The effect of nitrogen and sulphur foliar fertilization on sensory aspects of Chenin blanc and Sauvignon blanc wines

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Introduction

Vine nutrition is important to the entire vine as it plays a role with the berry composition, canopy growth and fruit yield. Vine nitrogen deficiency can negatively influence the aroma profile of white wines due to sluggish or stuck fermentation and the production of by-products.

Grape–derived volatile thiols are released during alcoholic fermentation by the yeast. Volatile thiols, namely 3-Mercaptohexanol (3MH) and 3-Mercaptohexyl acetate (3MHA) give tropical fruit aromas such as passion fruit, guava, grapefruit, gooseberry and mango in Sauvignon blanc wines.

Major volatile release is linked to the juice's nitrogen status. Ethyl esters of fatty acids and higher alcohol acetates contribute to the fruity aromas of white wines. Recent studies where nitrogen and sulphur with nitrogen have been applied resulted in higher volatile thiols levels and improved aromatic potential of Sauvignon blanc wines.

No previous research have focused on the specific impact of nitrogen fertilization on Chenin blanc wines and aromas.

Aim

The main aim of this study was to determine the effect of different sulphur and nitrogen foliar fertilization treatments on the volatile composition of Chenin blanc and Sauvignon blanc as reflected in the sensory evaluation of the 3 month old wines.

Experimental design

Vineyard

Plot	Experimental design
• Chenin blanc (Somerset West) and Sauvignon blanc vineyards (Elgin) • Vines with naturally low nitrogen content • No fertilization applied previously to vines during vine management • Sprayed 1 & 3 weeks before véraison	• Randomized plot design ➢ control (C) – no foliar application ➢ nitrogen (N) – urea (10kg/ha) ➢ sulphur (S) – elemental micronized sulphur (5kg/ha) ➢ nitrogen and sulphur (N+S) - urea (10kg/ha) & elemental micronized sulphur (5kg/ha)

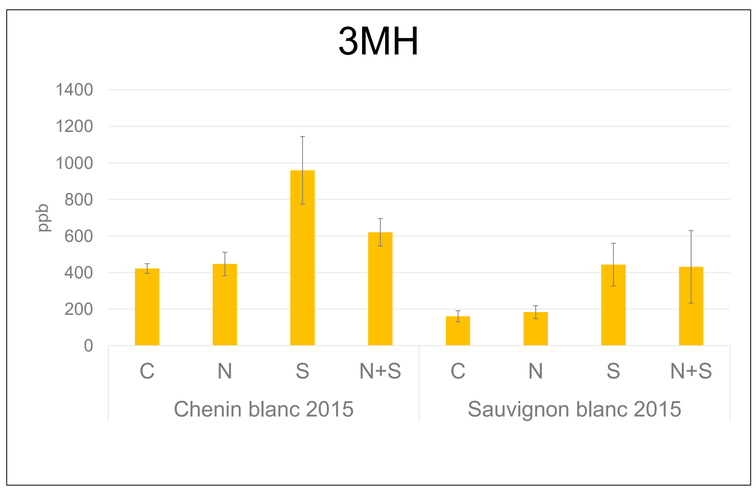
Row 1	Buffer 3 vines	C 12 vines	Buffer 3 vines	N 12 vines	Buffer 3 vines	N+S 12 vines	Buffer 3 vines	S 12 vines
Row 2		N 12 vines		N+S 12 vines		S 12 vines		C 12 vines
Row 3		N+S 12 vines		S 12 vines		C 12 vines		N 12 vines
Row 4		S 12 vines		C 12 vines		N 12 vines		N+S 12 vines

Wine 3 months

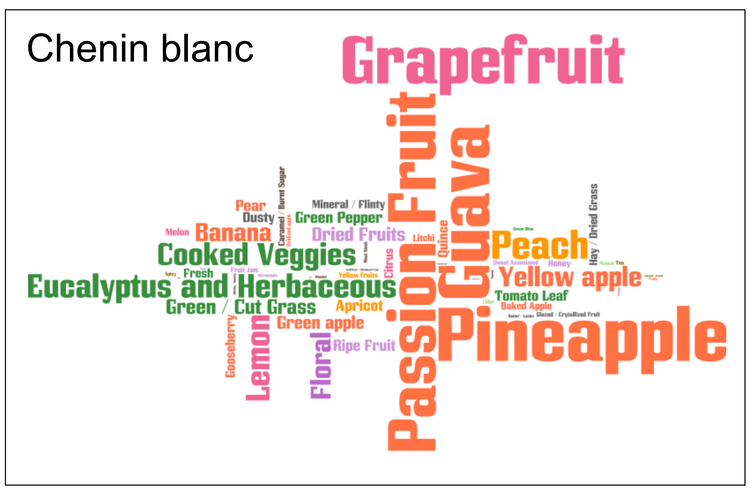
Chemical analysis:
- thiols

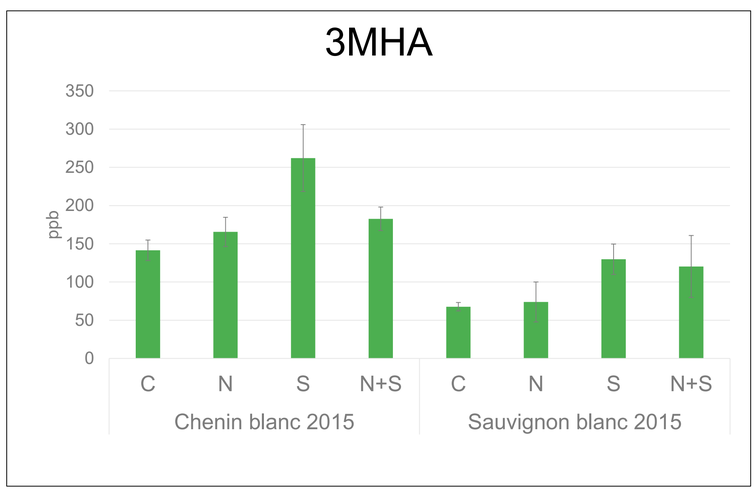
Sensory analysis:
- free sorting (15 expert panelists)

Results

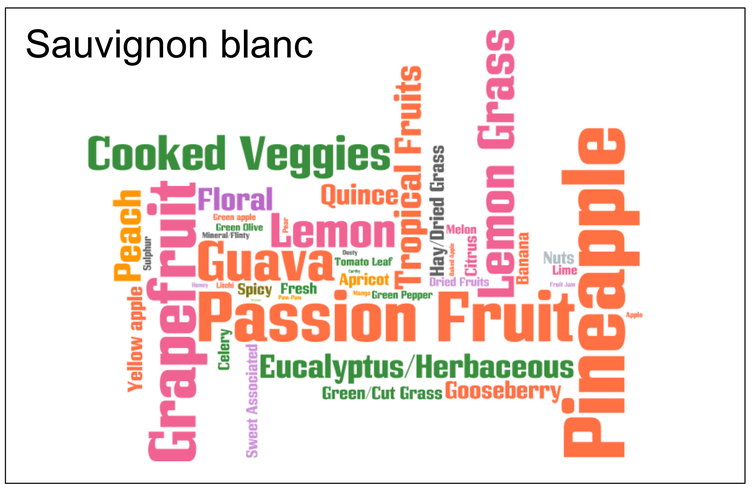


The effects of the S foliar fertilization are evident in the levels of thiols measured. Treatments that contained micronized S resulted in an increase of 3MH and 3MHA in both Chenin and Sauvignon blanc wines. Treatments with only S were more effective than the S+N treatments.





As can be seen from the descriptors generated, all wines had high positive attributes, some associated with thiols (passion fruit, grapefruit, guava) and others with esters (pineapple, banana).
However, attention should be paid to the less positive aromas (cooked veggies, herbaceous, green), also associated with an increase in the thiols and other S-containing compounds.



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NRF National Research Foundation