Linking sensory properties of Cabernet Sauvignon berries and wines

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Introduction

- Anecdotaly, tasting grapes can indicate to winemakers and grape growers potential wine style outcomes. The capacity of berry sensory properties to predict wine sensory attributes is not scientifically clear.
- The objective of the study was to relate the sensory characteristics of 2014 Cabernet Sauvignon berries (Berry sensory analysis (BSA)) to the wines.

Materials and methods

Samples: In 2014 grapes (50kg) were harvested at commercial maturity from 25 sites in; Barossa (BV), Clare (CV), and Eden Valleys (EV), McLaren Vale (McV), Langhorne Creek (LC), Riverland (RVL), Coonawarra (CWA), and Wrattonbully (WBY). All samples (30L) were identically vinified with no oak contact by WIC winemaking services.

Berry measurements:
1. pH & TA
2. Anthocyanins
3. Total phenolics and tannins
4. Brix
5. Deformability
6. Chroma
7. BSA (n=8) (physical, skins, pulp, and seeds)

Wines: Assessors (n=10) evaluated wines using descriptive analysis. Assessors were trained (16 h) before evaluating samples for 32 attributes (colour, aroma, flavour, taste, and mouthfeel).

Results

- Berries and wines could be discriminated by sensory properties.
- A total of 14 BSA and 31 wine sensory attributes significantly differed (p<0.05) across samples.
- Berry chemical measurements significantly (p<0.001) differed across samples.
- BSA and chemical measures were related to the wine sensory attributes using PLS2 (Fig 1) to determine how the berry measures correlate to wine sensory characters. Samples differentiated by region (Fig 1A) and berry chemistry associated positively to desirable wine sensory attributes (Fig 1B).

Fig 1. PLS2 scores (A) and loadings (B) plots for grape (blue) and wine (red) variables.

- Key berry sensory attributes and chemical measures gave a good model to predict nine wine sensory attributes with low estimation error (except colour attributes; hue and depth) (Fig 2). The model showed mixtures of correlative and causative relationships. Chroma and anthocyanins of berry measures showed causal relationships in perceived wine colour and astringency.

Conclusions

- Differences in sensory characteristics were determined among berries and wines.
- Achieving high correlations and finding causative connections between the berries and wine measures are challenging because of variability arising from the fruit to wine transformation.
- Simple grape chemistry contributes to the causative prediction of wine sensory characteristics, revealing both correlative and causative relationships, and correlation with numerous wine sensory attributes.

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