Factors Influencing the Aroma Stability of New Zealand Sauvignon blanc

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The Sauvignon Blanc Programme
THE SCIENCE BEHIND NEW ZEALAND WINE

Introduction

The passion fruit-type aroma of New Zealand Sauvignon blanc wines has been attributed to 3-mercaptohexan-1-ol (3MH) and 3-mercaptohexan-1-ol acetate (3MHA). Latest research has shown that these varietal thiols, particularly 3MHA, are unstable throughout storage. Their loss has been ascribed to polyphenol oxidation (Fig. 1), a process which can be inhibited by antioxidants such as sulfur dioxide (SO_2), ascorbic acid (AA) and glutathione (GSH).

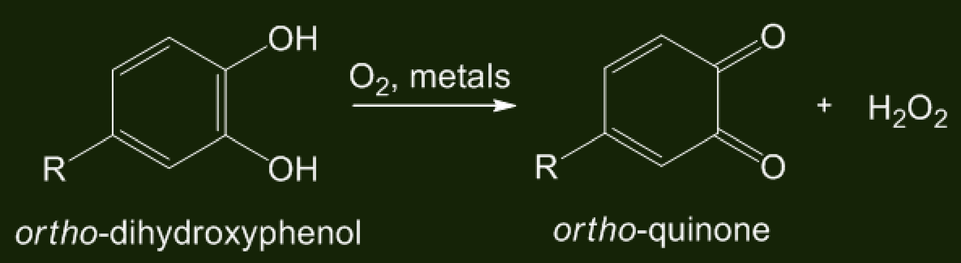


Figure 1: Polyphenol autoxidation

The goal of this study was to determine the impact of various factors (polyphenols, metals, antioxidants, temperature, and pH) on the 3MH and 3MHA stability, thus understanding the mechanism leading to the loss of these aroma compounds.

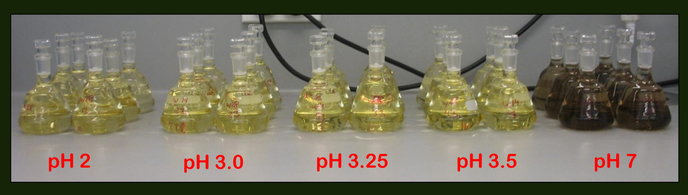
Experimental Set-Up

Accelerated Sauvingnon blanc stability trial

Accelerated 3MH and 3MHA stability trial at different pH values

⇨ **Model wine matrix**
(ultrapure water [MilliQ]/EtOH[88:12 v/v]; 5g/L tartaric acid)

⇨ **Wine matrix**
(Sauvignon blanc)



Method

⇨ Selective extraction of 3MHA and 3MH, followed by GC/MS-analysis [1]

[1] Tominaga,T., Murat, M.L., Dubourdieu, D. (1998). *J. Agric. Food Chem.* **46**: 1044-1048.

Results

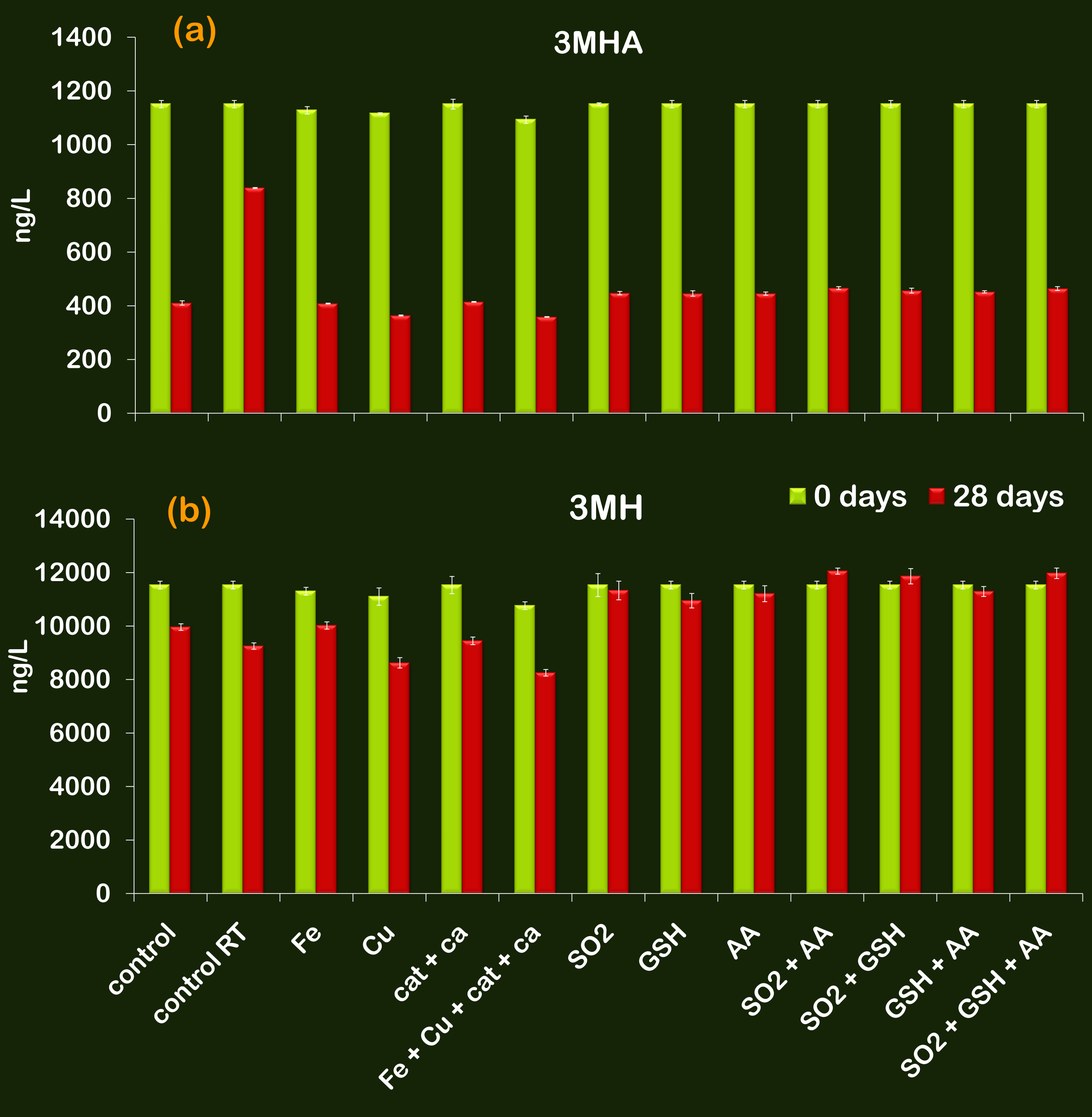


Figure 2: Evolution of 3MHA (a) and 3MH (b) in Sauvignon blanc under accelerated conditions (excluding control RT - 15°C)
[cat - catechin; ca - caffeic acid]

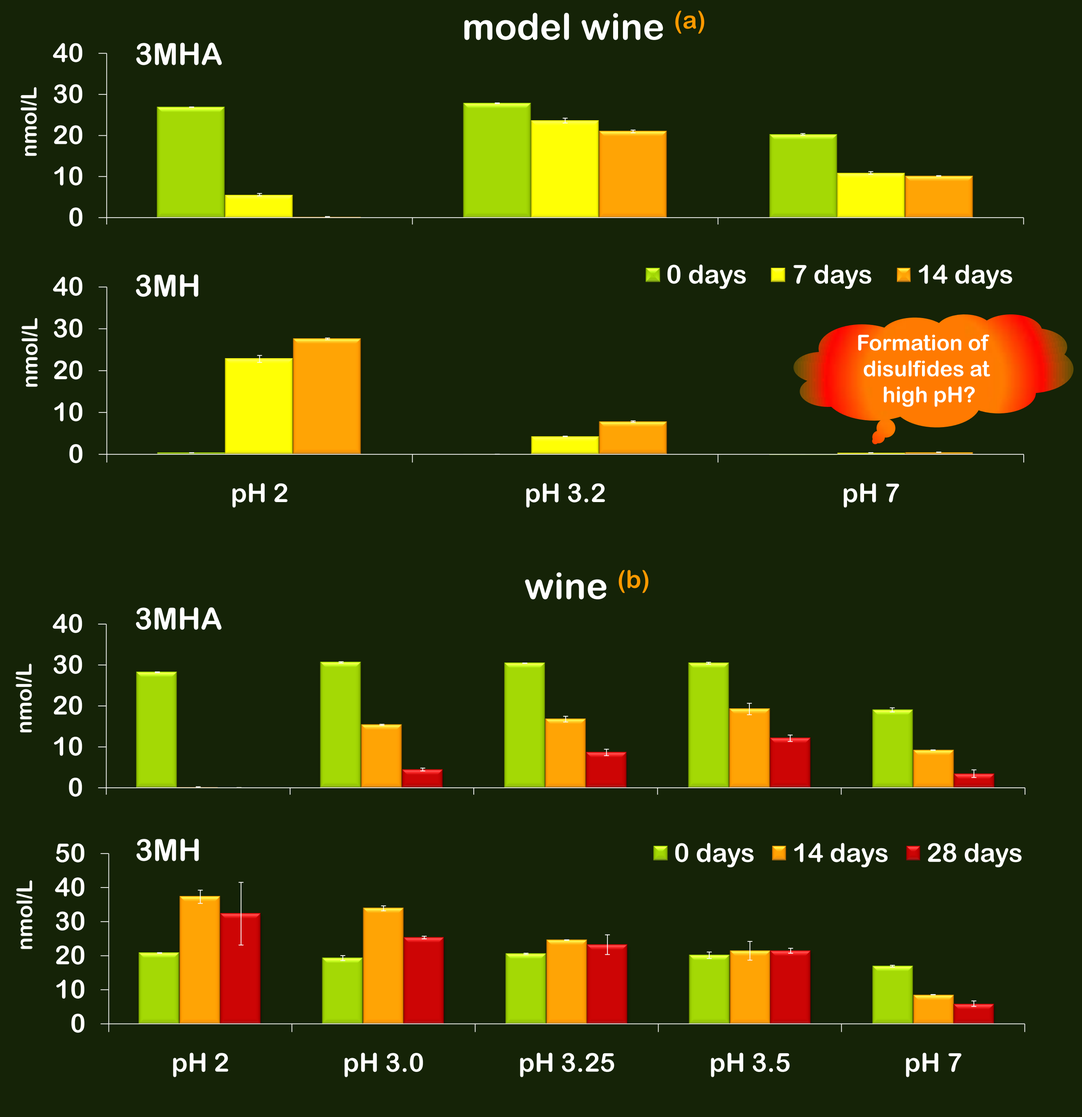


Figure 3: Effect of pH on thiol stability in model wine (a) and wine (b)

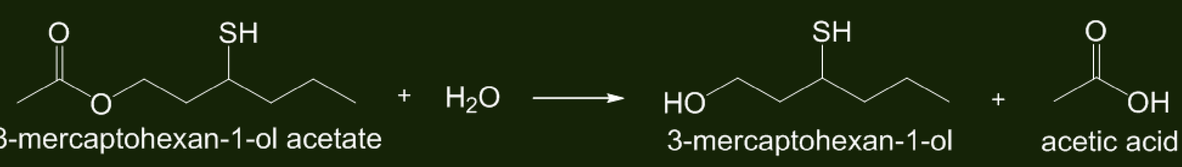
Conclusions

⇨ 3MHA is the least stable varietal thiols, with an average loss of 63 % after 28 days of storage, largely unaffected by additions of antioxidants (Fig. 2a), suggesting a hydrolysis loss mechanism (Fig. 4)

⇨ Conversion of 3MHA into 3MH is indeed favoured at high temperature (Fig. 2) and low pH (Fig. 3)

⇨ 3MH stability is affected positively by antioxidants, and negatively by metals as well as polyphenols - decline of 19 % (Fig. 2b), indicating an oxidative loss

Figure 4: 3MHA hydrolysis



Loss of the passion fruit-type character in New Zealand Sauvignon blanc is mainly due to loss of 3MHA via hydrolysis (perception threshold of 4ng/L versus 60 ng/L for 3MH)

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