

THE INFLUENCE OF THE DEBURBAGE AND THE ROLE OF FAT SUBSTANCES IN WHITE WINE MAKING

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Abstract: The deburbage operation has an important role concerning the alcoholic fermentation of the grapes juices, influencing positively the sensorial quality of the wines and their physical-chemical composition.

Through the metabolism of the sweet substances in the process of the alcoholic fermentation, the efficiency regarding the ethyl alcohol is higher in case of the deburbage juices or with a high content of fat substances which is possible in case the juice is maintained for a long period in contact with the sediment [9 - 11].

After the deburbage, the obtained wines have a relatively low content of fatty volatile acids and a lower content of unwanted smelling substances.

Keywords: *deburbage, fat extract, static clearness, dynamic clearness*

INTRODUCTION

The alcoholic fermentation procedure is very important concerning the obtaining of some quality wines. Especially in the damaged crops case, the juice preparation for the fermentation includes compulsory the deburbage (clearness) process, operation that can be done either through static methods (gravitational clearness) or through some controlled SO₂ doses, or under the action of low temperatures (under 10 °C) or dynamic methods through centrifugal action [5 - 8].

The effectuated analysis and the obtained practical results demonstrated the importance of this process, especially in case of white wines.

MATERIALS AND METHODS

In the achievement of the experimental determinations, grape juice obtained from “Sauvignon Blanc” grapes sort, with a sugar content of 196 g/l, was used.

The juice was sulphited with doses of 90 mg/l SO₂ and was divided in 4 lots:

- a) a witness lot, which wasn't cleared neither through centrifugal action nor through deburbaging;
- b) a cleared lot obtained through centrifugal action for 15 minutes at 5,000 rpm;
- c) a cleared lot obtained through static sedimentation for 24 hours;
- d). a cleared lot obtained through static sedimentation for 48 hours.

From the sediment obtained after the centrifugal action or the static sedimentation, the fat substances were extracted with dichloromethane; they were introduced in the cleared juice samples through the centrifugal action in equal proportions (1.5% fat extract) obtaining other 3 lots:

- A₁) – a lot with fat extract obtained from the sediment of the centrifugal action;
- B₁) – a lot with fat extract obtained from the static sedimentation for 24 hours;
- C₁) – a lot with fat extract obtained from the sediment resulted from the static sedimentation for 48 hours.

The clearness obtained through centrifugal action was realized with the help of a centrifugal machine, and the static deburbage was realized in cylindrical vessels having a 1:1 ratio between height and diameter.

The determination of the free fatty acids was realized through the determination of fats free acidity expressed in the acidity index or oleic acid.

RESULTS AND DISCUSSIONS

The deburbage operation of the juice in white wine making determinates a modification in the content of the volatile substances which can be found in wine.

In this way the methyl alcohol and the superior alcohols have 22 - 25% lower concentrations than the witness sample which hasn't been deburbaged.

On the other hand, the deburbaged juices have more superior alcohols (+ 86%) and fatty acids (+ 72 %).

It can be noticed that the deburbage decreases with 8% the volatile fatty acids content (- C₄, -C₅) of the unwanted smelling substances, and increases with 53% the fatty acids content (- C₆, - C₈, - C₁₀, -C₁₂)

In the same time, the utilization of the fat extract obtained at clearness through static sedimentation for 48 h determinates an increase of the fatty acids in the sample of centrifuged juice composed with the utilization of the extract obtained at clearness through static sedimentation for 24 h. The content in ethyl alcohol after the fermentation of the studied juice samples is kept at a constant level, with small increases regarding the witness samples the most significant one being samples b) and c) obtained through

the fermentation of the centrifuged juice and also of the juice cleared through sedimentation for 24 h without adding fat extract.

Numbers very closed to the content in ethyl alcohol can be noticed at sample a) (the witness samples) and b₁) (the sample obtained from the centrifuged juice adding the fat extract obtained from the sediment separated after 24 h from static sedimentation).

The juice clearness through the centrifugal action or natural sedimentation in examples b, c, d, increases the efficiency in ethyl alcohol after the metabolism process of sugar substances.

Table 1. The influence of the deburbage and fatty extract supplement on the content of the wine volatile substances

Characteristics	witness a	Centrifuged juice b	Deburbage juice after 24 h c	Deburbage juice after 48 h d	Centrifuged grapes juice		
					+ fat extract for 24 h, a ₁	+ fat extract for 48 h, b ₁	+fat extract after centrifugal action c ₁
Ethyl alcohol, % vol alc.	11.14	11.76	11.58	11.37	11.32	11.11	11.19
Methyl alcohol, mg/l	44	38	33	34	34	38	41
Glycerol, g/l	7.3	6.4	6.7	6.7	7.7	7.5	7.2
Superior alcohols, mg/l	202	182	174	154	179	181	192
Fatty volatile acids, -C ₄ , -C ₅ , mg/l	1.7	1.6	1.7	1.9	1.8	1.6	1.8
Fatty acids, -C ₆ , -C ₈ , -C ₁₀ , -C ₁₂ , mg/l	10.9	16.4	16.4	14.5	13.8	11.8	14.7

Also, it can be noticed that through maintaining in contact the sediment with the juice, the obtained wines have more fat substances so: the witness sample > the deburbage lot for 48 h > the deburbage lot for 24 h > the centrifuged lot.

Also, the content of amino-acids is higher in the sample obtained from the deburbage juice than the witness sample.

It can be noticed that adding fat compositions: concerning the content of superior alcohols and methyl alcohol, it has not occurred important variations regarding the witness sample, but else, adding the fat extract leads to a significant increase of volatile fatty acids and a decrease of fatty acids with long links, which has a bad effect on the wine quality [1 - 4].

It has also been noticed that adding fat extract in the juice leads to an enrichment in total fatty acids of the wine in comparison with the witness sample.

Table 2. The influence of the juice deburbation and the supplement of the fat extract on the content of wine fatty acids (free fatty acids)

Acids mg/l	Witness a	Centrifugated juice b	Deburbaged juice after 24 h c	Deburbaged juice after 48 h d	Centrifugated juice		
					+ fat extract for 24 h a ₁	+ fat extract for 48 h b ₁	+ fat extract after centrifugal action c ₁
Miristic acid	0.65	0.13	0.25	0.09	0.39	0.46	0.19
Palmitic acid	0.15	0.35	0.48	0.21	0.93	0.84	0.36
Stearic acid	0.05	0.06	0.08	0.06	0.19	0.11	0.06
Palmitoleic acid	0.05	0.11	0.14	0.05	0.21	0.32	0.14
Oleic acid	0.16	0.18	0.22	0.25	0.92	0.73	0.61
Linoleic acid	0.07	0.07	0.08	0.09	0.10	0.11	0.12

Table 3. The influence of the juice deburbation and the supplement of the fat extract on the content of wine fatty acids (total fatty acids, after the fat substances hydrolysis)

Acids mg/l	witness a	Centrifugated juice b	Deburbaged juice after 24 h c	Deburbaged juice after 48 h d	Centrifugated juice		
					+ fat extract for 24 h a ₁	+ fat extract for 48 h b ₁	+ fat extract after centrifugal action c ₁
Linolenic acid	0.17	-	0.14	0.13	0.38	0.18	0.24
Palmitic acid	2.64	0.95	1.74	2.02	2.56	1.83	2.71
Stearic acid	1.41	0.53	0.74	1.09	1.28	0.80	1.03
Palmitoleic acid	1.08	0.56	0.82	0.84	0.84	0.81	1.08
Oleic acid	1.43	0.62	1.60	1.65	1.66	1.52	2.11
Linoleic acid	0.65	0.22	0.53	0.52	1.13	0.44	0.91

CONCLUSIONS

The juice deburbation operation executed either through static methods or dynamic ones has a directly involvement on the white wines quality which is accomplished through the improvement of the sensorial and physical - chemical characteristics.

Concerning the influence of the deburbation and the role of fat substances in white wine making, here are some conclusions to take:

1. By keeping the sediment and the juice in contact, the wines gain more fat substances.

2. The content in superior alcohols and methyl alcohol regarding the deburged samples is lower than the one present in the witness samples.
3. The deburage has a decreasing effect on the content of fatty volatile acids and unwanted smelling substances.
4. Through the metabolism of sugar substances in the alcoholic fermentation process, the efficiency in ethyl alcohol is higher in the deburged samples than in the witness sample and the deburged samples with fat extract additions.
5. Adding the fat extract leads to a significant increase of the content of fatty acids with long chains, this has a disadvantageous effect regarding the white wines quality.

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