

INNOVATIVE TECHNOLOGY FOR TEMJANIKA WINE PRODUCTION WITH HONEY ADDITION BEFORE FERMENTATION

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INTRODUCTION

In this study, addition of honey before fermentation (20 and 40 g/L added honey) of Temjanika white grapes was performed in order to study the influence of the honey on the wine quality. Fast and accurate analytical technique, fourier-transform infrared spectroscopy (FT-IR), was used to determine the chemical composition of wines produced with honey and compared with the control wine (produced without addition of honey). Basic parameters such as alcohol, density, glycerol, pH, total acidity, total sugars, individual carbohydrates (glucose, fructose and saccharose), individual organic acids (tartaric, lactic, malic, citric and acetic) as well as total phenolic content and total antioxidant activity have been determined.

MATERIALS AND METHODS

Wine samples: Temjanika wines from Tikveš wine region in Macedonia.

Winemaking: White grapes from Temjanika variety (*Vitis Vinifera* L.) were crushed and immediately, the grape juice was separated from the pomace, transferred to 3 tanks for fermentation, followed by addition of SO₂ and yeast.

I tank – control wine,
II tank – addition of 20 g/L honey
III tank – addition of 40 g/L honey.

Honey was produced by the Macedonian bee *Apis mellifera macedonica*.

FT-IR analyses of 17 parameters:
Alcohol, density, glycerol, pH, total acidity, total sugars.
Carbohydrates: glucose, fructose and sucrose.
Organic acids: tartaric, lactic, malic, citric and acetic.
Total phenolic content (TPC) and total antioxidant activity (TAA).

RESULTS AND DISCUSSION

Table 1. Basic chemical parameters

Wines/Parameters	Alcohol (%)	Density (g/cm ³)	pH	Total acidity (g/L)	Total sugars (g/L)	Glycerol (g/L)	Acetic acid (g/L)
Temjanika-C	12.87±0.06	0.99±0.001	3.23±0.02	4.63±0.11	3.77±0.28	9.27±0.15	0.51±0.02
Temjanika-20	13.90±0.001	0.99±0.001	3.28±0.01	4.60±0.1	11.97±0.37	9.33±0.15	0.61±0.01
Temjanika-40	13.30±0.001	0.99±0.001	3.25±0.01	4.60±0.1	5.97±0.12	9.07±0.11	0.52±0.01

Table 2. Content of carbohydrates, TPC and TAA

Wines/Parameters	Fructose (g/L)	Glucose (g/L)	Sucrose (g/L)	TPC (mg GAE/L)	TAA (% inhib. DPPH)
Temjanika-C	1.63±0.15	2.13±0.15	1.20±0.17	367±3.86	67.3±0.71
Temjanika-20	6.60±0.2	4.80±0.1	1.73±0.15	429±1.81	65.4±0.26
Temjanika-40	1.87±0.21	3.73±0.4	1.43±0.15	386±4.62	62.5±0.57

Table 3. Content of organic acids

Wines/Parameters	Tartaric acid (g/L)	Citric acid (g/L)	Malic acid (g/L)	Lactic Acid (g/L)
Temjanika-C	2.19±0.03	0.01±0.02	1.50±0.1	n.d.
Temjanika-20	2.18±0.05	0.18±0.06	1.70±0.1	n.d.
Temjanika-40	2.23±0.05	0.11±0.08	1.57±0.05	n.d.



Temjanika grapes

Results are presented as average ± SD (standard deviation). Abbreviations: C – control wine, 20 – 20 g/L honey, 40 – 40 g/L honey.

CONCLUSION

- ✓ Wine fermented with 20 g/L honey added before fermentation presented increased content of almost all parameters, with exception of the total antioxidant activity, which concentration was highest in the wine fermented with 40 g/L added honey.
- ✓ Tartaric acid was the dominant organic acid in wines, followed by malic and citric acid, regardless the addition of honey.
- ✓ Wines presented satisfactory values for alcohol, pH, total acidity, glycerol and acetic acid, confirming the quality and stability of the wines.
- ✓ Wine presented relatively high content of total phenols and high antioxidant activity.
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