



Crush 2011

the grape and wine science symposium

28-30 September 2011

Adelaide, South Australia

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Crush 2011 Program

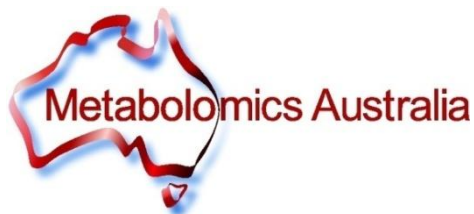
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Venue 3

Session 3: Soil and Water

Convened by Everard Edwards

- 10 Presenter: **Mr Mark O'Connell**, Research Scientist, Department for Primary Industries, Victoria
Paper title: **Satellite derived estimation of evapotranspiration in vineyards**
Paper authors: O'Connell M, Mendez-Costabel M
- 11 Presenter: **Mr Tim Pitt**, Senior Research Officer, SARDI
Paper title: **Re-directing rainfall to manage rootzone salinity**
Paper authors: Pitt T, Stevens RM, Dyson C, Chvyl L
- 12 Presenter: **Dr Pichu Rengasamy**, Senior Research Fellow, The University of Adelaide
Paper title: **Potassium in winery waste waters used for irrigation and soil structural decline**
Paper authors: Rengasamy P, Marchuk A
- 13 Presenter: **Dr Mike McCarthy**, Senior Research Scientist, SARDI
Paper title: **Multiple season, low irrigation availability: grapevine obituary or recovery?**
Paper authors: Pech J, McCarthy M, Ratcliffe A, Hall A, Strachan R
- 14 Presenter: **Dr Karin Mandl**, Department Leader Biology, Educational and Research Center for Viticulture and Pomology (LFZ), Austria
Paper title: **The Verification of the Transportation of *Saccharomyces cerevisiae* within *Vitis vinifera* subsp. *vinifera***
Paper authors: Schieck J, Silhavy-Richter K, Prange A, Mandl K

11.00am - 12.30pm

Sessions 4 - 6

Venue 1

Session 4: Juice & Yeast Interactions 1

Convened by Vladimir Jiranek

- 15 Presenter: **Dr Paul A Henschke**, Principal Research Microbiologist, Australian Wine Research Institute
Paper title: **Inorganic nitrogen (DAP) – a double-edged winemaking sword**
Paper authors: Varela C, Ugliano M, Torrea D, Siebert T, Kalouchova R, Winter G, Travis B, Bramley B, Schmidt S, Curtin CD, Bell SJ, Francis IL, Henschke PA
- 16 Presenter: **Dr Simon Schmidt**, Research Scientist, Australian Wine Research Institute
Paper title: **Impacts of variations in elemental nutrient concentration of Chardonnay musts on *Saccharomyces cerevisiae* fermentation kinetics and wine composition**
Paper authors: Schmidt SA, Dillon S, Kolouchova R, Henschke PA, Chambers PJ
- 17 Presenter: **Ms Meagan Mercurio**, Manager, AWRI Metabolomics Facility
Paper title: **Evaluating the impact of wine fermentation practices on volatile aroma compounds, through targeted metabolite analyses and non-targeted metabolomic analyses**
Paper authors: Mercurio M, Curtin CD, Mercurio P, Watson-Heigh NS, Hines W, Hack J
- 18 Presenter: **A/Prof Vladimir Jiranek**, Associate Professor, Oenology, The University of Adelaide
Paper title: **Using metabolomics to probe the impact of an adaptively evolved wine yeast on oenological fermentation**
Paper authors: Gardner J, McBryde C, Dunn W, Brown M, Oliver S, Jiranek V
- 19 Presenter: **Ms Jade Forrester**, PhD candidate, The University of Adelaide
Paper title: **The biggest fermentation exo-metabolomic study to date**
Paper authors: Forrester J, Taylor D, Jiranek V, Bowyer P



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Full Set of Abstracts

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PRESENTATION TITLE

Potassium in winery waste waters used for irrigation and soil structural decline

AUTHORS AND AFFILIATIONS

Pichu Rengasamy (presenting author), The University of Adelaide and

Alla Marchuk, The University of Adelaide

ABSTRACT

Long-term application of winery waste water containing high levels of potassium will lead to build-up of exchangeable potassium in soils which can cause soil structural problems similar to exchangeable sodium. Conflicting reports on the effect of exchangeable potassium, being either equal to or less than that of sodium, are found in the literature. We investigated the dispersive and flocculating powers of cations viz. Na, K, Mg and Ca on the basis of our concept that the degree of ionicity (or covalency) of clay-cation bonds determine the dispersion and flocculation of soil clays. Our experimental results were in conformity with the theoretical values of flocculating powers of cations. Compared to Na=1, the flocculating power of the other common cations would be K=1.8, Mg=27, and Ca=45. Flocculating power gives the inverse of dispersive effects. Based on these notions, a ratio analogous to the SAR (sodium adsorption ratio), but which incorporates the differential effects of Na and K in dispersing soil clays, and also the differential effects of Ca and Mg in flocculating soil clays was derived as:

$$\text{Cation ratio of soil structural stability (CROSS)} = (\text{Na} + 0.56\text{K}) / [(\text{Ca} + 0.6\text{Mg}) / 2]^{0.5}$$

Where the concentrations of these ions are expressed in millimole of charge/L.

The effectiveness of CROSS in predicting the soil structural decline, particularly when potassium is dominant in irrigation water, was tested using a few soils from South Australia. The results on clay dispersion from soils and soil saturated hydraulic conductivity confirm the superiority of CROSS compared to SAR which is currently used for the evaluation of the quality of irrigation waters.