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terminology for communicating the mouth-feel  
characteristics of red wine

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#### Abstract

A hierarchically structured vocabulary of mouth-feel sensations elicited by red wines has been produced. Represented as a wheel, this structured vocabulary should assist tasters in their interpretation and use of terminology relating to 'in mouth' sensations produced by red wines. These terms and their definitions were generated by consulting the opinions of experienced wine tasters following exposure to an extensive range of commercial red wines. Logical relationships among the derived terms were formulated by analysis of 'sorting data' provided by a combined group of experienced winemakers and wine-tasters.

**Keywords:** *red wine, astringency, mouth-feel, sensory analysis*

## **Introduction**

'In mouth' sensory properties of red wines, encompass multiple and interacting sensations of acidity, sweetness, bitterness, retronasal aroma perception (flavour), viscosity, warmth, and astringency. These sensory properties are often described by experienced wine tasters using general and subjective terms. The importance of wine-tasters achieving a common understanding of terms describing wine mouth-feel has been demonstrated (Gawel 1997); mouth-feel terms that were not adequately defined substantially reduced the communicative value of those descriptions.

The beer industry has a standardised terminology wheel of mouth-feel and taste terms (Meilgaard et al. 1979). By contrast, there is no well defined vocabulary of red wine mouth-feel sensations. Extensive use of a wine aroma wheel (Noble et al. 1987) suggests that there is an analogous need for a sensory wheel that describes the astringent and other mouth-feel sensations of red wine.

## **Development of terminology**

A tasting panel was convened comprising 12 male and two female staff from the Department of Horticulture, Viticulture and Oenology and the Australian Wine Research Institute. All except one had at least five years' extensive wine tasting experience and all were required to taste wine regularly as part of their professional activities, including regular participation in sensory analysis panels.

Terms to describe the red wines' mouth-feel properties were derived during two distinct phases. The first phase involved tasting 72 red wines over a six-week period totalling 18 hours of discussion time. The sole purpose of this phase was to derive a vocabulary for the tactile/ astringent sensations displayed by these red wines. Wines that were tasted ranged from one year to 33 years of age (median age, 4 years), and were light- to full-bodied in style. They were largely Australian examples of commercially available Shiraz, Cabernet Sauvignon, Pinot Noir and Grenache red wines and their blends. These test wines also included Italian DOCG wines made from cv. Nebbiolo and cv. Sangiovese. A single 13-year-old second growth Bordeaux red wine was also presented. Tasters generated terms independently, considering tactile sensations perceived while the wines were held in their mouth and after expectoration. Relationships and redundancies among the terms were then discussed in a group forum at each session.

The second phase of tasting was conducted in a similar fashion except that panellists concentrated on mouth-feel characteristics other than those which could be reasonably considered to be astringent-like. A further 75 red wines

of similar origin and age profile to those used in the first phase were tasted and discussed over a seven-week period.

The panel leader proposed definitions of each of the terms. These definitions were discussed and further refined in the context of additional wines tasted. Tastings and discussions continued until the panel agreed to a set of mutually exclusive terms (with definitions) that could be used to describe the mouth-feel properties of red wines in a comprehensive way (Table 3).

Some terms could be defined by reference to the touch of a physical standard using fingertips, e.g. the feel of a piece of suede to represent the mouth surface sensation labelled suede (see Figure 2). However, some terms by their nature could either not be represented by a physical standard, were a synthesis of sensations, or had hedonic connotations. Table 1 gives the definitions of these terms as agreed by the panel.

### **Establishing relationships among terms**

A sorting task was used to investigate the conceptual relationships among the astringency/tactile terms generated by the panel. Terms were listed in alphabetical order without definitions, and presented separately to (1) a group of nine experienced red winemakers and (2) the panellists who had derived the terms. Each individual independently sorted the terms into groups such that terms placed in the same group were considered more similar than terms placed in different groups. As many groups as necessary could be used. The number of times each pair of terms was placed in the same group was collated. The resulting aggregate data matrix therefore served as a measure of similarity between terms, and was consequently analysed via cluster analysis utilising Gamma distances and the centroid linkage method (SYSTAT). This was done in an attempt to detect any natural groupings of terms that may exist. The process was not repeated for terms describing non-astringency mouth-feel because we felt that perceptually distinct and mutually exclusive categories existed for those terms.

The panel of experienced tasters also discussed the possible logic underlying the groupings and suggested titles for each of the groupings. The dendrogram resulting from the astringency term clustering process is given in Figure 1. A cut-off was chosen to give a reasonable number of groupings that represent logical sub-sets of the astringency terms. Suggested titles and descriptions of the astringency groupings are given in Table 2. The outcome of this process is summarised in the form of a 'wheel' and is shown in Figure 2. Further results describing the ability of the tasters to consistently use the mouth-feel terms, and to the degree of agreement between tasters will be given elsewhere (Gawel et al. 2000).

## **Concluding remarks**

The standardised terminology suggested here should assist wine industry personnel and researchers to communicate the effect of winemaking and viticultural practice on wine mouth-feel properties. In addition, sensations perceived in the act of tasting are important determinants of consumer response to red wine, and thus carefully describing these sensory attributes is important for continued improvement in red wine quality.

This mouth-feel wheel is a suggested list of terms for describing wine taste attributes as an aid for clear communication. We recognise inherent difficulties in proposing these terms in that they represent a vocabulary developed by a relatively small number of wine-tasters.

Some terms may be considered to be redundant, while additional terms might be needed. Consequently, this present list will be altered as has already occurred with the original wine aroma wheel of Noble et al. (1984) which was subsequently modified (Noble et al. 1987). We would appreciate being notified of views on this terminology and suggestions for improvement.

## **Acknowledgements**

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## **References**

- Gawel, R., Iland, P.G. and Francis, I.L. (2000) Characterizing the astringency of red wine: A case study. Submitted to the Journal of Food Quality and Preference.
- Gawel, R. (1997) The use of language by trained and untrained wine tasters. Journal of Sensory Studies **12**, 267-284.
- Meilgaard, M.C., Dalglish, C.E. and Clapperton, J.F. (1979) Progress towards an international system of Beer Flavour Terminology. American Society of Brewing Chemists **37**, 42-52.
- Noble, A.C., Arnold, R.A., Masuda, B.M., Pecore, S.D., Schmidt, J.O. and Stern, P.M. (1984) Progress towards a standardized system of wine aroma terminology. American Journal of Enology and Viticulture **35**, 107-109.
- Noble, A.C., Arnold, R.A., Buechsenstein, J., Leach, E.J., Schmidt, J.O. and Stern, P.M. (1987) Modification of a standardized system of wine aroma terminology. American Journal of Enology and Viticulture **38**, 143-145.

**Table 1.** Supplementary definitions for astringency terms in Figures 1 and 2

**Term Definition**

***pucker*** A reflex action of mouth surfaces being brought together and released in an attempt to lubricate mouth surfaces.

***chewy*** Gives the feeling that mouth movements (chewing) can displace the astringent sensation.

***grippy*** Distinct lack of slip between mouth surfaces resulting in the inability to easily move mouth surfaces across each other.

***adhesive*** The feeling that mouth surfaces are sticking or adhering to one another, yet can be pulled away from each other with slight pressure.

***hard*** Combined effect of bitterness and astringency. Synonym 'harsh'.

***aggressive*** Balance term indicating excessive astringency.

***abrasive*** Excessive astringency of a strongly roughing nature.

***soft*** A light and finely textured astringency.

***supple*** Balance term indicating low to moderate astringency with an appropriate level of acidity and flavour concentration.

***rich*** High flavour concentration with balanced astringency.

***fleshy*** High flavour concentration with suppleness.

***mouthcoat*** Gives the impression of a coating film that adheres to mouth surfaces, and which falls from the mouth surfaces with time.

***parching*** Drying with a background of alcohol hotness.

***green*** Combined effect of excess acidity and astringency.

***sappy*** Astringency with high acid and slightly bitter. Reminiscent of the astringency elicited by chewing on a green grape stalk.

***resinous*** Astringency elicited as if chewing on a piece of raw wood.

**Table 2.** Title and description of the groupings of astringency terms

**Grouping Distinguishing feature of the group**

***particulate*** Feelings of particulate matter brushing against the surfaces of the mouth through the movement of the wine.

***surface*** Textures felt on mouth surfaces when the different

***smoothness*** surfaces come in contact with each other.

***complex*** A positive hedonic grouping consisting of an amalgam of pleasing astringency sensations, flavour and balanced acidity.

***drying*** Feelings of lack of lubrication or desiccation in the mouth.

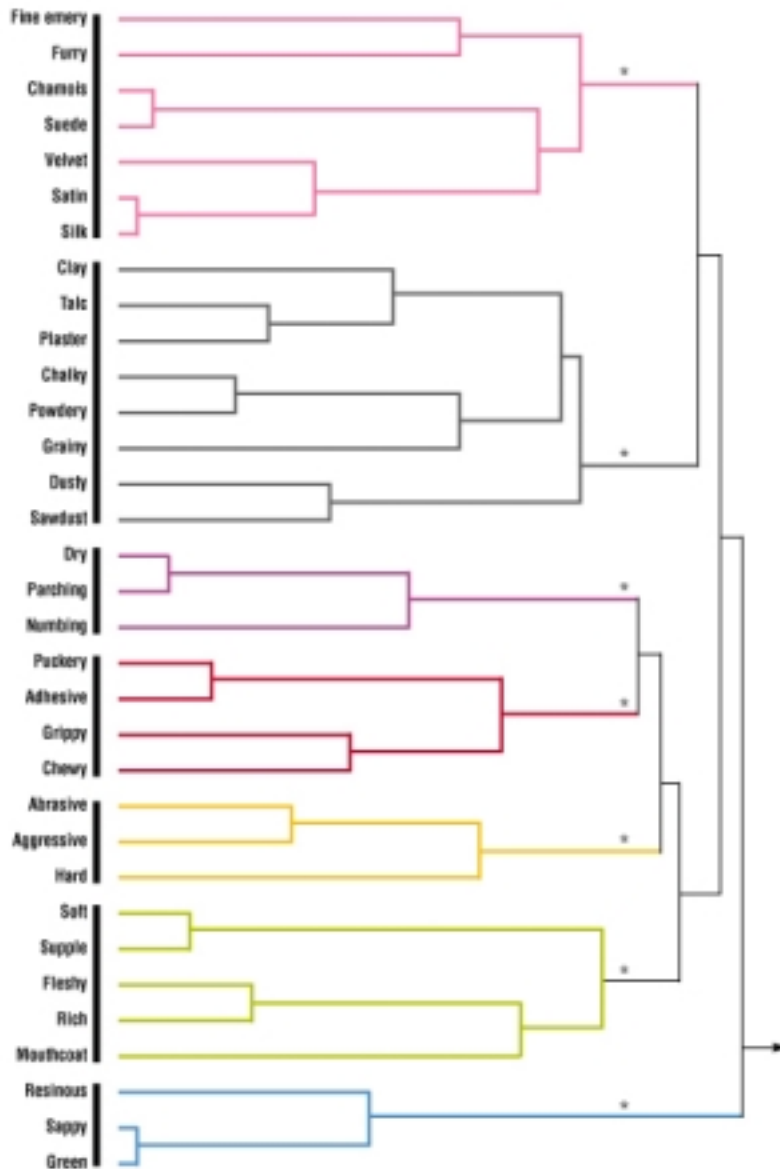
***dynamic*** Sensations involving some form of mouth movement.

***harsh*** A negative hedonic grouping suggesting aspects of excessive unbalanced astringency, excessive roughness and/or bitterness.

***unripe*** A negative hedonic grouping consisting of an astringent feel associated with excessive acidity and associated green flavour notes.

**Figure 1.**

A dendrogram showing proximity in terminology as assessed by a combined panel of experienced tasters and winemakers. The asterisks show that this methodology reveals a number of logically consistent sub-groupings of terms.



**Figure2.**

A 'Mouth-feel Wheel' showing a hierarchical representation of terms that can be used to describe the mouth-feel characteristics of red wine.

