradnaia', 'Trofimovscaia', 'Botanicescaia'. The quality of the fruits is influenced by a number of factors, including the variety or the climatic conditions, on which depends the amount of nutrients accumulated in it. The amount of dry substances in the fruit ranged from 8.3% to 9.24%, the accumulated sugars varied between 1.39-2.56%, the acidity varied between 2.94-4.08%. The amount of coloring and tanning substances accumulated in white seabuckthorn varieties ranged from 38.80- 54.32 mg%, and the vitamin C content in fruits varied between 100.3 mg% - 145.64mg%. The lowest values of the amount of nutrients have been accumulated in the 'Nivelina' variety, and the highest in the 'Otradnaia' and 'Botanicescaia' varieties. Under the conditions of a favorable year (2016), the most adaptable among the studied varieties proved to be 'Trofimovscaia', which increases the quality of the fruits to the sugar/acid ratio of 2.2 times compared to the variety 'Nivelina'.

Cuvinte cheie: soiuri, fructe, cățina albă, substanțe nutritive, Republica Moldova.

Key words: varieties, fruits, white seabuckthorn, nutrients, Republic of Moldova.

1. Introduction

The seabuckthorn is a shrub that has a high ecological plasticity, is less demanding regarding the temperature, resist on temperatures as low as -35°C or -40°C, and on strong sunburns over +45°C as well. The seabuckthorn requires a lot of light and produces very large fruits in areas exposed directly to the sun (Chira, 2000). The sea buckthorn contains twice as much vitamin C as the eglantine and 10 times more than citrus (Gatin, 1963). Sea buckthorn fruits, leaves and wood have a particularly rich and varied content due to the 150 substances identified so far, including almost all the vitamin range, carotene oil, organic acids, mineral salts and many other biologically active substances. The sea buckthorn has found its application in the pharmaceutical, food, cosmetic, animal husbandry and veterinary industries and with multiple applications in forestry as an anti-erosion and ornamental plant (Bukštinov, Trofimov, 1978; Grădinariu, Istrate, 2009; Balan, Sava et al., 2017). The average values of the accumulated quantity of dry substances in the fruits of the white seabuckthorn varieties studied under the conditions of the Republic of Moldova in the period 2005-2013 varied within the range of 8.2-9.1%. The total amount of accumulated sugars ranged between 3.45-5.01%, titrable acidity between 1.88-3.3%, tanning substances and colorants between 54.04-68.59 mg%. The accumulated amount of vitamin C ranged from 88.64 mg% on variety 'Botanicescaia' to 110.58 mg% on variety 'Trofimovscaia', and the ratio of sugar/acid between 1.15 on 'Botanicescaia' to 4.81 on 'Otradnaia' variety (Sava, Gherasimova, 2013).

2. Material and methods

The researches were carried out during the years 2015-2017 in the experimental field of the "Codru" Technology-Experimental Station. The plantation established in 1999, on non-irrigated land with the following sea buckthorn varieties: 'Nivelina', 'PodarocSadu', 'Otradnaia', 'Trofimovscaia', 'Botonicescaia' on a surface of 0.2 ha with the planting scheme of 3.0 x 2.0 m. The soil type is a medium chernozem clay. In order to assess the quality of the sea buckthorn berries on the introduced varieties, the researchers have been carried out in accordance with accepted methods for studying small fruit species.

3. Results and discussions

The sea blackthorn culture is highly effective in introducing advanced cultivation technology, irrigation and specialization in fruits production.

The establishment of intensive sea buckthorn plantations, the use of high performance varieties resistant to diseases, with less thorns, productive and with quality fruits, which, when applying irrigation, allows for increased harvests with high amounts of production.

Researches on the sea buckthorn varieties has made it possible to establish that pedoclimatic conditions, especially the amount of rainfall accumulated and the temperatures recorded during the vegetation period, influence the process of nutrient accumulation in fruits, their quantity and quality which depending on the variety.

The data obtained during the research period on the nutrients quantity, under the influence of the variety and the climatic conditions, are shown in the Table 1.

Analyzing the data in the table 1, sea buckthorn varieties have accumulated the dried substances in the fruits, ranging from 8.3% to 9.24%.

The amount of sugar accumulated in the fruits varies between 1.39 -2.56%. Acidity in the fruits of sea buckthorn varieties ranges from 2.94 to 4.08%.

The amount of coloring and tanning substances accumulated in the fruits of sea buckthorn varieties ranges from 38.80- 54.32 mg%.

The content of C vitamin in the fruits varies between 100.3 mg% to 145.64mg%.

The lowest values of the amount of nutrients have been accumulated in the variety 'Nivelina', and the highest in the varieties 'Otradnaia' and 'Botanicescaia'.

Sea buckthorn fruits quality factor expressed by the sugar/acid is different depending on the climate set in the formation and growth of the crop and of course depending on the particular variety.

The results obtained during the years 2015-2017 with regard to the determination of the sugar/acid ratio on the basis of which the quality of sea buckthorn fruits is assessed by variety are shown in Figure 1.

According to the data included in figure 1, the best sea buckthorn fruits qualities in year 2015 were on the varieties 'Otradnaia' (1.13), 'Botanicescaia' (0.86), in year 2016 - the varieties 'Trofimovscaia' (1.38) and 'PodarocSadu' (0.96), and in year 2017 – 'PodarocSadu' (1.15) and 'Nivelina' (0.78).

The most favorable year for obtaining fruits with high taste qualities proved to be the year 2016. The fruits quality in the varieties 'Nivelina' and 'Botanicescaia' were less influenced by the conditions of the year.

The accumulation of nutrients in white sea buckthorn varieties varies, depending on the variety, the region in which it is grown, the climatic conditions specific to the area and year, the type of the plantation, the cultivation technology, etc.

In Table 2 are reported the average data obtained as a result of researches carried out in Romania (Mladin, 1982), Russia (Aitjanova, 2005) and Moldova (Sava, 2015).

According to the data presented in Table 2, it can be said that the accumulation of nutrients in the white berries is different and varies according to the cultivated variety, the region and the climatic conditions that influence this process. The white bulb has a high vitamin C storage potential ranging between 96.7 mg% (Republic of Moldova) and 450 mg% (Russia). The sugar /acid ratio based on which the fruit quality is appreciated has reached the highest values (3.2) in Romania. The quantity of dry matter accumulated in white seabuckthorn fruits, reached the highest values under Romania's cultivation conditions (17.5%) and the quantity of sugars under the conditions of cultivation provided in Russia (9.0).

4. Conclusions

Based on the researches on introduced varieties of white sea buckthorn on fruits quality and the amount of nutrients accumulated in them, it was established that:

- The degree of adaptation to the growing conditions and the fruit quality obtained by cultivation without irrigation are influenced both by climatic conditions and by the particularities of the variety.
- The lowest values of the amount of nutrients have been accumulated in the 'Nivelina' variety, and the highest in the 'Otradnaia' and 'Botanicescaia' varieties.
- The high amount of dry substances in the seabuckthorn fruits was at variety 'Otradnaia' (9.24%).
- The highest accumulated sugars amount was determined at variety 'Nivelina' (2.56%).
- The fruits with the highest acidity has been established in the variety 'Nivelina' (4.08%).
- The amount of coloring and tanning substances accumulated in the fruits of sea buckthorn was the highest on variety 'PodarocSadu' (54.32 mg%).
- The vitamin C content in the sea buckthorn fruits, the high amount was at the variety 'Otradnaia' (145.64 mg%).

- Under the conditions of a favorable year (2016), the most adaptable among the studied varieties proved to be 'Trofimovscaia', which increased quality of the fruits and the sugar/acid ratio of 2.2 times higher compared to the variety 'Nivelina'.

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Tables and figures

Table 1. Biochemical analysis of fruits in some sea buckthorn varieties, 2015-2017 years

Name of varieties	Dried substances, %	Sugar amount, %	Acidity, %	Coloring and tanning substances, mg%	Vitamin C, mg%	Sugar / acid ratio
Nivelina	8.3	2.56	4.08	38.8	100,30	0.65
Otradnaia	9.24	1.39	3.34	49.88	145,64	0.73
Botanicescaia	9.23	2.39	3.5	48.49	141.51	0.69
Trofimovscaia	8.9	2.20	2.98	48.30	127.51	0.79
PodarocSadu	8.7	2.32	2.94	54.32	140.13	0.90
Average	8.87	2.17	3.37	47.96	122.97	0.75
Variation limit	8.3 - 9.24	1.39 - 2.56	2.94 - 4.08	38.80 -54.32	100.3 -145.64	0.65 - 0.90

Table 2. The amount of nutrients in white sea buckthorn fruits in different regions

Name of varieties	Dried substances %	Sugar amount, %	Acidity, %	Coloring and tanning substances, mg%	Vitamin C, mg%	Sugar / acid ratio
România	17.5	5.5	1.72	-	210.0	3.2
Rusia	-	9.0	3.0	-	450.0	3.0
Republic of Moldova	9.33	4.48	2.93	63.60	96.70	1.50
Variation limits	9.33-17.5	4.48-9.0	1.72-3.0	63.60	96.70-450.0	1.5-3.2

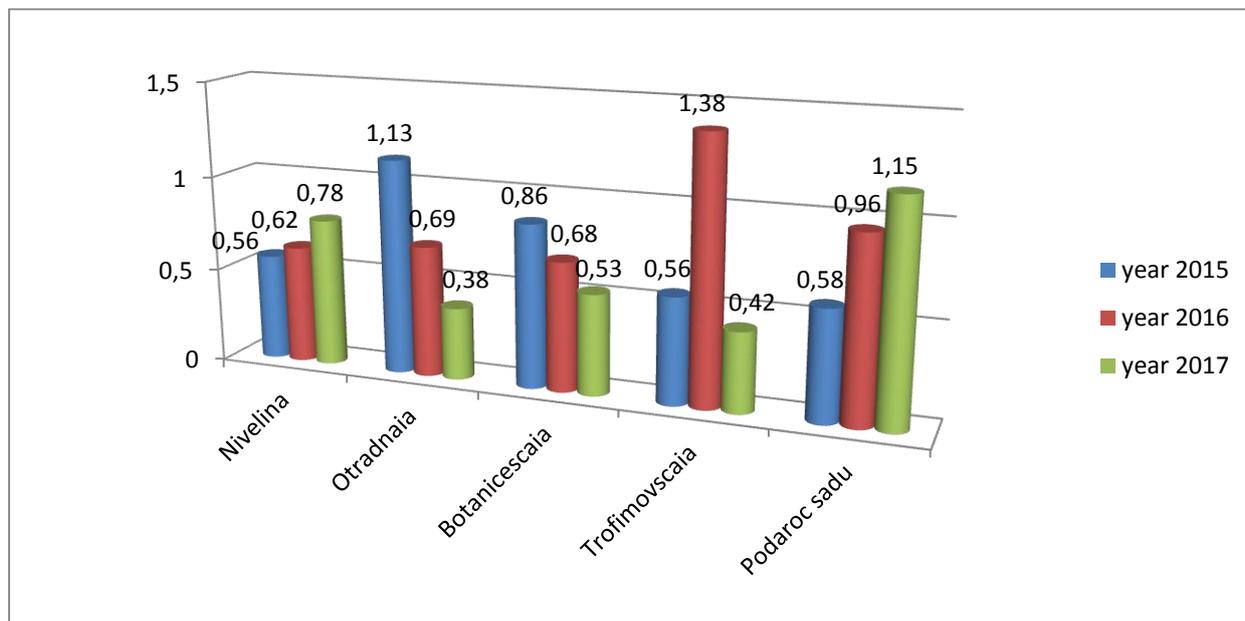


Fig. 1. The sugar/acid ratio of sea buckthorn fruits depending on variety and conditions of year