https://doi.org/10.61308/CHCI7449

Dried cherries – the tasty and healthy way to sustainable preservation of local genetic resources

Svetoslav Malchev[1], Sashka Savchovska*[1]
[1]Fruit Growing Institute – Plovdiv, 12 Ostromila Str., 4004 Plovdiv, Agricultural Academy, Sofia, Bulgaria
*E-mail: *kirilova.savchovska93@abv.bg*

Citation: Malchev, S., & Savchovska, S. (2025). Dried cherries – the tasty and healthy way to sustainable preservation of local genetic resources. *Bulgarian Journal of Crop Science,* 62(4) 106-111.

Abstract: Preserving the endangered local cultivars important for agriculture and national identity is a priority and one of the main duties of the agrarian scientific community. Very often, these local forms and cultivars are carriers of valuable economic traits such as drought resistance, cold resistance, resistance to diseases and pests, high content of sugars and dry matter or unique and specific taste and aroma. Preserving taste habits or certain local foods by preserving old traditional cultivars associated with certain regions or even individual settlements is a sustainable and effective practice aimed at preserving local taste and traditions. In this study, the taste qualities of dried fruits from 9 local cherry cultivars are evaluated.

Keywords: taste qualities; dried cherries; genetic resources

INTRODUCTION

Sweet cherry (*Prunus avium L.*) is an economically important species in Europe, especially in Bulgaria. Cherry production ranks on the fourth place in the EU with 169932 ha (6%) of area harvested in 2022 (https://www.fao.org/faostat/). However, the cultivar spectrum in fruit production and breeding programs is limited. Within the frame of the project KP-06-PN46/3 'Innovations and traditions in the conservation and use of old and local genetic resources in fruit growing and viticulture', funded by the Bulgarian National Science Fund (BNSF) of the Ministry of Education and Science of Bulgaria, old local cultivars and forms of sweet cherries and other fruit species were collected, preserved and studied (Malchev and Vasileva, 2021; Malchev et al., 2022; Nesheva et al., 2022a, 2022b). A suitable and efficient conservation is dependent on successful inclusion of the specimens in various breeding programs or local businesses aimed at preservation of indigenous tastes and traditions.

The demand for dried cherry products has risen steadily in recent years due to their health benefits and unique taste profile. Moreover, the consumption of these products as snacks or desserts is on the rise due to increasing awareness about healthy food options among consumers. Dried cherries are small, sweet, and tart fruit that has been dried with the skin on. Drying these fruits reduces their size but concentrates their nutrient content, making them an excellent source of antioxidants and good for your health (Klincsek et al., 2006; Altıok and Otağ, 2019; Thornsbury and Martinez, 2012; Anuradha More, 2023). Also, large amounts of sweet cherries are annually discarded because they do not meet exportation standards, or are sold as fresh fruits in local markets at a low price. To increase the valorization and avoid environmental problems, processing this fruit by drying methods can be applied to reach certain market niches (Uribe et al., 2023).

The global dried fruits market attained a value of about USD 10,973.2 million in 2023, driven by

the growing inclusion of dried fruits in various delicacies. Aided by the rising demand for immunity-boosting food products with the coronavirus outbreak, the market is expected to witness further growth in the forecast period of 2024-2032, growing at a CAGR of 4.9%. The market is projected to reach nearly USD 14,367.94 million by 2032 (EMR, 2023).

Local food traditions are an essential part of culture and society, reflecting a community's history, values, and beliefs (D'Andrea and D'Ulizia, 2023). In this study, selected local sweet cherry cultivars are used to find a tasty and healthy way to sustainable preservation of Bulgarian genetic resources.

MATERIAL AND METHODS

Subjects of this study are local forms and old cultivars gathered during the scientific explorations part of Project KP-06-PN46/3 "Innovations and traditions in the conservation and use of old and local genetic resources in fruit growing and viticulture". Average samples were formed randomly at the time of consumptive maturity of the fruits from the following specimens: SM-73 (local form from Damyanovo village), Rumanka (local Bulgarian cultivar with unestablished origin), Balgarska hrushtyalka (old cultivar obtained by crossing of seedling No.34 × Chrzastka Kozerska, originating from Kyustendil), Miziya (cultivar created at the Fruit Growing Institute in Kyustendil in 1971), Vasilena, Wolwe serce (Volsko sartse, unknown origin introduced in Bulgaria in the 60's from Poland), Kasina ranna, Kisinevskaja (Moldovska ranna) and Rainier as a standard cultivar for comparison.

The biometric indicators of the fresh fruits were measured according to the standard methodology used in Fruit Growing Institute-Plovdiv "Methodology for the study of plant resources in fruit plants" (Nedev et al., 1979) and updated in 2016 (Malchev, 2016), additionally soluble solids content was determined refractometrically by Brix and fruit firmness by FHT-15 Fruit Penetrometer Hardness Tester.

The fresh fruits were dried in a dehydrator for 14 hours at a temperature of 65 degrees. Afterwards, sensory analyses were carried out by a trained panel of consumers. Their taste quality was evaluated using the following scale: 1-3(min) very bad to bad; 3-4-satisfactory; 5-6 good and 7-9 (max) - excellent. The final overall score was calculated as an average of all characteristics using the following correction coefficients for degree of significance: 0.200 for appearance, 0.125 for fruit color, -0.025 for fruit skin thickness, 0.200 for sweet taste, 0.125 for sour taste, -0.025 for bitter taste / mold presence, 0.200 for balance between tastes, and 0.200 for texture.

The results were subjected to statistical analysis using the methods of Multiple Range Test and correlation analysis using the software products "MS Excel 365 Analysis ToolPak Add-Ins" (https://support.office.com) and "R-4.1.2" in combination with "RStudio Desktop 2021.09.1+372" and installed package "Agricolae 1.3 -5"(Mendiburu, 2021).

RESULTS AND DISCUSSION

The observed group of cherry cultivars ripens in the range between 30 May to 14 June (Table 1).

The appearance of the fruits arouses the initial interest of consumers. It includes characteristics such as the fruit's weight, shape and color. In our study, the local form SM-73 (7.95 g) and Kasina ranna (7.02 g) had the highest fruit weight. Slightly smaller were the fruits of the cultivars Vasilena (6.35 g) and Rainier (6.15 g). In all other variants, the average fruit weight was above 5g. In all stone fruits, the stone is required to be small percentage compared to the fruit flesh. The cultivar with the largest stone is Wolwe serce (0.51 g). Smaller stones were those of Rumanka (0.47 g), Rainier and Kasina ranna (0.43 g). In all the others, the stone weight was in the range of (0.32 to 0.37 g). Wolwe serce (9.60%) and Rumanka (9.04%) have the most unfavorable fruit flesh to stone (**F/S**) ratio. The most favorable F/S ratio is observed in SM-73 (4.51%) which has the biggest fruits and relatively small stones. A slightly high-

er percentage of the stone to the fruit flesh was obtained for Vasilena (5.84%). In all others this value ranged from (6.24%) for Kasina ranna to (6.93%) for Rainier.

Of the three fruit size indices measured, the largest values were obtained for width. The fruit width ranged from 21.05 for Rumanka to 23.96 for Kasina ranna (Table 2). In cv. Rumanka, the standard deviation is the largest (1.86). The smallest variation in this characteristic was observed for SM-73 0.77. This indicates that its fruits are almost equal in diameter. The height ranges from 20.30 mm for Kisinevskaja to 23.40 mm for Wolwe serce. The standard deviation for this indicator is the smallest for Rainier (0.57) which has a fruit height of (20.52mm). The largest deviation for the height indicator was measured for the cultivar Vasilena (4.23). The lowest values were obtained for fruit thickness. It ranged from (17.75 mm) for Kisinevskaja to (20.62 mm) for the variety Rainier. The standard deviations for this parameter are the smallest, which indicates that this parameter is not highly variable. Only for the cultivar Vasilena it is (2.79).

The largest dimension in the stone is the height. It ranges from 12.13 mm for Miziya to 10.17 mm for Rainier (Table 3). A slightly larger height was measured for the Vasilena cultivar (11.26 mm). The deviation of this parameter is small. The highest standard deviation was observed for Rumanka (0.63). Thickness is the second largest indicator after height. It is in a close range from 8.64 mm for Miziya to 9.93 mm for Wolwe serce. The standard deviation values for

Table 1. Ripening time, fruit and stone weight and fruit flesh/stone ratio

Specimen	Ripening time	Fruit weight (g)	Stone weight (g)	F/S ratio (%)
Balgarska hrushtyalka	6-Jun	5.55 b	0.37 b	93.28 ab
Kasina ranna	1-Jun	7.02 a	0.43 ab	93.76 ab
Kisinevskaja	2-Jun	5.10 b	0.32 b	93.56 ab
Miziya	4-Jun	5.11 b	0.33 b	93.50 ab
Rainier	6-Jun	6.15 ab	0.43 ab	93.07 ab
Rumanka	13-Jun	5.38 b	0.47 a	90.96 a
SM-73	14-Jun	7.95 a	0.36 b	95.49 a
Vasilena	30-May	6.35 ab	0.36 b	94.16 a
Wolwe serce	9-Jun	5.51 b	0.51 a	90.40 b

**Different letters in the same column mean significant difference at P=0.05*

Table 2. Fruit size (mm) of cherries

Specimen	Hight (mm)	StdDev	Width (mm)	StdDev	Thickness (mm)	StdDev
Balgarska hrushtyalka	22.24	1.36	22.37	1.38	19.84	0.64
Kasina ranna	21.35	0.88	23.96	1.15	19.91	0.81
Kisinevskaja	20.30	0.82	21.31	1.07	17.75	0.83
Miziya	21.03	0.62	22.20	0.82	18.97	0.75
Rainier	20.52	0.57	22.61	0.80	20.62	0.50
Rumanka	19.63	1.92	21.05	1.86	18.77	1.54
SM-73	22.32	0.69	25.12	0.77	22.60	0.80
Vasilena	21.91	4.23	21.95	1.41	18.56	2.79
Wolwe serce	23.40	1.23	22.20	1.78	19.33	1.06

this trait are the lowest in all the observed variants. Which indicates that this characteristic is relatively stable. The lowest values for stone were obtained for width, ranging from 6.68 mm for Miziya to 7.77 mm for Wolwe serce. The standard deviation does not vary much for this parameter, from 0.21 for Kasina ranna to 0.68 for Vasilena. The stone sizes are more constant than those of the fruits.

The soluble solids content (SSC) ranged from 13.43 °Brix for Vasilena to 16.62 °Brix for Kasina ranna. The Rumanka, Miziya, Kisinevskaja and Kasina ranna cultivars outperform the cv. Rainier in SSC (Table 4). Which at the standard is 13.64 °Brix. The largest variation of SSC, usually indicating sugar contents, was observed for the cultivar Miziya (3.83) and the smallest for the Wolwe serce (0.78). Fruit flesh firmness of the varieties studied ranged from 3.98 kgf/cm^2 in Rainier to 6.02 kgf/cm^2 in Miziya. In the latter, the standard deviation is the highest. For the other variants, the standard deviation ranged from 0.51 for Rumanka to 0.79 for Balgarska hrushtyalka.

The appearance of the fruit is very important because it attracts the consumer. In the dried fruit tasting, the highest score for appearance was given to Rainier (1.63), Wolwe serce and Miziya with the same score (1.56) (Table 5). The highest score for color was given to the standard Rainier. The sweet taste is again most noticeable in Rainier. A slightly lower score for sweetness was given to the variety Kasina ranna. The sour and bitter flavors were most pronounced in Miziya. With the most balanced taste and the best fruit

Table 3. Stone size (mm)

Specimen	Hight (mm)	StdDev	Width (mm)	StdDev	Thickness (mm)	StdDev
Balgarska hrushtyalka	10.86	0.24	6.87	0.37	8.75	0.22
Kasina ranna	10.56	0.27	7.62	0.21	9.84	0.25
Kisinevskaja	10.69	0.43	7.32	0.32	8.90	0.36
Miziya	10.40	0.27	6.68	0.27	8.64	0.28
Rainier	10.17	0.57	7.34	0.50	9.24	0.59
Rumanka	10.68	0.63	7.38	0.38	9.33	0.38
SM-73	10.34	0.35	7.42	0.37	8.96	0.29
Vasilena	11.26	0.49	6.94	0.68	9.15	0.38
Wolwe serce	12.13	0.32	7.77	0.31	9.93	0.33

Table 4. Soluble Solids content and fruit firmness

Specimen	Soluble Solids content °Brix	StdDev	Fruit firmness (kgf/cm^2)	StdDev
Balgarska hrushtyalka	13.53	1.70	4.85	0.79
Kasina ranna	16.62	0.87	4.74	0.69
Kisinevskaja	13.74	1.37	4.85	0.60
Miziya	14.10	3.83	6.02	3.89
Rainier	13.64	0.92	3.98	0.99
Rumanka	15.44	1.25	4.26	0.51
Vasilena	13.43	0.95	3.43	0.53
Wolwe serce	13.48	0.78	4.67	0.88

Table 5. Sensory evaluation of cherry genetic resources

Specimen	Appearance	Color	Fruit skin thickness	Sweet taste	Sour taste	Bitter taste / mold presence	Balance between tastes	Texture	Overall score	
Balgarska hrushtyalka	7.33	7.17	6.33	6.33	5.00	1.33	7.00	8.00	7.06	Very Good
Kasina ranna	7.20	7.00	7.00	7.00	5.00	3.20	7.00	7.40	6.97	Good
Miziya	7.80	7.20	7.00	6.40	5.40	4.20	7.00	6.60	6.86	Good
Kisinevskaja	7.20	7.00	6.40	5.20	3.40	1.40	6.40	5.80	6.03	Good
Rainier	8.17	7.83	5.17	7.17	3.50	1.00	7.50	8.17	7.46	Very Good
Rumanka	7.20	7.00	6.60	6.40	2.60	1.20	7.20	6.60	6.49	Good
SM-73	6.80	6.40	6.20	5.60	4.80	2.80	6.80	6.20	6.26	Good
Vasilena	6.50	5.33	6.00	6.67	3.50	3.17	6.00	6.50	6.01	Good
Wolwe serce	7.80	7.40	6.60	4.80	4.00	0.80	6.60	7.20	6.52	Good

texture was evaluated again the Rainier. With the highest total score and very good taste qualities were evaluated the fruits of Rainier and Balgarska hrushtyalka.

CONCLUSIONS

All tested specimens scored an overall score of very good and good taste qualities, therefore are suitable for local production of dried fruits, contributing to preservation of local genetic resources.

The old cultivar Balgarska hrushtyalka received a very good overall score close to the reference cultivar Rainier.

The local form from Damyanovo village SM-73 has the highest fruit weight and the lowest stone to fruit ratio, whereas Kasina ranna has the highest amount of soluble solids.

Acknowledgements

This research work was carried out with the support of the Bulgarian National Science Fund (BNSF) of the Ministry of Education and Science and was financed from Project KP-06-PN46/3 “Innovations and traditions in the conservation and use of old and local genetic resources in fruit growing and viticulture”.

REFERENCES

Altıok, D., & Otağ, M. R. (2019). Assessment of physicochemical and bioactive properties of fresh and dried sweet cherry fruit. *Karadeniz Fen Bilimleri Dergisi*, *9*(1), 22-32.

Anuradha B. More (2023) Dried Cherries Market Research Report https://dataintelo.com/report/global-dried-cherries-market/ Accessed: 01-04-2024

D’Andrea, A., & D’Ulizia, A. (2023). Preserving Local Food Traditions: A Hybrid Participatory Approach for Stimulating Transgenerational Dialogue. In Societies (Vol. 13, Issue 4). https://doi.org/10.3390/soc13040095

Expert Market Research (EMR) (2023) Global Dried Fruits Market Outlook. https://www.expertmarketresearch.com/reports/dried-fruits-market Accessed: 01-04-2024

https://www.fao.org/faostat/ Accessed: 01-04-2024

Klincsek, P., Král, G., & Simon, G. (2006). Dried fruit quality judging on different sweet cherry varieties grown in Hungary. *International Journal of Horticultural Science, 12*(3), 41-44.

Malchev, S. (2016). Research of selected hybrids and new cultivars in sweet cherry breeding. Doctoral dissertation, Fruit Growing Institute - Plovdiv, Agricultural Academy, Bulgaria.

Malchev, S., & Vasileva, K. (2021). Resistance screening of new promising cherry hybrids in FGI-Plovdiv, Bulgaria. South-Western. *Journal of Horticulture Biology & Environment*, *12*(2).

Malchev, S., Ivanov, P., Savchovska, S., & Akova, V. (2022). Comparative performance of local cherry cul-

tivars in Plovdiv, Bulgaria. *Scientific Papers. Series B. Horticulture*, *66*(2).

Mendiburu, F. (2021). Statistical Procedures for Agricultural Research. Retrieved from https://cran.r-project.org/web/packages/agricolae.

Nedev, N., Grigorov, J., Baev, Hr., Serafimov S., Strandjev, Al., & Kavardjikov, L. (1979). Methodology for the study of plant resources in fruit plants. Plovdiv, Fruit Growing Institute - Plovdiv.

Nesheva, M., Akova, V., Marinov, Y., Vasilev, D., & Malchev, S. (2022, August). Fruit quality of old local Bulgarian apple genetic resources. In *XXXI International Horticultural Congress (IHC2022): International Symposium on Conservation and Sustainable Use of 1384* (pp. 435-442).

Nesheva, M., Mihaylov, M., & Malchev, S. (2022, August). Possibilities for preserving some old local grapevine cultivars threatened from extinction in Bulgaria. In *XXXI International Horticultural Congress (IHC2022): International Symposium on Conservation and Sustainable Use of 1384* (pp. 137-144).

Thornsbury, S., & Martinez, L. (2012). Capturing demand for functional foods: A case study from the tart cherry industry. *American journal of agricultural economics*, 94(2), 583-590.

Uribe, E., Pasten, A., Mejias, N., & Vega-Galvez, A. (2023). Valorization of Sweet Cherries (Prunus avium) Using Different Drying Methods for Obtaining a Healthy Dried Product. *ACS Food Science & Technology*, 3(2), 301-309.

Received: April, 08, 2025; *Approved:* June, 22, 2025; *Published:* August, 2025