



Chemical and Fistic Components of *Shesh i Bardhe*: Grape Cultivar in Albania

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Abstract

The study assessed regional differences and effects in berry morphology (skin, pulp and seeds) in relation to chemical compounds. The flavonoids containing in berries (ITF), of the autochthonous cultivar, *Shesh i Bardhe*, of grapevine, in three micro zonal of Albania (Gjirokastra, Tirana, Durres) has been determined with spectrophotometrically and they ranged from 165.62; 66.36; 183.85 respectively for three different eco-climatic zones of Albania. The content of sugar, Brix, was: 13.53 for cv. *Shesh i Bardhe*, Gjirokastra; 17.5 per cv. *Shesh i Bardhe*, Tirana and 11 for cv. *Shesh i Bardhe*, Sukth. The effect of climatic zones, therefore ripening, was deep in the grape, with drastic variabilities in the different components: the content of sugar Brix, total Acidity, total Index of polyphenols, total flavonoids, colour intensity. Statistical analyses of the data over physical indicator (The weight of the sample, the weight of the berries sample, the weight of rachis sample, coefficient of construction, weight of 100 berries, contents of peeling, the content of the seeds, size of berries (length /width), the index of berries, the coefficient of the berries composition), and even chemical, had a correlation of indicators of research with environmental factors in the vineyard.

Keywords: Flavonoids; Total phenolics; cv. *Shesh i Bardhe*; Sugar content brix; Total acidity

Introduction

Viticulture and the enology in Albania

Albania, a small European country on the Mediterranean sea coast. As a Mediterranean country, Albania can be called cradle of European viticulture. French historian Henri Enjalbert has stated that Albania, along with the Ionic Islands of Greece and Southern Dalmatia, now called Bosnia and Herzegovina, may have been last European refugee of the grapevine, after the glacial era. Of course, there are written documents about the wine that was cultivated in Illyria, as it was known in classical times around the 8th century p.e.s. Greek and Roman authors of ancient times (Straboni, Aristotle, Pliny etc.) wrote about the wine cultivated by the Illyrian tribes. Early Latin writers also qualified Illyrian as a place for cultivating many varieties of grapes [1].

In the 17th century, with massive islamization of the population, the growth of vineyards and wine production was diminished drastically and was banned by the rules of the Quran. During the 45 years of the socialist system, vineyards covered 20000 hectares, of which 14000 hectares were full in production and were represented by indigenous varieties. The main autochthonous grape varieties are: *Shesh i Bardhe*, *Debine e bardhe*, *Pulez* (White wine), *Shesh i Zi*, *Kallmet*, *Vlosh*, *Serin*, *Debine e zeze* (ed wine) Grape production was an average of 70 quintals/ha.

Shesh i Bardhe and *Shesh i Zi*, are the most important varieties for traditional drinks; raki and they are very widespread in the following years. The name comes from the hilly village Shesh about 15 km near Tirana. From here it was distributed in many coastal regions of Albania and represents about 35% of grape for wine production.

The wines produced by *Shesh i Bardhe*, with around 11-12 of average grade and around 6.5 g/lof total acidity, expressed as tartaric acid, are harmonious and very pleasant taste. The flowers arome raises its quality when harvesting is carried out early, otherwise lose their varietal characteristics and wine loses distinguishing features.

Wines produced by *Shesh i Zi*, with about 12-13 of average grade and about 6.0 g/l of total acidity, expressed as tartaric acid, are very sensible and balanced, warm represent a soft taste (mature), with red glowing ruby color, with pleasant aroma. If the year has been good, so temperatures have reached the amount of assets, it becomes an excellent wine.

Albania allocated in four zones of growth of vineyards Zone 1: Coastal lowland areas at altitudes 0-300 m. It includes the cities of Tirana, Durres, Shkodra, Lezha, Lushnja, Fier, Vlora, Delvina, etc.

Zone 2: The hilly area where the vineyards are located at an elevation of 300-600 m and comprises the districts of Elbasan, Kruje, Gramsh, Berat, Permet, shines, Meath, etc.

Zone 3: The under- mountainous area which are located at an elevation of 600-900 m around the towns of Pogradec, Korca, Leskovik Peshkopi etc.

Zone 4: The mountainous area located between 800 and 1000 m elevation. land generally, Despite the increase in surface vineyards, it failed to be met the requirements of domestic and export market for wine.

The main reasons were:

- Inappropriate distribution in small and new vineyards.
- Lack of number of plants per hectare.

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- Limited services of viticulture especially in agricultural cooperatives.
- Low performance of grape production.
- These setbacks brought the lack of raw material in this industry by not justify the investment made in the wine industry during 1980-1990.

Materials and Methods

The object of the study is the knowledge of genetic variation for some key indicators “Shesh i bardhë” grape in the vine basin in south-west of Albania where this ecotypes has its place-origins and greater spread. The study was conducted in three plots planted with these varieties in Gjirokastra (humelice) Durres (Kulle, Sukth), Tirana (Paskuqan) 2015- 2016.

Mechanical grape compound understand report parts that are components of bunch: bracts and seeds; while against the grain report pulp, chip on it.

Mechanical analysis includes the following definitions:

1. The weight: Knowing the weight of the sample and the number of clusters through technical scale makes it possible to average bunch weight. The sample taken must represent the entire quantity of grapes to be analyzed.

2. The weight of the pedicel and berries: The weight of the pedicel and berries is defined by plainly the berries of each bunch, weighted before. From the bunch weight, in particular bracts and berries is determined the coefficient of construction 3.

$$\text{Coefficient of construction} = \frac{\text{weight of berries}}{\text{weight of pedicels}}$$

The weight of 100 grains and then averaged.

Pedicel weight: The peels of 100 berries, collected in capsules or in zero setting Becker. Measure of crumb weighed separated.

The content of pips: Pips of 100 berries weighed carefully.

Size of berry (length/width): The number of berries per 100 grams of berry grapes {index}.

Coefficient of berry composition: This coefficient is expressed in the report:

$$K2 = \frac{\text{Pedicel weight of 100 berries}}{\text{weight of 100 skin berries} + \text{pips weight of 100 berries}}$$

General determination of acidity: Definition in numeric value of the chromatic characteristics in cider

Mode of analysis: In grape juice, pipette 10 ml, cast into a conical ballon 250-300 ml, add 50 ml water and 0.5 ml (or 10 points) bromthymol blue. Titled with 0.1 N sodium hydroxide to clear blue.

Calculations

The total acidity (X) expressed in grams of tartaric acid per liter is calculated according to the formula:

$$X = \frac{v \times 0.0075 \times 1000}{10}$$

Where: V: volume in ml of solution of 0.1 N NaOH used for entitlement 0.0075: The amount in grams of tartaric acid which

corresponds to 1 ml 0.1 N NaOH.

Dominant colors ranging from golden yellow to yellowish green, so the theoretical maximum absorption should be from 400 to 480 nm, but this was not observed in practice. Wavelength is usually taken as 420 nm wavelength which have maximum absorption. The result is expressed as optical density (D.O.) [2].

Usually to white grapes in wine which are not altered represent values from 0.05 to 0.15 (Figures 1-3).

IPT - Total Index Polyphenols

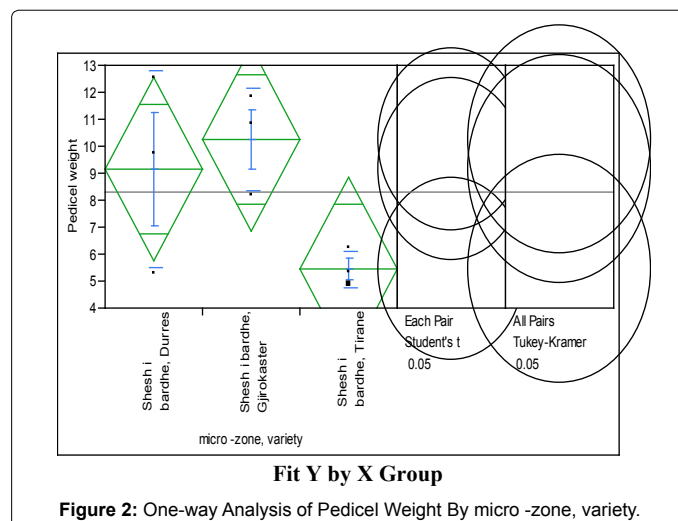
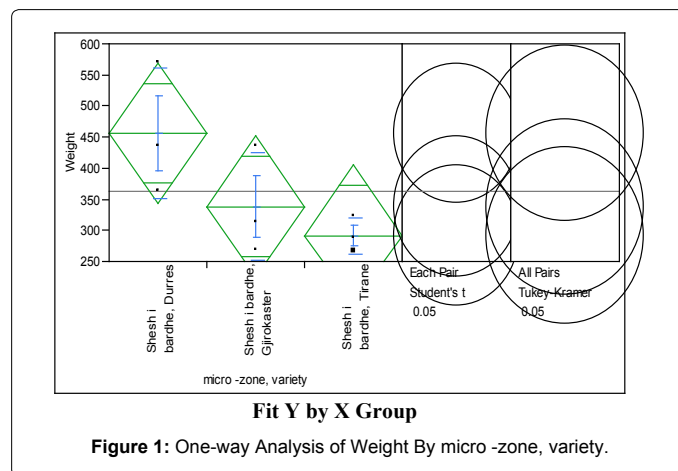
Principle of the method: The method uses the maximum absorption in the wavelength 280 nm (spectrophotometer) cycle characteristic of acid present in all polyphenols [3].

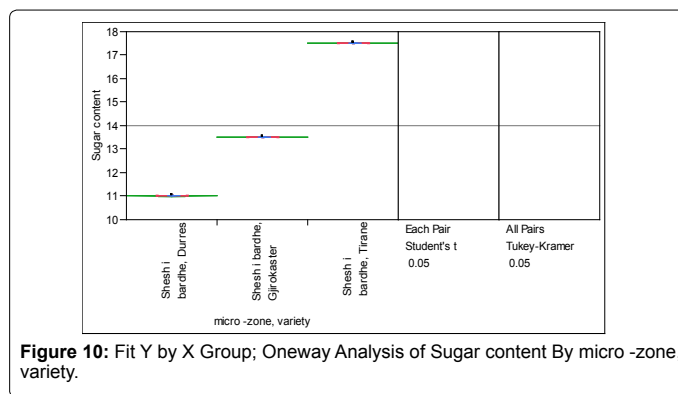
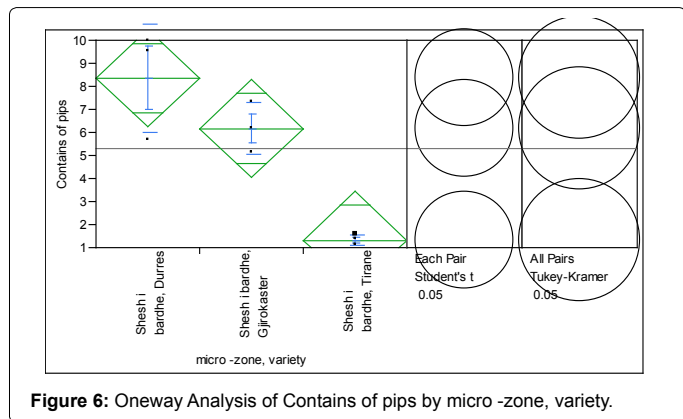
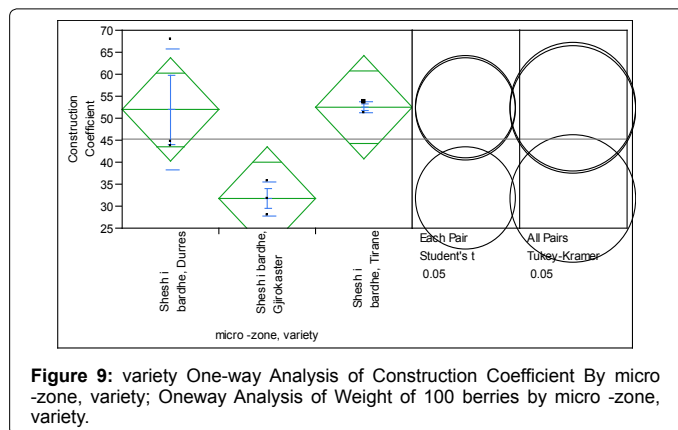
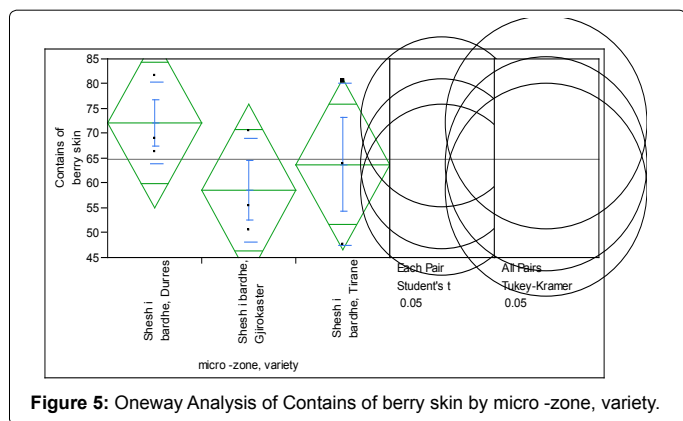
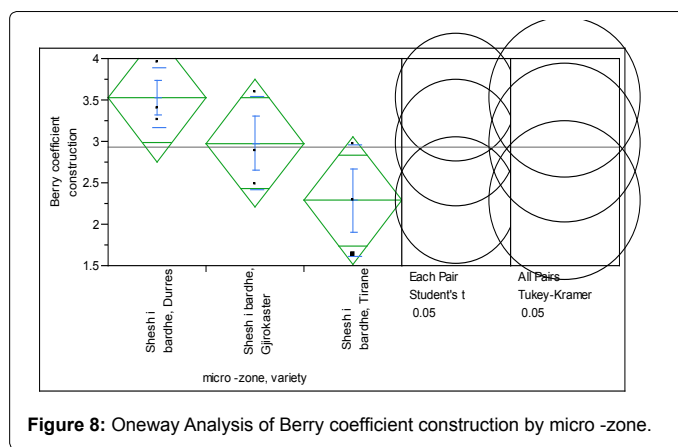
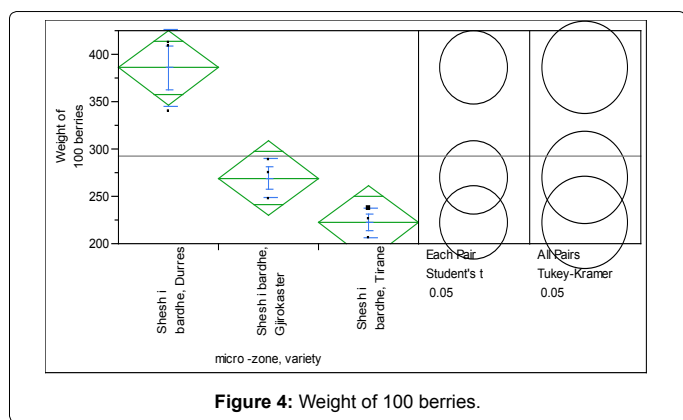
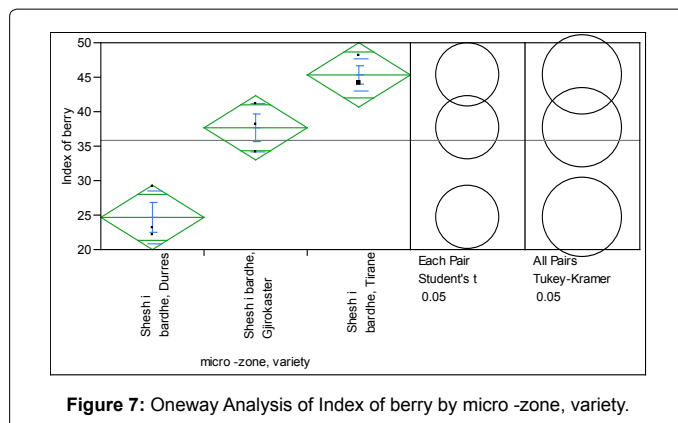
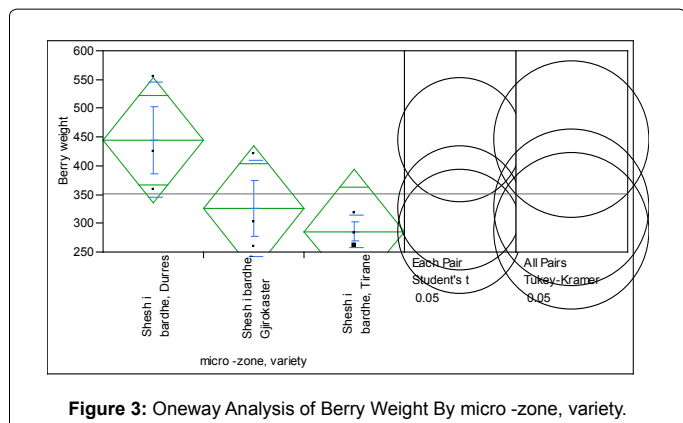
Making a cider sample dilution with water (1:100, 1:200 in total) and recorded the spectrum between 200-350 nm, and measuring optical density at the wavelength becomes 280 nm.

The found absorbance value should be between 0.2-0.4.

Calculation: IPT (280)=ABS280 × dilutions

Note: Such dilutions (1:200) is calculated (ml of cider+200)/ml of cider. All results obtained displayed in tables and statistical analysis was performed with JMP, SAS software.





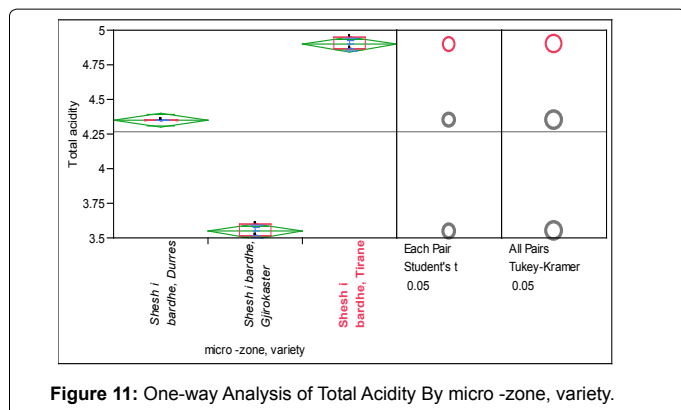


Figure 11: One-way Analysis of Total Acidity By micro-zone, variety.

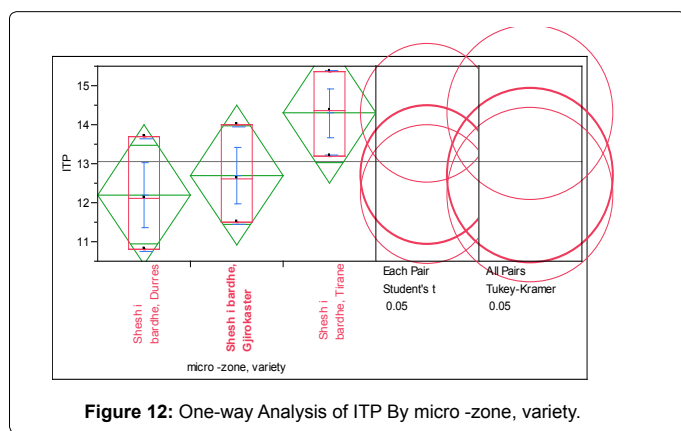


Figure 12: One-way Analysis of ITP By micro-zone, variety.

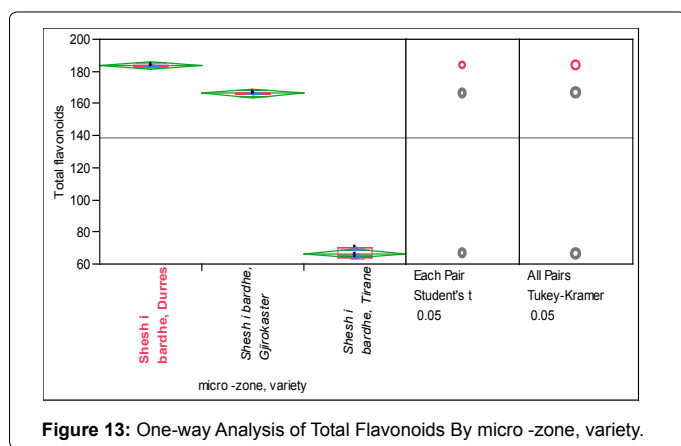


Figure 13: One-way Analysis of Total Flavonoids By micro-zone, variety.

S. No	Indicators	Tirana	Durres	Gjirokastra
1.	Sugar content	17.5	11.0	13.53
2.	Total acidity	4.89	4.35	3.54
3.	Index of total polyphenols	14.30	12.2	12.7
4.	Total flavonoids	66.30	183.58	165.62
5.	Intensity of color	0.623	1.489	1.245

Table 2: Data of chemical analysis on three viticole micro-zones of Albania for cv. *Shesh i Bardhe*, of grape.

Results and Discussion

The study of genetic variation of grapevine of *Shesh i Bardhe* variety, was taken, in three survey points in Gjirokastra, Durres, Tirana.

This variety is distinguished for a high fitness (adaptation) for conditions in the middle of Albania. This has made this ecotypes not only spreads, but has also attracted the attention of various researchers.

One of the most important questions that is done today, what variability it is present in natural populations as is in our case *Shesh i Bardhe* ecotype (Table 1) (Figures 4-6).

Inheritable quota of variability within the population is important for various reasons:

- Defines potential cv.
- Defines the capacity for evolutionary diversity.

At *Shesh i Bardhe* variety is present a genetic variation which poses a significant problem undertake the improvement programs that would be of interest to other cultivars originating country [4,5].

It analyzed the features of the importance of first-hand from an economic standpoint; weight of berry fruit, sugar content, represent a variability that is not qualitative type (respectively 17.5; 13.5; 11) differences between individuals depend on the degree of expression of the trait.

Number of indicators for quantitative traits of seeds represents generally continuous variability in the sense that it is possible to pass from one to another of the feature value through very small changes. (berry weight from 444.68 in Durres to 285.35 in micro zone of Tirana). Indicators of this feature is also variability (455.802 to 291.591) (Figures 7-9). Principles of valuable heritage features with quality variability are not available for those with quantitative variation. Among the plants analyzed changes which proved statistically on two levels.

But between groups: the white square $\alpha/2$, the critical zone (0.0025), while the 0.5% level proved, as the level of credibility hypothesis. The difference stands above all in the phenotypic manifestations of different genotypic combinations, due to the large number of genetic factors (genes) and imposing environmental effects.

The chemical composition of the estimated indicators of chemical analyzes to cv. *Shesh i Bardhe*, is recorded as follows in three micro-zones. Table 2 shows the contents of phenolics as well as antioxidant activity of grapes and their product Cv. *Shesh i Bardhe*, in Durres had the highest content of total phenolics than Gjirokastra and Tirana micro-zones (Figures 10-13) [6-8].

Conclusion

1. The proportion of these bunch elements has special importance for the oenological industry, interest here appears to grapes to be processed, which should have a much higher ratio of berries to reins and crumb to the crust and seeds.

S. No.	Indicators	Tirana	Durres	Gjirokastra
1	Weight	291.590	455.80	338.09
2	Pedicle weight	5.44	9.15	10.25
3	The weight of berry	285.553	444.68	325.94
4	Construction coefficient	52.44	51.91	31.65
5	Weight of 100 berries	222.215	385.66	269.10
6	Content berry skin	63.77	72.15	58.55
7	Content of pips	1.32	8.37	6.17
8	Dimensions of berry (Length/Width)	1.8/1.52	1.63/1.30	1.87/1.98
9	Index of berry	46.33	24.67	31
10	Berry coefficient construction	2.29	3.53	2.98

Table 1: Data of physico-mechanical indicators in three micro-zones of Albania of cv. *Shesh i Bardhe*.

2. For all features noted morphological and chemical variability of production showing that *cv. Shesh i Bardhe*, presents a genetic variation in different micro ecological areas in Albania.

3. Large blocks of vineyards represent heterogeneous materials.

4. Higher values of variability were seen in chemicals indicators; ITP and Total flavonoids respectively 14.3 in Tirana and approximately 12 in Durres and Gjirokaster; 183 and 166 in Durres and Gjirokaster; 66 in Tirana.

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