QUALITY EVALUATION OF SOME SWEET CHERRY CULTIVARS PROCESSED INTO STEWED FRUIT

EVALUAREA CALITĂȚII UNOR SOIURI DE CIREŞ PRELUCRATE SUB FORMĂ DE COMPOT

SÎRBU Sorina[1], BECEANU D.[2], CORNEANU G.[1], PETRE L.[1], ANGHEL Roxana Mihaela[2], IUREA Elena[1]

[1]Fruit Growing Research Station Iaşi, Romania

[2]University of Agricultural Sciences and Veterinary Medicine Iasi, Romania

Abstract. *In 2009, 7 sweet cherry cultivars existing in experimental plot of Fruit Growing Research Station Iasi, as stewed fruit processing, in the technological industry, at Contec Foods Ltd. Tecuci (Galati County, Romania), was performed. With these samples was performed in a 'consumer test' of Cantina USAMV Iasi, attended by 155 persons of both sexes, aged between 11 and 62 years, of different occupations. Sheet used for the test referred to the main parameters characterizing the quality of cherry stewed fruit and assessment index for a parameter was expressed on a scale rising from 1 minimum to a maximum 5. 'Mary' was most appreciated by consumers, recording scores between 4.2 and 4.5 at most syrup and fruit characteristics. Compote made from 'Bucium' has qualities valued by both consumers and processors, with large fruit size (22.2 mm), bright red skin colour and a balance sugars / acidity ratio (22.34).*

Key words: sweet cherry processing, cultivar, consumer test, stewed fruit, acidity.

Rezumat: *În 2009, din 7 soiuri de cires existente in poligonul experimental al SCDP Iasi, s-a realizat prelucrarea fructelor sub formă de compot, în flux tehnologic industrial, în cadrul SC Contec Foods SRL Tecuci. Cu aceste probe s-a efectuat un test al consumatorului la Cantina USAMV Iaşi, la care au participat 155 persoane de ambele sexe, cu vârste cuprinse între 11 şi 62 ani, de ocupatii diferite. Fişa utilizată pentru test s-a referit la principalii parametri ce caracterizează calitatea compotului de cireşe, iar indicele de apreciere pentru un parametru a fost exprimat pe o scară crescândă de la minim 1 la un maxim de 5. Soiul Maria a fost cel mai apreciat de consumatori, înregistrând note cuprinse intre 4,2 si 4,5 la majoritatea caracteristicilor siropului si fructului. Compotul obținut din soiul Bucium are calități apreciate atât de consumatori cât şi de procesatori, având fructe mari (22,2 mm), de culoare roşu strălucitor şi cu un raport zaharuri/aciditate echilibrat (22,34)* .

Cuvinte cheie: prelucrare cireşe, soi, evaluare senzorială, compot, aciditate.

INTRODUCTION

Compotes are produced as part of canned fruit assortment used as a dessert, which containing over 50% fruit and a liquid coating of at least 16 °Brix,

sterilized at 100 ºC for 65 minutes (20-25-20) for 570 jars ml (Beceanu, 2009 ; Beceanu & Chira, 2003 ; Jamba & Carabulea, 2002).

Being a short trial processing, stewed fruit preserves more nutrients and taste properties of fruit (Jamba & Carabulea, 2002).

Compotes quality particular depends on the cultivar features, which must provide a fruit cracking resistance into sterilization process, the minimum size of 18 mm in equatorial diameter (Jamba & Carabulea, 2002), fermity, uniform fruit size and attractive color (Webster & Looney, 1996).

Tressler & Woodroof, 1976 shows that products with higher fruit size, syrup coating requires a higher concentration, compared compotes with small fruit size (about 18 mm in diameter), where the number of fruits per jar is greater. In terms of processors, a condition the choice of the cultivar are presence the stone without adherence to flesh (Webster & Looney, 1996 ; Beceanu & Chira, 2003 ; Sîrbu & Beceanu, 2007).

The most popular cultivars used for making cherry compote in Romania are: 'Van', 'Bing', 'Sam', 'Bigarreau Dönissen', 'Hedelfinger', 'Boambe de Cotnari', 'Roze', 'Simbol', 'Rubin', 'Jubileu 30', 'Daria' and 'Severin' which were added soon another cultivars like 'Maria', 'Golia', 'Stefan', 'Bucium' and 'Marina' (Budan & Gradinariu, 2000, Sirbu et al., 2007). In the U.S.A., recently introduced cultivars are used for compote like 'Cavalier T', 'Chelan', 'Hartland, (Andersen et al., 2003), and in the world are known other cultivars for fermity and clear juice coloring like 'Vega', 'Germersdorf', 'Linda', 'Solymar Gömbolü' (Hui, 2006).

Fruit assessment directly to the consumer test is often used when seeking widespread a new cultivar or when you want to compare quality of several varieties or processed fruit products (Lugli et al., 2006, Turner et al., 2008).

In this paper, the results of sensory evaluation of the 7 samples of compotes made in processing flow from 7 different sweet cherry cultivars are presented.

MATERIAL AND METHODS

On November 12, 2009, in collaboration UASVM Iasi and FGRS Iasi organized a consumer test of 7 types of sweet cherry compote. The test samples, 10 jars of compote of 7 different sweet cherry cultivars from the experimental polygon of FGRS Iasi: 'Maria', 'Oana', 'Radu', 'Golia', 'Van' 'Bucium' and 'Boambe de Cotnari' were presented. 151 people aged between 11 and 62 years with different profesional occupations participated. Samples from stewed fruit processing by the 7 sweet cherry cultivars were done in processing flow, at CS Contec Foods Ltd. Tecuci. HACCP quality products system are practice there. Samples were kept in cold storage at 10 °C until testing (125 days).

Consumer test was performed at UASVM Iasi restaurant, each taster received about of 30 ml syrup and 5-6 fruits. Sheet used for the test referred to the main parameters concerning the quality of sweet cherry compote (Peter et al., 2005), represented by the appearance (color), integrity, taste and aroma of fruit. For syrup quality parameters followed as: color, clarity, taste and aroma.

Assessment index for a parameter was expressed on a scale increasing from minimum 1 to maximum 5, as follows: 1 = unpleasant, 2 = less pleasant, 3 =

neutral, 4 = pleasant, 5 = very pleasant.Consumers present data has been statistically processed with multiple comparisons method (Duncan test, P 5%) using Microsoft Excel (Snedecor, 1968; Ceapoiu, 1968).

Compote samples were analyzed in laboratory, too. Average number of fruits was established for each type compote, soluble solids content (SSC), titratable acidity (TA), reducing sugars content (RSC) and RSC / TA ratio. SSC was determined using of fruit pulp with a hand refractometer Zeiss, at room temperature (range from 18 to 23ºC). Titratable acidity (TA) was determined by titrimetric method by neutralization with sodium hydroxide solution 0.1 N, to the point of equivalence, using timolftaleine as an indicator. Reducing sugars content were determined by Schoorl method whose principle is the property of reducing sugars to reduce at hot influence the alkaline cupper-tartarical solution to cupperous oxide. Excess divalent copper oxidizes potassium iodide to elemental iodine, free iodine is then titrated with sodium thiosulfate. Depending on the amount of thiosulfate consumed we determined the quantity of reducing copper, and then from tables, the reducing sugars (as glucose, fructose, etc.) (Ghimicescu, 1977).

RESULTS AND DISCUSSIONS

By consumer test were recorded average notes for both fruit and juice characteristics presented in tables 1 and 2. Thus, at fruits, for color, integrity and taste 'Maria' has the highest notes of appreciation, ranging between 4.11 and 4.5 (table 1). For fruit flavor, 'Bucium' was most appreciated, with an average score of 4.07 (table 1).

Table 1

Average notes for fruit characteristics recorded by consumer test with 7 compote samples (November 2009)

Sample	Color*	Integrity*	Taste*	Aroma*
Maria	4.5^{a}	4.2^{a}	4.1075^{a}	3.9525^{ab}
Oana	3.82^{de}	4.09^{abc}	3.8625^{bc}	3.9675^{ab}
Radu	3.79^{e}	4^{abc}	3.925^{abc}	3.935^{ab}
Golia	4.02^{bcd}	3.87^{c}	3.7375^{c}	3.735^{b}
Van	3.99^{bcde}	4.01^{abc}	3.945^{abc}	3.8925^{ab}
Bucium	4.14^{bc}	4.11^{abc}	4.0625^{ab}	4.0725^{a}
Boambe de Cotnari	4.15^{b}	4.19^{abc}	3.725^{c}	3.825^{ab}
LSD 5%=	**0.18 - 0.24**	**0.24 - 0.33**	**0.22 - 0.24**	**0.23 - 0.26**

*****- Different letters after the number corresponds with statistically significant differences for P 5% - Duncan test

At syrup compote, highest scores were recorded to 'Maria', with scores between 4.26 and 4.5 (table 2), for color and taste. However, for clarity and flavor

syrup, ‘Bucium’ was most appreciated by consumers, with scores between 4.16 and 4.23.

Analyzed in the laboratory, compote samples have registered values contained in table 3.

Table 2

Average notes for syrup characteristics recorded by consumer test with 7 compote samples (November 2009)

Sample	Color*	Clarity *	Taste*	Aroma*
Maria	4.5125[a]	4.2225[a]	4.2625[a]	4.1775[a]
Oana	3.9925[b]	4.075[a]	3.955[bc]	4.0875[a]
Radu	4.0325[b]	4.05[a]	3.9825[bc]	4.025[a]
Golia	4.2375[b]	3.915[a]	3.87[c]	3.925[a]
Van	4.0625[b]	3.9925[a]	4.0725[abc]	3.9975[a]
Bucium	4.2575[b]	4.2325[a]	4.15[ab]	4.1575[a]
Boambe de Cotnari	4.0025[b]	4.2075[a]	3.855[c]	3.9175[a]
SD 5% =	**0.25 - 0.28**	**0.28 - 0.32**	**0.25 - 0.28**	**0.24 - 0.27**

***** - Different letters after the number corresponds with statistically significant differences for P 5% - Duncan test

At cultivars have been studied, the lagerst fruit size registered on ‘Van’ with 23.2 mm in equatorial diameter, and the smallest fruit size registered on ‘Oana’ and ‘Golia’ with 19.9 mm (table 3). Depending on the size, the average number of fruits per jar was different at each cultivars, ranging between 62 fruits at ‘Boambe deCotnari’ and 76 fruits at ‘Radu’ (table 3).

‘Van’, ‘Maria’ and ‘Radu’ have a short peduncle, and this presented difficulties in stem removal mechanized operation. However, ‘Bucium’, ‘Golia’, ‘Oana’ and ‘Boambe deCotnari’ have a medium length of stems and in this regard are more suitable for industrial processing.

Soluble solids content (SSC) **of syrup** made from the highest at ‘Van’ and ‘Golia’ (17.27 ° Bx) and lowest values in ‘Maria’, ‘Oana’ and ‘Boambe Cotnari’ (16.27 ° Bx) (table 3).

Soluble solids content (SSC) **in fruit** from compote was 18.07 ºBx at ‘Van’ and 16.27 °Bx at both ‘Oana’ and ‘Maria’. All other cultivars accounting an intermediate values.

Highest recorded value in reducing sugar content (RSC) was 10.32 g% on ‘Radu’ and lowest (8.42 g%) was recorded in ‘Maria’ (table 3). Titratable acidity (TA) showed the highest value (0.486 g%) at ‘Radu’ and lowest (0.353 g%) at ‘Van’. RSC / TA ratio showed the highest value (28.84) at ‘Van’ and the lowest was recorded in ‘Boambe Cotnari’ (20.07) (table 3).

Table 3

Physical and chemical features of fruits used for compote presented to the test

Cultivar	Average no. fruits/ jar (570 ml)	Size of fresh fruits used for compotes (mm)	Peduncle length *	SSC (°Bx)		RSC (g%)	TA (g malic acid %)	RSC/TA ratio
				Syrup	Fruit			
Van	66	23.2	short	17.27	18.07	10.18	0.353	28.84
Bucium	65	22.2	medium	16.67	17.07	10.13	0.434	23.34
Golia	71	19.9	medium	17.27	17.47	10.25	0.441	23.24
Maria	64	21.7	short	16.27	16.27	8.42	0.375	22.45
Oana	72	19.9	medium	16.27	16.27	8.78	0.405	21.68
Radu	76	20	short	17.07	17.27	10.32	0.486	21.23
Boambe de Cotnari	62	23	medium	16.27	16.47	8.85	0.441	20.07

*- Peduncle length assessed as: very short ≤ 3.0 cm; short = 3.1-4.0 cm; medium = 4.1-4.5 cm; long = 4.6-5.0 cm; very long ≥ 5.1 cm (***, 2006)

CONCLUSIONS

Compote made from ‘Mary’ was most appreciated by consumers (getting average grades of 3.9-4.5 to the fruit’s parameters and 4.2-4.5 to the syrup’s parameters) and the analytical point of view is a cultivar with bright red skin colour, the equatorial diameter 21.7 mm with a total of 64 fruits per jar and RSC / TA ratio of 22.45. However, ‘Mary’ has a short stalk that being a technological disadvantage, which can cause difficulties for stalk removal mechanized operation.

‘Oana’ obtained the lowest score on fruit’s parameters (3.8-4.09) to consumer test having a smaller size (19.9 mm equatorial diameter) and therefore showed a greater number of fruits / jar (72) and the ratio sugar / acidity was 21.68, being small compared to other cultivars.

‘Radu’ was appreciated by consumers with high scores on both parameters syrup and fruit characteristics, given in terms of technology has the disadvantage of the presence of a short stalk and smaller fruit size (20 mm in equatorial diameter).

‘Golia’ and ‘Van’ showed intermediate assessment scores compared to other cultivars, but ‘Van’ has the most valuable fruit size (23.2 mm) and ratio RSC / TA (28.8). From the technological point of view, ‘Van’ have a short stalk that being a disadvantage.

‘Boambe de Cotnari’ is available in terms of processing, with large fruit, half yellow half red skin colour, with a balance sugars / acid ratio, but consumers have shown a preference for compotes with purple red syrup color, with strong visual impact.

‘Bucium’ has quality assessed both consumers and processors, with large fruits, bright red, with medium length stems and a balance sugars / acidity ratio (22.34).

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