RESEARCH ON BLACKBERRY FRUIT PROCESSING

CERCETĂRI PRIVIND PRELUCRAREA FRUCTELOR DE MUR

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Abstract. *This paper reflects the results of scientific investigations on biometric and organoleptic indices of fresh blackberry fruits and processed products. Blackberry culture is one of perspective for Republic of Moldova, which can give an output of 6.0 - 12.0 t/ha of high quality fruits, and the processed blackberry products are highly appreciated. As results of research have been established the biometric indices and organoleptic quality of fresh fruit blackberry variety Thornfree Cl., and products made from them. From the investigated agricultural raw material were prepared following samples: compote of blackberries, blackberry nectar with sugar, mashed blackberries with sugar, blackberry jam, frozen berries and dried berries. It was found that the samples of the blackberry canned products are distinguished by original taste, aroma characteristic, intense color and pleasing appearance, which were valued at tasting with high notes. Blackberry jam won the 4.47 mark, blackberry compote was rated at 4.67. Nectar of blackberries with sugar scored a 4.68. Mashed blackberries with sugar were assessed with the highest grade of 4.73. Blackberry industrialization in order to obtain frozen and lyophilized represents a future direction for use.*
Key words: *blackberry, berries, biometric and organoleptic indices, processed products.*

Rezumat. *În lucrare sunt reflectate rezultatele cercetărilor ştiinţifice efectuate referitor la indicii biometrici şi organoleptici ai fructelor proaspete de mur şi ai produselor prelucrării. Cultura murului este una de perspectivă pentru Republica Moldova, care poate da o producţie de 6,0 - 12,0 t/ha de fructe de calitate înaltă, iar produsele obţinute în urma prelucrării bacelor de mur sunt înalt apreciate. În rezultatul cercetărilor s-au stabilit indicii biometrici şi organoleptici de calitate a fructelor proaspete ale soiului de mur Thornfree Cl., precum şi a produselor preparate din acestea. Din materia primă agricolă cercetată s-au preparat următoarele mostre: compot din mure, nectar din mure cu zahăr, mure pasate cu zahăr, dulceaţă din mure, mure congelate şi mure liofilizate. S-a constat că mostrele din produse conservate din mure se deosebesc printr-un gust original, aromă caracteristică, culoare intensă şi aspect exterior plăcut, care au fost apreciate la degustare cu note înalte. Dulceaţa din mure a obţinut nota de 4,47, compotul din mure - nota 4,67, nectarul din mure cu zahăr a obţinut nota de 4,68. Murele pasate cu zahăr au fost apreciate cu cea mai înaltă notă de 4,73. Industrializarea murelor în vederea obţinerii produselor congelate şi liofilizate reprezintă o direcţie de utilizare de perspectivă.*
Cuvinte cheie: *mur, bace, indicii biometrici şi organoleptici, produse prelucrate.*

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INTRODUCTION

Blackberry bush, prized berries in the diet for its high nutritional value with herbal properties, is successfully used as melliferous and decorative culture. Currently in the world there are known over 300 varieties of blackberry in culture strains which grow vertically and are equipped with barbs or semi-creeping up to 3m long and without barbs (Kondratenco et al., 2002). Blackberry bush fruiting period is between the months of July to September, the fruits are large, dark, protected by a layer of bloom, and the fruit harvest obtained exceeds 5-10 t / ha (Hapova, 2003). The duration of fruit ripening at different blackberry varieties is almost 3 months, which is of great importance for providing fresh fruit, raw material for the canning factories and employment over a long year (Mladin et al., 1990).

The importance of the blackberry bush is conditioned by a number of advantages it possesses over other fruit crops. One of these advantages is that the blackberry bush easily and quickly multiplies. He enters bearing early and give quite big harvests. Rich harvests are obtained from blackberry in the 3 to 4 th year after planting. Due to late flowering, the blackberry flowers are not injured by the late spring frosts (Julea,1973). Blackberries are berries of perspective with high potential for the food industry of Moldova.

They contain a wide range of nutrients and pharmacological substances, including: sucrose, glucose, fructose (up to 5%), citric acid, tartaric, malic, salicylic acid and other organic acids, vitamins B, C, E, K, P, PP, provitamin A, minerals (potassium, copper and manganese), phenolic and aromatic substances, pectic substances, fibers and various macro-and micronutrients (Şahin et al., 2010; Patraş et al., 2009; Turkben et al., 2010). In traditional medicine are used fresh blackberries for prophylactic purposes. Blackberries contain a significant amount of phenolic substances, which act to strengthen the capillaries, antiatherosclerotic and antiinflammatory (anthocyanins, leucoantociane, flavonols and catechins) (Crețu et al., 1989).

MATERIAL AND METHOD

The research was conducted at the stage "Testing of new varieties and the technology of horticultural crops perspective by establishing their manufacturing divisions," which were used fresh and frozen fruits of blackberry, variety Thornfree Cl., harvest fruit 2011, obtained as a result of the shrubs research laboratory of the Scientific and Practical Institute for Horticulture and Food Technologies. Organoleptic tests were performed on frozen blackberry, which were kept for 8 months at minus 18ºC, and on products made from fresh fruit of this variety of berries.

RESULTS AND DISCUSSIONS

Blackberry bush is a culture that begins to quickly fructify and enter the bearing fully in the fourth year after planting, does not support shading and water shortages during critical periods of plant development adversely affects fruit production (Chira, 2000). Culture blackberry bush is one of perspective, being of high productivity and high quality fruit, but however is still less

cultivated on large surfaces. Moldova's climate conditions are difficult because the critical periods of development of plants frequently are set high temperatures, rainfall is insufficient or absent, and air humidity is low, which negatively influence fruit harvest if irrigation is applied. Amount of precipitation that has accumulated during the growing season of 2011 reached 351.5 mm in total and average temperature compared air reached 17.01°C.

According to the bushes and strawberry research laboratory of IP IŞPHTA, the harvest per hectare of blackberries, cultivated in Central Moldova, depending on the variety and pedo-climatic conditions for several years was 6.0 -12.0t / ha, which gives a good perspective for creating the raw material for berry crops in the country. In our country, the use of blackberry is limited for processing due to the small number of industrial plantations. Blackberry variety Thornfree Cl. (Original - IP IŞPHTA) was included in the Register of Plant Varieties in 2012, which presents a premise for spreading it. The fruits obtained from the shrubs experimental laboratory were subjected to laboratory research in fruit processing.

The results obtained allowed to establish technical characteristics, biometric indices of blackberry fruit harvested in 2011, variety of Thornfree Cl., which are presented in Table 1. In fresh blackberries, variety Thornfree Cl., are contained 8.6 to 10.2% soluble solids, 1.74% - malic acid recalculate on the titratable acids, 21-22 mg/100g of vitamin C. The Blackberry active acidity measures 2.9 (pH). From the processed blackberry fruits were prepared jam, sugary nectar, compote of blackberries and mashed blackberries with sugar, which were presented at the tasting to be judged according to their quality. Appearance of fresh blackberry fruits is shown in Figure 1 (A) and the blackberry in a frozen state in Figure 1 (B).

Table 1

Fruits biometric characteristic of blackberry variety Thornfree Cl.*

Features	Index
weight of 1000 berries, g	9091,0
weight of berry, g	9,0
Length of berry (average / min-max), mm	27,0/20-30
diameter of berry (average / min-max), mm	20,2/18-22
shape index	1,3
Description of variety	Berries are beautiful, large, straight conical shape, shiny, without dried grains, with consistent pulp. The berries have dark purple colour, uniform, 30% of the berries have claret stripes. Their taste is sweet-sour, the flavour is less pronounced. Each grape seeds correspond to the large size of berries. These berries are considered mature when fully complete each hole in the center of pearls.

*Note: area of harvesting blackberry variety Thornfree Cl. is the experimental field of Small fruits laboratory (Center of Republic of Moldova).

Figure 2 illustrates four samples of products made from berries: jam, sugary nectar, compote of blackberries and mashed blackberries with sugar. Blackberry compote is great, it has a pleasant taste and the color is slightly different compared to the raw material. Blackberry nectar has a pleasant aspect and specific intense taste. It is recommended to use these high quality berry compotes or nectar only in combination with other fruits (assortment) with neutral flavor to alleviate astringency.

Mashed blackberries with sugar have a pleasant taste and the required consistency, but requires alleviate sweet. This product requires the addition of acid or the blending of raw materials that are more acidic. Blackberries mashed with sugar may be used in confectionery or ice cream recipes, cocktails or in combination with apple puree. They may be recommended for industrial processing.

A B

Fig. 1- Appearance of blackberry variety Thornfree Cl. Fresh (A) and frozen (B).

Having a specific taste that sweet has a limited use, depending on the customer's preferences. It recommends a less severe heat treatment for it. It is also recommended to improve the manufacturing technology of blackberry jam to maintain stable colour raw material. Blackberry varieties tested can be used for freezing and sublimation.

Figure 3 presents the assessment blackberry taste samples suggested the tasting dishes: jam, sugary nectar, blackberry compote and blackberry mashed with sugar.

In the blackberry jam fruits are too hard and too sweet, and the syrup has a brown tint, which reduces the value of its external appearance, the seeds are too noticeable.

A B C D

Fig. 2 - Samples made from mulberry (Cl Thornfree variety.): A - nectar of blackberries, B - compote of blackberries, C - dried berries, D - blackberry jam.

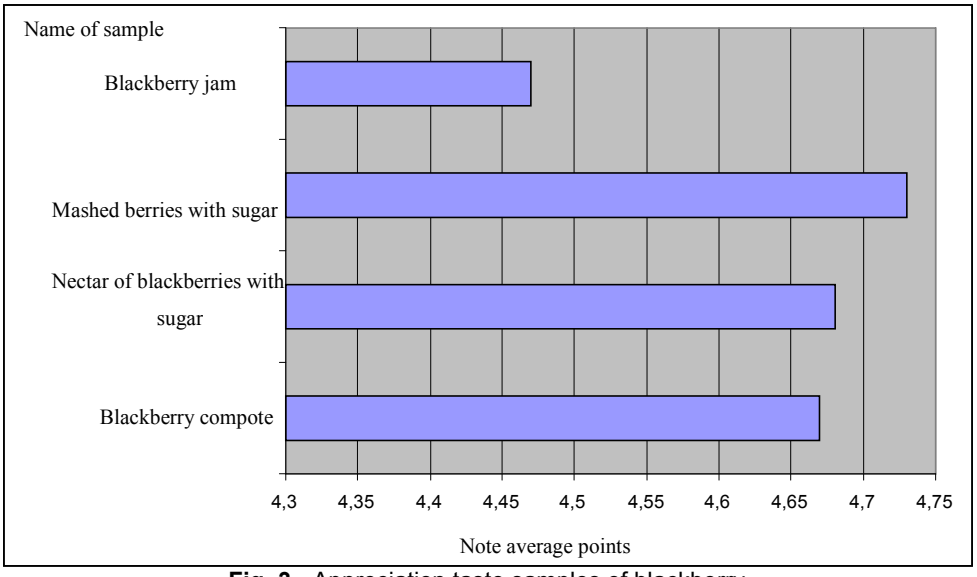

Fig. 3 - Appreciation taste samples of blackberry

According to data included in Figure 3 the products made from blackberries and presented at the tasting were assessed with high notes. Blackberry jam scored a 4.47. Blackberry compote was rated at 4.67. Nectar of blackberries with sugar scored 4.68.

Mashed blackberries with sugar were assessed with the highest grade - 4.73. Thus, for blackberry industrialization is rational for them to be used in the form of puree or mashed fruit. Industrialization of blackberries in order to obtain frozen and lyophilized products represents a future direction for use. Blackberry products, given the cost of raw material represent elite products.

CONCLUSIONS

1. The culture of blackberry bush is one of perspective for Moldova, which can give an output of 6.0 to 12.0 t / ha of high quality fruits, and the products processed from blackberry berries are highly appreciated.

2. Were established the biometric and organoleptic indices of quality of fresh blackberry fruits, variety of Thornfree Cl., as well as the processed products thereof.

3. The following samples were prepared from agricultural raw materials investigated: compote of blackberries, blackberry nectar with sugar, mashed blackberries with sugar, blackberry jam, frozen berries and dried berries. Samples of the blackberry canned products, the variety Thornfree Cl., are distinguished by original taste, characteristic aroma, intense color and pleasing appearance.

4. High efficiency, nutritional value and enhanced biological value of blackberries determine the importance and prospects of using this type of material in the food industry for making compotes, jams, jelly, fruit mashed with sugar, nectars, juices, dietary and prophylactic products. For the industrialization of blackberries is more rational for them to be used in the form of puree or mashed fruit. Their industrialization in order to obtain frozen and freeze-dried products is a direction for future use.

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