



RESEARCH FOCUS AREA and ACADEMIC EXPERIENCE

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Qualifications

BSc Agric (Oenology Spes)

Stellenbosch University
Major subjects: Viticulture and Oenology
2005 – 2008
Graduated *Cum Laude*

MSc Agric (Oenology)

Stellenbosch University
Thesis title:
Oxygen and Sulphur Dioxide addition to Sauvignon blanc: effect on must and wine composition
2009 – 2011
Graduated *Cum Laude*

PhD Agric (Oenology)

Stellenbosch University
Dissertation title:
Oxidation treatments affecting Sauvignon blanc wine sensory and chemical composition
2011 – 2014

Research Focus Area

My main research focus area in the past years has been the investigation of the effect of sulphur dioxide and oxygen addition to must and wine on Sauvignon blanc wine composition and quality.

During my Masters study, we found that oxidation in the absence of SO₂ led to a decrease in glutathione (antioxidant) and certain phenolic compounds in the must. In general, volatile thiols ("tropical fruit" aroma) were protected against oxidation by SO₂, even when O₂ was present in the must. Methoxypyrazines ("green" aroma) concentrations were not significantly influenced by the treatments.

My PhD focussed on the effect of oxygen on the chemical and sensory evolution of Sauvignon blanc wine under controlled oxidation conditions. The sensorial interactive effects between Sauvignon blanc varietal aroma compounds and compounds that typically arise during oxidation of white wines was also investigated.

The sensorial interactive effects of Sauvignon blanc impact compounds and aldehydes typically originating from oxidation of white wines were investigated. In one study, four compounds, 3-mercaptohexan-1-ol (3MH), 3-isobutyl-2-methoxypyrazine (IBMP), 3-(methylthio)-propional-dehyde (methional) and phenylacetaldehyde were added together in a model wine medium at varying concentrations. In a different investigation the effect of the presence of increasing amounts of acetaldehyde on the perception of other aroma compounds were investigated. The sensory effects of these compounds were profiled using a trained sensory panel. Data were statistically analysed using relatively novel techniques that allowed deeper insights into the interactions involved. Various observations were made such as the contribution of 3MH to the 'green' character of the wine; the potent suppressing abilities of methional on 3MH and IBMP and the additive effect of methional and IBMP contributing to the 'cooked' character of the sample. Acetaldehyde was able to effectively mask the 'green' character of the sample, while it also enhanced certain fruity nuances when present at specific concentrations.

Other objectives were to investigate the effect of repetitive oxidation on a fresh and fruity style Sauvignon blanc wine and to report the progress and evolution of aromatic and non-aromatic compounds during an oxidative aging period. A large range of chemical analyses were conducted together with extensive sensory profiling. Results showed a decrease in mainly volatile thiols responsible for the fruity nuances and an increase in oxidation related compounds, such as acetaldehyde, during the course of the oxidation. Sensory profiling showed the evolution of the aroma of the wine during the oxidation. The evolution of the wine colour was also monitored using a spectrophotometer as well as a sensory panel. The advantages and disadvantages of oxygen exposure to this type of wine style are discussed in the dissertation as well as the complexity of the wine matrix and sensory interactions occurring in the specific wine. The combination of chemical and sensory data delivered some interesting conclusions. This study paved the way for future investigations on the sensory relationships of Sauvignon blanc aroma compounds and the role of proper oxygen management in the production of quality wines.

Various advanced analytical techniques were used during these studies such as GCMS/MS, HPLC and LCMS as well as sensory evaluation. Mastering these techniques is considered to be a scarce skill.

Other research projects investigated includes the effect of oxidation on Chenin blanc wines; the effect of commercial products on oxygen consumption as well as chemical and sensory composition of Sauvignon blanc wines; the sensorial effects of acetaldehyde combined with SO₂ and the effect of oxygen on various Sauvignon blanc wine styles. The effect of sparging wines to remove oxygen are also currently under investigation.

Sensory and chemical analyses of the top 10 South African Sauvignon blanc wines have also been conducted in order to provide the industry with information regarding the composition of the wines.

Academic Experience

Student/Staff development

- Undergraduate supervision of internships (2014-2016). Assist students in project planning and execution of study. Assist students in scientific writing of project proposals, interpretation of results and writing of reports.
- Laboratory training to various postgraduate students and staff. Laboratory etiquette, principle laboratory techniques (sample preparation), training on various advanced equipment (eg. GC/MS), sensory training.

Lecturing

- Lecturing undergraduate modules in Wine Aroma, Wine Stability and Antioxidants for third year students (2014-2017).
- Lecturing postgraduate module in Wine Aroma.

Moderator for secondary/tertiary institutes

- External Moderator for exit level module (Wine Evaluation 654) at Elsenburg Agricultural Institute. June 2013
- Judge at Bloemhof High School Science Expo. May 2016
- Reviewer for South African Journal of Viticulture and Oenology