EFFECT OF NITROGEN CONTENT ON FERMENTATION KINETICS & AROMA PROFILE OF ASSYRTIKO WINE

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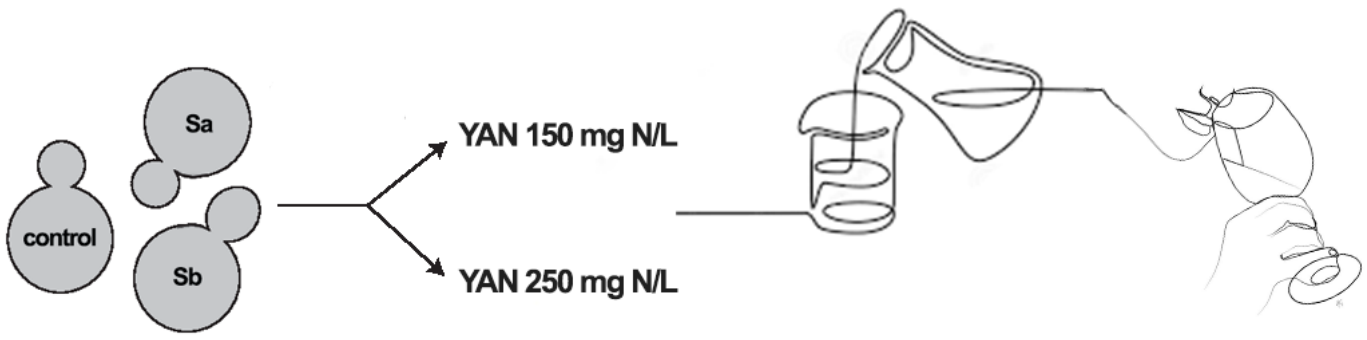
INTRODUCTION . . .

Over the 1990s radical changes in global wine exports have occurred, leading in alterations in production and consumption of wine. In order to gain significant national competitive advance, producers focused on the production of terroir wines, using indigenous grape varieties and 'wild' yeast strains[1]. Different yeast strains are characterised by a unique nitrogen uptake system resulting in different fermentation kinetics and wine profiles[2].

OBJECTIVE . . .

Evaluation of Assyrtiko wines produced using 2 different concentrations of YAN & 2 yeast strains isolated from spontaneous fermentations contacted in Santorini island.

METHODS . . .



Chemical analysis
% vol., pH, TA & VA[3]
NH_4^+ & N α-amino acid[4]
red. sugars, glycerol[5]
volatile profile of wines[6]

Organoleptic analysis
Pivot[7]

RESULTS . . .

Table 1 Chemical parameters of ferments after 25 days of fermentations with different yeast strains

	Control low	Control high	Salow	Sahigh	Sblow	Sbhigh
EtOH % (v/v)	12.76 ± 0.12[a]	12.91 ± 0.01[a]	13.10 ± 0.08[a]	13.00 ± 0.00[a]	12.82 ± 0.00[a]	12.81 ± 0.17[a]
Density (g/mL)	0.992 ± 0.001[a]	0.991 ± 0.000[a]	0.989 ± 0.001[a]	0.989 ± 0.000[a]	0.991 ± 0.000[a]	0.991 ± 0.001[a]
pH	3.13 ± 0.01[a]	3.14 ± 0.00[a]	3.09 ± 0.01[b]	3.09 ± 0.01[b]	2.98 ± 0.00[c]	2.99 ± 0.01[c]
TA (g tartaric acid/L)	7.84 ± 0.03[b]	7.68 ± 0.02[b]	7.39 ± 0.03[c]	7.50 ± 0.03[c]	8.67 ± 0.02[a]	8.56 ± 0.06[a]
VA (g acetic acid/L)	0.53 ± 0.02[a]	0.53 ± 0.00[a]	0.37 ± 0.01[b]	0.40 ± 0.01[b]	0.31 ± 0.01[c]	0.32 ± 0.02[c]
Red.Sug (g/L)	8.05 ± 1.9[a]	6.15 ± 0.3[a]	3.70 ± 1.4[a]	3.65 ± 0.4[a]	4.65 ± 0.2[a]	5.35 ± 1.3[a]
Glycerol (g/L)	6.25 ± 0.15[abc]	6.00 ± 0.00[bcd]	5.75 ± 0.15[cd]	5.55 ± 0.05[d]	6.75 ± 0.15[a]	6.50 ± 0.00[ab]
Tartaric (g/L)	5.4 ± 0.1[abc]	5.2 ± 0.0[c]	5.3 ± 0.1[bc]	5.3 ± 0.0[bc]	5.6 ± 0.1[a]	5.5 ± 0.1[ab]
Citric (mg/L)	180.0 ± 0.0[b]	185.0 ± 0.0[b]	190.0 ± 0.0[b]	170.0 ± 0.0[b]	365.0 ± 0.0[a]	385.0 ± 0.0[a]

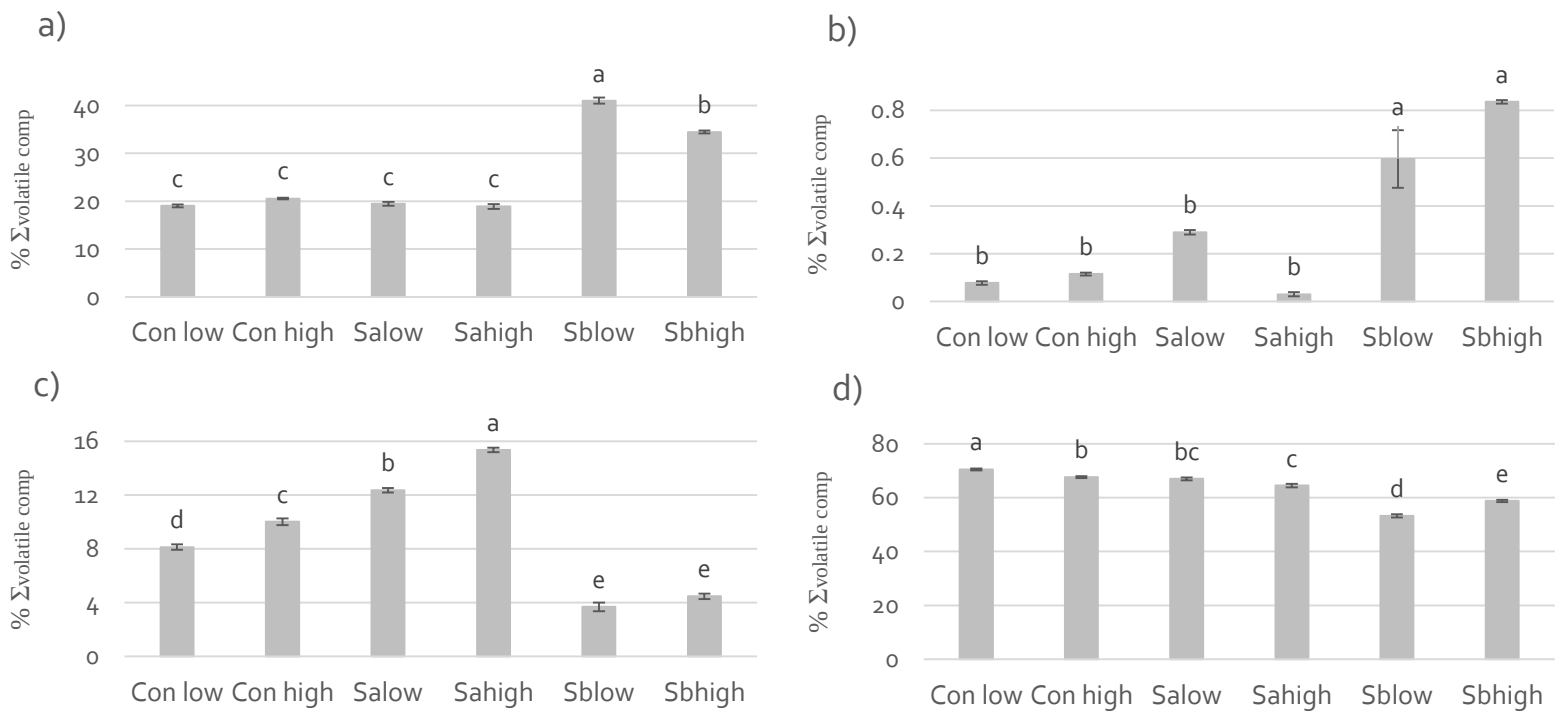
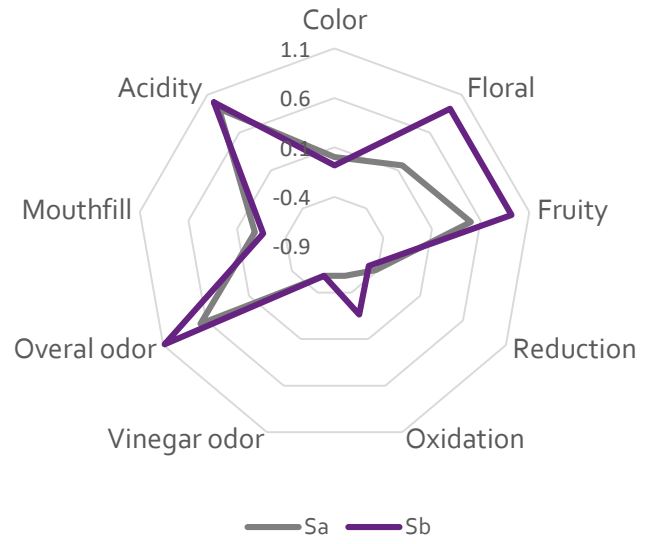


Figure 2 %Concentrations of the most important groups of volatile compounds a) higher alcohols, b) ketones, c) fatty acids & e) esters



. . . CONCLUSIONS

The three S. cerevisiae strains presented different depletion rate of nitrogen (NH_4^+ & N α-amino acid). As it was expected, these resulted in fermentation kinetics alteration, production of secondary compounds and eventually in different sensory profile for each fermentation. Initial YAN concentration had a greater impact on the volatile profile of the produced wine. Combination of specific strain with initial YAN concentration could lead to the preferred profile of Assyrtiko wine.

REFERENCES

(1) Hussain , Cholette & Castaldi, 2008. Journal of Global Marketing, 21:1, 33-47.
(2) Magasanik & Kaiser, 2002. Gene 290, 1–18.
(3) OIV (2020) methods
(4) Dukes & Butzke, 1998. *Am. Journal of Enology and Viticulture*, *49*, 125–134
(5) Papanikolaou, et al., 2002. *Journal of Applied Microbiology*, *92*, 737–744
(6) Christofi et al., 2021. OENO One, 1, 235-252.
(7) Thuillier et al., 2015. Food Quality & Preference, 42, 66-67