

EXPERIMENTAL STUDIES CONCERNING OBTAINING SOME WINE COOLER PRODUCTS

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Abstract

Wine coolers are drinks that can be easily prepared in short time and effortless, accessible and easily distributed, bought everywhere. This study is about the wine cooler obtainment on laboratory scale with red wine and strawberry juice. The achieved products have sensorial and physico-chemical properties that are specifically related, with two components of blend.

The last years, consumers have shown a preference for low-calories beverages, low-alcohol content, freshness beverages, considered more adequate that prepares wines, as we talk about rapid and light meals. In the same time we must not forget the hygienic and nutritional performances and, also, a temperate (controlled) processing.

Wine cooler drinks have a small alcohol percentage, nutritional, strengthening prepared with wine, fruit-juice, vegetable-juice, and natural flavored extracts. Wine is regularly common-wine, usually from new harvest or maybe concentrated wort, partially fermented. Common wine is used 50% per total product.

Cooler wine means low content alcohol drinks (5-6%) made with wine and aromatic fruit juice. Usually there are used: common white wines, light pink and red wines, concentrated wort, aromatic herbs extracts, synthesis flavors, citric acid for acidity amelioration, soft water.

After these experiments we may conclude: the achieved products have sensorial and physico-chemical properties that are specifically related, with two components of blend; sensorial qualities of products are: freshness, fructosity, pleasant and harmonious taste, these outlines the properties for new products that are agreed by consumers; besides, strawberry juice is characterized by high content of vitamin C (50-150 mg/100 g juice), mineral salts, acids, oligoelements.

Keywords: freshness beverages, wine cooler, spectrophotometry

Submitted: 20-04-2011

Reviewed: 16.05.2011

Accepted: 26.05.2011

1. INTRODUCTION

Wine-cooler-type products are low-alcoholic beverages, refreshing and nutritious, made of wine mixed with fruit juice, vegetable juice, natural aromatic extracts. Translated „refreshing wine”, these products are low alcoholic drinks (5-6% vol. alc.) based on aromatic wine and fruit juices (Tita, 2002). They usually use white, rosé and red current consumption wines, concentrated wort, extracts of herbs, essential oils and synthetic flavours, citric acid for pH correction, softened water.

The wine normally used is table wine, usually from new production or even partially fermented concentrated wine wort. When using table wine, its share of the total product is about 50%. When using partially fermented concentrated wine wort, its total weight is

about 10% (Leonte, 2000; Tardea et al., 2001). This paper concerns the obtainment of such wine-cooler-type products based on red wine and strawberry juice.

2. MATERIAL AND METHODS

The experiments made use of Merlot red wine, 2009 production, having the following physicochemical characteristics:

- alcoholic strength 11% vol.
- sugar content 3,5 g/L
- total acidity 4,01g H₂SO₄/L
- pH 3,7
- total content of dry extract 30 g/L

In order to obtain wine-cooler-type products was used laboratory strawberry juice obtained as follows: after the washing and stem removal operations the pulp was shredded and squeezed through, then filtered to obtain a clear product.

The strawberry juice showed the following physicochemical characteristics:

- dry substance content 4 %
- sugar content 123 g/L
- acidity 4,9H₂SO₄/100mL
- pH 3,5

Improving the flavour of the finished product was achieved by introducing strawberry juice in the manufacturing recipes. Initial products (red wine and strawberry juice) and finished products were sensorial and physicochemical analyzed using the following methods:

- sensorial properties – sensorial analysis – tasting temperature:
 - red wine – 15°C;
 - wine cooler - 10°C;
- colour – spectrophotometric method – is based on measuring the optical density and extinction of wine at 420 nm, 520 nm and 620 nm wavelengths, values used for calculating colour intensity and hue; a JENWAY 6400 spectrophotometer was used;
- acidity – titrimetric method – titrating wine acidity and wine cooler products' acidity with a NaOH solution in the presence of phenolphthalein as the indicator;
- pH – electrometric method, using a laboratory pH meter;
- sugar content:
- strawberry juice – refractometric method;
- wine and wine cooler – chemical method.

Colouring intensity is given by the sum of optical densities at 420, 520 and 620 nm measured under a 10 mm layer of distilled water (Gloriés index):

$$IC' = d_{420} + d_{520} + d_{620} \text{ și } IC = d_{420} + d_{520}$$

Hue (tone) of colour is the ratio of optical densities at 420 nm and 520 nm, i.e. the proportion of yellow colour to red:

$$T = \frac{d_{420}}{d_{520}}$$

Overall share of each colour to the global colour of the product was calculated by the ratio of each optical density and colouring intensity, as follows:

$$\text{- yellow colour \% } d_{420} = \frac{d_{420}}{IC'} \cdot 100;$$

$$\text{- red colour \% } d_{520} = \frac{d_{520}}{IC'} \cdot 100;$$

$$\text{- purple colour \% } d_{620} = \frac{d_{620}}{IC'} \cdot 100 \text{ [1]}$$

2. RESULTS AND DISCUSSIONS

Wine-cooler-type products based on red wine and strawberry juice were prepared in four versions (alternatives):

- version 1: 20% strawberry juice;
- version 2: 30% strawberry juice;
- version 3: 40% strawberry juice;
- version 4: 50% strawberry juice;

Experimental versions – manufacturing recipes for 200mL of finished product

Table 1. Adopted working version

Raw materials	Experimental samples			
	S ₁	S ₂	S ₃	S ₄
red wine, in mL	160	140	120	100
strawberry juice, in mL	40	60	80	100

The sensorial properties were determined through sensorial analysis. Sensory assessment was carried out for commercial purposes to know consumer preferences and the satisfaction level of the product taking into consideration the products intended use. First was conducted the tasting of dry red wine and dry strawberry juice used for the blend, then the 4 corresponding experimental versions. After tasting, sensory changes of the newly obtained products were shown and the following conclusions were reached:

- version 4 and 3, where share of red wine to strawberry juice was 1:1 and 3:2 respectively, showed a pronounced fruity taste and smell, and even a decrease in colour;
- versions 1 and 2, where share of red wine to strawberry juice was 3:1 and 4:1 respectively, presented sensorial characteristics closer to wine, but also other new characteristics given by the strawberry juice such as freshness and fruitiness and preservation of strawberry fruit flavour. The sweetness of all 4 samples masked the acidity given by the strawberry juice.

Table 2 shows the values obtained by the spectrophotometer at 420, 520 and 620nm wavelengths, for the 6 samples:

Table 2. Spectrophotometer results

Wave lengths	Wine-cooler-type products				Straw berry juice	Red wine
	S ₁	S ₂	S ₃	S ₄		
420 nm	1,215	1,397	1,481	1,438	0,818	0,996
520 nm	1,267	1,391	1,603	1,474	1,113	1,252
620 nm	0,323	0,461	0,460	0,433	0,091	0,818

Physicochemical indicators of the analyzed samples are presented in the table below:

Table 3. Physicochemical indicators of the analyzed samples

Physicochemical index	Wine-cooler-type products				Juice	Red wine
	S ₁	S ₂	S ₃	S ₄		
Dry substance content	2,6	3	3,5	3,8	4,7	2,2
pH	3,66	3,63	3,62	3,58	3,51	3,7
Total acidity [g H ₂ SO ₄ /100ml]	4,6	4,9	6,8	7,3	6,1	4,9

The following chromatic indexes were calculated based on the spectrophotometer results (table 4).

Table 4. Determined chromatic indexes

Chromatic index	Wine-cooler-type products				Juice	Red wine
	S ₁	S ₂	S ₃	S ₄		
Colouring intensity CI (Sudraud index)	2,482	2,788	3,084	2,912	1,931	2,248
Colouring intensity CI' (Glories index)	2,805	3,249	3,544	3,344	2,022	2,429
Colour hue	0,958	1,004	0,92	0,97	0,734	0,79
The weight of each colour:						
- yellow	43,31	42,99	41,78	43	40,45	41
- red	45,16	42,81	45,23	44,07	55,04	51,5
- purple	11	12,97	12,97	12,94	4,5	47,45

3. CONCLUSIONS

From the experiments performed we can draw the following conclusions:

- The obtained products are characterized by sensorial and physicochemical properties specific to the two blending components: versions 1 and 2 are distinguished by red wine characteristics, while versions 3 and 4 by strawberry juice characteristics and a reduction in colour intensity.

- Wine-cooler-type products show freshness, fruitiness, pleasant and harmonious taste, drawing on the properties of new products with appeal to consumers; additionally the strawberry juice is characterized by a high content of vitamin C (50-150 mg /100 g juice), minerals, trace elements, acids.

- Physicochemical indicators of the obtained products did not record great changes when compared to the raw materials red wine and strawberry juice.

The measurements made determined the following values for dry matter substance: 4.7 for strawberry juice and 2.2 for red wine raw materials for obtaining the wine-

- cooler product. The 4 wine-cooler versions registered dry substance content values in the range 2.2-4.7%.

- The worldwide trend in food industry is marketing products whose manufacturing recipes eliminate synthetic manufacturing, preferring to use natural ingredients.

The research begun will be continued by establishing an optimum manufacturing recipe that will remain faithful to its raw materials used will render a certain personality to the finished product.

4. REFERENCES

- [1] Ana, Al., Manual de lucrari practice in oenologie, Editura Fundatiei Universitare "Dunarea de Jos" Galati, 2002
- [2] Leonte, M., Vinul – aliment, tonic, medicament, Editura Pax Aura Mundi, Galati, 2000
- [3] Tita, O., Obținerea vinurilor speciale și a distilatelor din vin, Editura Universității Lucian Blaga Sibiu 2002
- [4] Tardea, C., *et al.*, Tratat de vinificație, Editura Ion Ionescu de la Brad, Iași 2001.