

## CHARACTERISTICS OF TEMPRANILLO GRAPE VARIETY (*Vitis vinifera* L.), GROWN IN TIKVEŠ'S VINEYARD

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### ABSTRACT

The studies were conducted on the grape variety of Tempranillo on the production plantations located on the site of Lepovo in the Tikveš vineyards, owned by "Bovin" winery. The plantations were planted in 2006 with certified planting material at the distance of 2.4 m between the rows and 1 m between the vines in a row. The applied farming system is the two legged Guyot system by leaving 7 buds per vine. Optimal agro-technical and ampelo-technical measures were applied. The plantations are under a drop-by-drop irrigation system (drip irrigation system). In the period of the study (2010-2012) the following elements were taken into consideration: realized yields (kg/vine) chemical composition of grape must (sugar, total acids, pH) and chemical analysis of the wine. The results show a slight variation in yield (coefficient 10.36) which is due to the age of the grape or it is in the second (2010) and third (2012) year of harvest. The must contains 237 g/L sugar, 5.6 g/L total acids, average of 13.71 vol% and degustation score of 18.0 points, which are due to the selective harvesting of the grapes and the method of vinification.

*Key words:* Tempranillo, yield, must, wine.

### INTRODUCTION

In most of the vineyards in the Republic of Macedonia, particularly the Tikveš vineyards with continental and partially Mediterranean climates, the agro-ecological conditions are favourable for successful cultivation of wine grape varieties of all epochs of maturity. The climate conditions has a direct effect on the quantity and quality of the grapes and on the wine production (Lyudmil Angelov, Boyan Stalev 2011, Violeta Dimovska at all.,2010). In the period of invegitation, Lepovo mikrolocation is characterized by daily mean air temperatures of 13.7–14.5°C with annual temperature sum of 4998–5305°C and vegetation temperature sum ranging from 4339°C to 4528°C. Total annual precipitation ranges from 320–593 mm, and from 190–268 mm during the vegetative growth cycle. Lack of water, especially during the vegetation is gone, because the vineyards are irrigated with drip irrigation. The vegetation period lasts on average from 206 to 209 days (Table 1), enough for the grapes to reach technological and full maturity.

**Table 1 Climatic factors in Lepovo mikrolocation (2010/2012)**

Vegetative period	in days	209
Period of active vegetation	in days	206-209
Average annual air temperature	in C <sup>0</sup>	13.7-14.5
Sum of annual temperature	in C <sup>0</sup>	4998-5305
Sum of temperature in the vegetative period	in C <sup>0</sup>	4339-4528
Annual precipitation	in mm	320-593
Precipitation in the vegetative period	in mm	190-268

The Tempranillo grape variety, known as Tinto Fino, originated from Spain, the area Rioja. It is variety leading to 75% of the production assortment of red wines. The core of almost every red wine from this area is Tempranillo. The wines are characterized by a good balance of alcohol

content, color and acidity, and aging receive smooth structure , specific fruity taste that lasts long. In Spain produce 28 different types of wines with a protected designation of origin. In Portugal, it is called Tinta Roriz and Aragonez. In California, it was known as Valdepeñas (Larry Bettiga 2003).

## MATERIALS AND METHODS

Studies were carried out on the Tempranillo grape production plants located in the Lepovo mikrolocation-Tikveš vineyard. The plantations are owned by "Bovin" winery. The plantation was built in 2008 with certified planting material. The training system was a double Guyot cordon of pruning, distance of planting of 2.4m between the lines and 1.m between the grapevines in line with an optimal strain of 20 buds by grapevine. Regular agro-technical and ampelo-technical measures were applied. The vintage is under irrigation drip.

The yield of grapevine by and ha was determined as a representative parameter of the agro-biological and technological characteristics. During the vegetation, regular agro-technical and ampelo-technical measures were applied. 30 grapevines of each clone were included in the studies (three repetitions of 10 grapevines). The yield of grapevine by and ha was determined as a representative parameter of the agro-biological and technological characteristics.

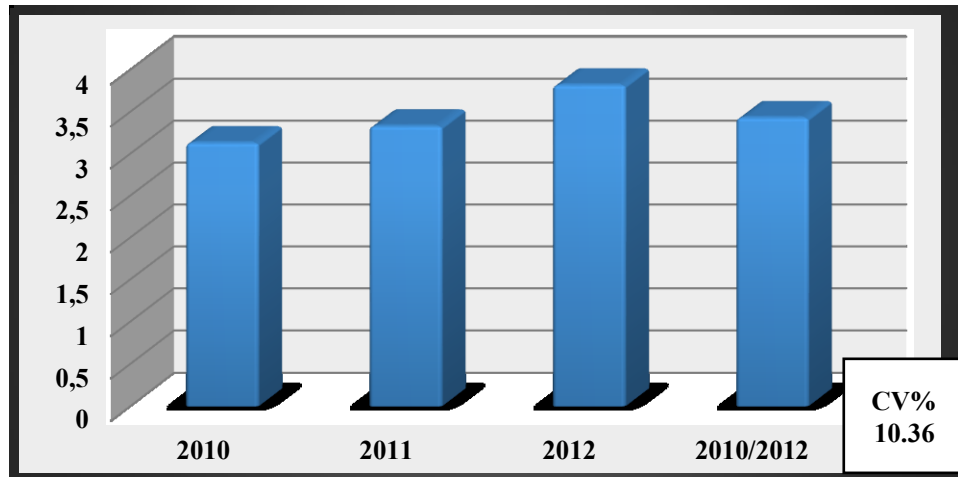
The yield of 30 grapevines by 1ha was mathematically calculated. The content of sugar in the must was determined by help of Oechsle Scale, and the composition of total acids was determined by titration method using solution of N/4 NaOH with factor 1.0000. The pH value on the must and wine, was determined by pH meter PB-11, Sartorius.

For wine production, grapes were harvested at technological maturity transported to the Winery Bovin. The grape mash was sulphated with 80 mg/l liquid SO<sub>2</sub>, and then selected wine yeast Fermol Premier Cru (*Saccharomices cerevisiae*) was added. During the maceration period of 6 days, the grape was pressed mechanically two times per day. After the maceration, wines were separated from the pomace, collected in glasses balloons whereas the alcoholic fermentation finished. The temperature during the alcoholic fermentation was 23-25 °C. The wines produced with these procedure were poured off 2 times, and during every pouring off, a correction of SO<sub>2</sub> was done, to not lower than 30 mg/l free SO<sub>2</sub> and not higher than 100 mg/l total SO<sub>2</sub>. Chemical analysis of the wine was done after the second pouring off and recommended methods of O.I.V (International organization of vine and wine) were used. For determination of the wine specific weight, alcohol and dry extract, a pycnometer method was used.

## RESULTS AND DISCUSSION

The fertility of grape varieties is determined by the level of growth and the number of eyelets. Beside the characteristics of the variety and their biological potential, yield depends on agro-ekological conditions where the variety is grown (Karoglan Kontic Jasminka, 2000) of farming systems and the level of schedule the eyelets (Jesús Yuste, María Alburquerque (2014), etc .

The results of obtained yields of grapes (kg/vine) for the test period in years, are presents on the graphe 1. The quantity (yield) of gathered grapes plays an important role in the quality of raw material (stuff) and wine. In the years of testing, the yield ranges from 3.130 kg/vine (2010) to 3.82 kg/vine (2012) or an average of 3.460 kg/vine (2010/2012). In the years of research, in terms of yield , the variety Tempranillo showed high stability (nonsignificant variation (10.36), and is a result of the variety and its adjustment to environmental conditions.



**Graph. 1 Yield of grape (kg/vine)**

The content of sugar and total acids and their ratio are among the important parameters based on which the quality of one variety or clone is assessed. The results for the sugar and total acids content and pH value in the must are presented in table 2. During the period of study, the average sugar content ranged from 215 g/L (2011) to 270 g/L (2012), which enabled producing of medium strong (2010, 2011) to strong wines (2012). Compared by years, the sugar content in the must was significant variation with the coefficient of variation from 12.38. The freshness of the wines depends on the content of total acids in the must. The average content of total acids ranged from 5.4 g/L (2010) to 5.8 g/L (2012). No significant changes in the content of total acids in the must, were observed during the period of three years. The coefficient of variation is 3.74.

**Table 2 Content of sugar and total acids in the must**

Element	2010	2011	2012	2010/2012	CV%
Sugar (g/L)	215	225	270	237	12.38
Total acids (g/L)	5.4	5.5	5.8	5.6	3.74
pH	3.26	3.27	3.26	3.26	0.18

The chemical composition of wine is important parameters that contribute to the sensory characteristics (Lyudmil Angelov, Boyan Stalev, 2011). The results of the chemical analysis of the wine Tempranillo are presented in Table 3. During the period of study, the average alcohol content in the wines is 13.25 vol%, at ranged from 12.35 vol% (2011) to 15.77 vol% (2012). Thus, the wine produced in 2010 and 2011 are medium strong and wines from 2012 are strong.

Compared by years, the alcohol content in the wine was significant variation with the coefficient of variation from 13.25. This is due to the different sugar content in the must.

The content of residual sugar in the wines (from 3.23 g/L to 4.5 g/L), they are the group of dry wines.

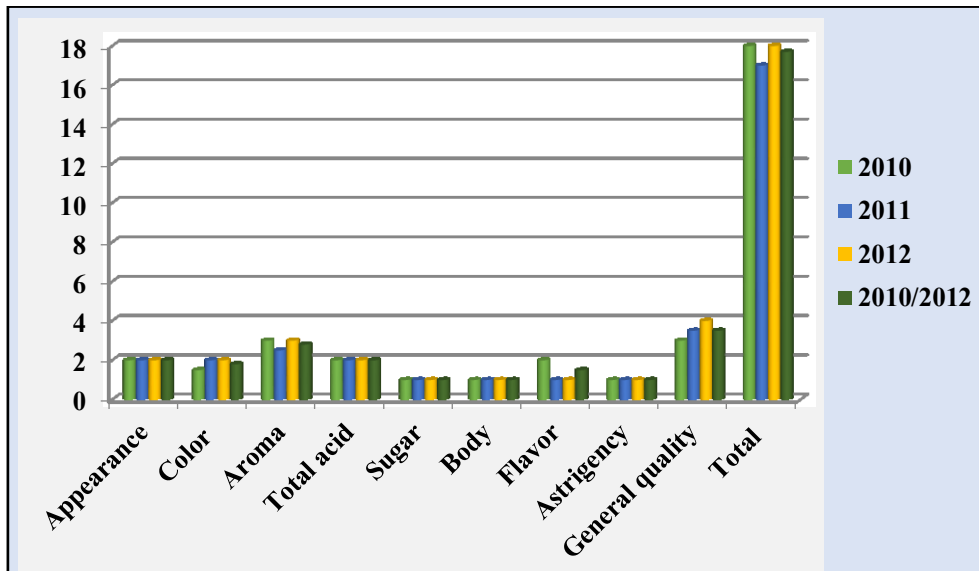
In addition, the sugar-free extract (dry extract) in wine is a characteristic parameter for each variety. In the period of study, values for the dry extract ranged from 31.8 g/L (2011) to 36.2 g/L (2012). The wine has a value of pH (3.28) which is very stable, which means that the wine has a high level of natural acidity.

Besides chemical analysis, organoleptic evaluation (tasting) is an important indicator for determining the quality of the wine. When tasting the wine Tempranillo the following elements are evaluated: appearance, color, aroma, total acid, sugar, flavour and astringency. The sum of the calculated values gives the total evaluation of wine. Wine-tasting points of the examined wine are given in Graph. 2.

Average wine-tasting grades range is 18.0 point. In the years of testing, wine from this variety, were characterized by high stability assessment, i.e. the coefficient of variation ranges is 3.85. Based on the results of chemical analysis and tasting evaluation, the Tempranillo wine belongs to the group of wines of high quality.

**Table 3 Chemical analysis on wine**

Element	2010	2011	2012	2010/2012	CV%
Alcohol vol %	12.35	13.00	15.77	13.71	13.25
Dry extract (g/L)	31.8	32.0	36.2	33.33	7.45
pH	3.28	3.29	3.28	3.28	0.18
Total acids (g/L)	4.9	5.0	5.5	5.13	6.26
Sugar free (g/L)	3.2	2.0	4.5	3.23	38.67



**Graph.2 Degustation rating of wine (points)**

### CONCLUSION

The results of this study give us knowledge of production and technological characteristics of the Tempranillo grape variety, grown in agro-ecological conditions in Lepovo - micro locality, Tikveš wine region. As a newly introduced variety (2008), in the years of testing showed high stability of the quality of grape must and wine. This gives us the right to say that variety Tempranillo is interests the Vine and Wine sector in the Tikveš vineyard.

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