

## PROTEIN CONTENT FOR VARIOUS GRAPE-MUST FERMENTATION METHODS

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The food value of any product is determined by the content of lysine and threonine. Just these essential amino acids dominate in wines prepared by two-step fermentation. This is not noted for other fermentation methods.

Yeasts exhibit protective properties due to the transformation of many organic compounds that are toxic for their physiology [1]. We investigated how the content of chlorine- and phosphorus-containing pesticides and synthetic pyrethroids that are present in the starting material changes during alcohol fermentation. Thus, we cultivated the wine yeast *Saccharomyces vini* of the Canepabu strain [2]. Nitrogenous substances (grape amino acids) are not only necessary for the nutritive medium of yeast but also have a significant effect on the quality of grape wines. Proteinaceous substances affect on their stability. We studied the effect of various industrial fermentation methods of grape must on the protein content and amino-acid composition of the wines.

Fermentation was performed in a laboratory ultrafermenter by various methods: periodically at 25°C for 7 d (first method); cold fermentation with preliminary fermentation at 25°C to 5% must sugar and further slow fermentation at 10°C in a refrigerator for 20 d limiting the growth of yeast at the low temperature (second method); two-step fermentation with yeast continuously held in the exponential growth phase during the first stage and fermentation performed under limiting conditions with prolonged contact of the fermentation medium with yeast cells during the second stage (third method) [1].

Model specimens of grape must with added pesticides, the contents of which were determined at the beginning and end of fermentation by GC (Tsvet-500M chromatograph), were prepared for the analyses [1]. The results showed that the pesticides are transformed during fermentation. For prolonged yeast cultivation with their growth limited by solution factors, Cl-containing pesticides were transformed into trace quantities. The residual content of P-containing pesticides and synthetic pyrethroids for all fermentation methods was below the detection limit because of their complete transformation.

Furthermore, we found that the fermentation methods described above affect variously not only the protein content in wine but also the amino-acid composition. Using the classical method (first) and the usual practical fermentation method (second), the protein concentration was 1.08 and 0.46 mg/mL, respectively, whereas it was 1.38 mg/mL for the two-step method (third) [3]. The amino-acid composition of these proteins was determined [4]. Table presents the results of the amino-acid analysis.

Thus, *Saccharomyces vini* yeast of the Canepabu strain transforms pesticides. Prolonged contact of yeast with the fermentation medium under limiting growth conditions for the yeast, the medium composition, and the effect of low temperature not only assists extensive transformation of the pesticides but also affects the protein and amino-acid contents in the resulting wine. This guarantees production of not only ecologically pure but also high-quality grape wines.

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TABLE 1. Amino-Acid Composition of Proteins as a Function of Fermentation Method, wt. %

Amino acid	Fermentation type		
	at 25°C	at 10°C	Two-step
Asp	1.5	0.9	3.5
Thr	1.6	0.7	4.1
Ser	1.8	0.8	2.8
Gly	2.2	1.0	3.2
Pro	2.9	2.9	3.1
Gly	0.7	0.9	1.7
Ala	3.3	2.5	2.1
Val	3.8	3.0	2.6
Met	1.8	1.3	2.8
Ile	1.8	1.5	2.6
Leu	0.1	1.0	1.9
Tyr	2.2	1.9	4.7
Fhl	2.5	2.3	3.6
Gys	1.8	2.2	2.3
Lys	3.4	3.2	3.7
Arg	2.1	1.9	1.0

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