

Can variation in wine preference amongst consumers be explained by salivary protein composition?



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INTRODUCTION

Background: Wine consumers with different cultural backgrounds display different preferences for flavours and aromas. One of the direct determinants is the in-mouth perception of wine. This is contributed by retronasal olfaction, modulated by saliva. We hypothesise that the variations in salivary protein compositions between two ethnic groups of consumers could differ in the release of wine aroma, influencing their wine preference determined by sensory analysis.

Aim: To investigate the relationship between **salivary protein composition** and **wine preference** of experienced Western and Chinese wine tasters.

METHOD

Sensory Panel



Western
(n=13, 6M:7F)



Chinese
(n=13, 6M:7F)

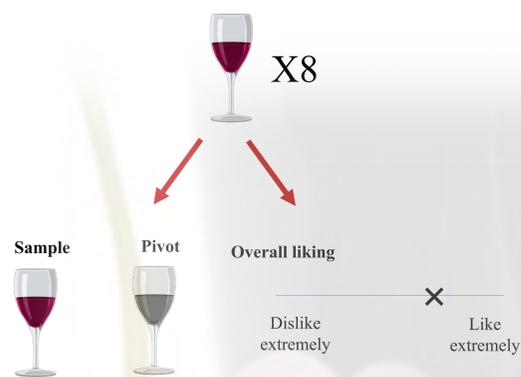
They were experienced wine tasters, trained wine tasters or professionals

Saliva Sample Collection



1. Panellists were asked not to eat or drink 2 h prior tasting.
2. In a 5-min time, stimulated saliva was collected facilitated by a tasteless chewing gum.

Sensory Assessments



Proteomics Analysis



Statistics

CONCLUSIONS

Our results indicated that salivary protein composition may explain the variation in sensory perception and thereby preference for specific wines.

Significance of this study: This information could start to explain cultural preferences for particular food and beverage sensory attributes and allow targeted products to be released on the market.

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References

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RESULTS

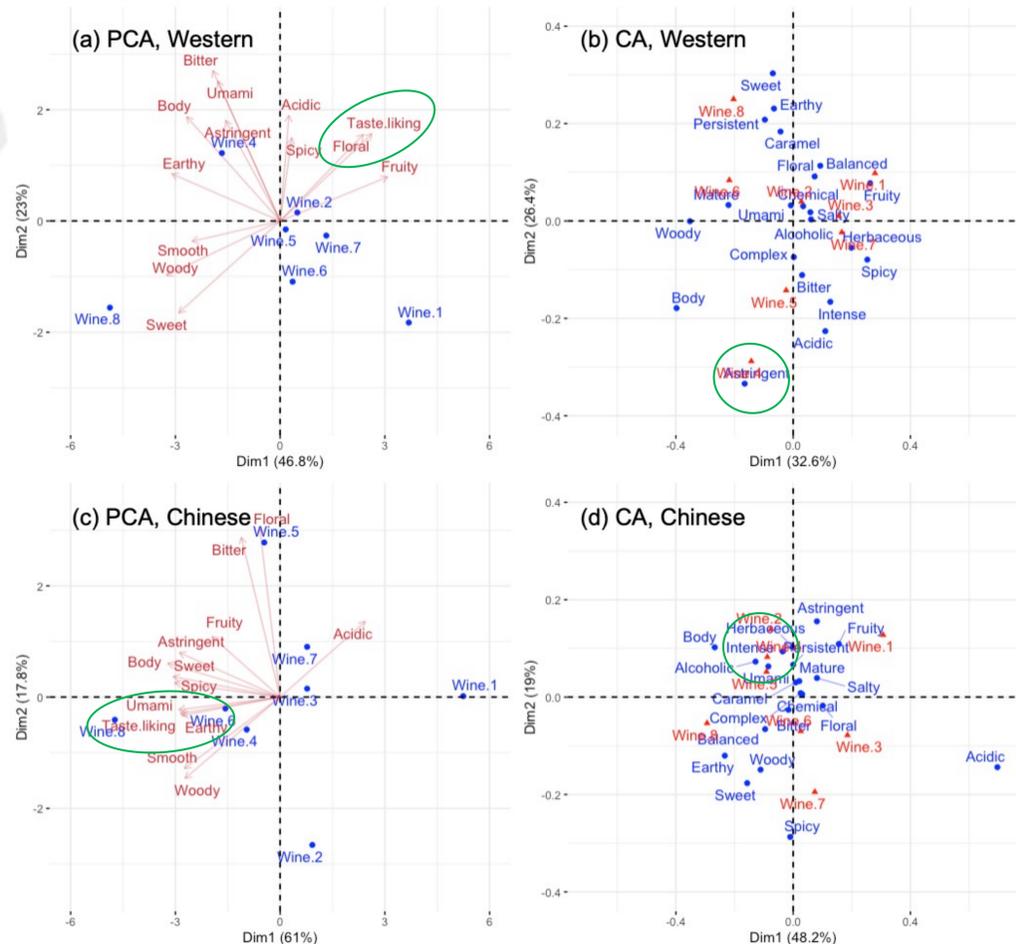


Fig. 1. Principal component analysis illustrating continuous scale assessment results of Western (a) and Chinese (c) wine consumers and correspondence analysis illustrating translated frequency of wine descriptors used by Western (b) and Chinese (d) wine consumers.

Principal Component Analysis and Correspondence Analysis

Finding 1: Difference in wine preference

- Overall liking in the Western group biplot (Fig 1a) clustered tightly with the “floral” attribute.
- The Chinese group (Fig 1c) clustered with attributes including “umami” and “earthy”.

Finding 2: Difference in wine perception

- Wine 4 was mostly associated with “astringent” in the Western group (Fig 1b).
- Wine 4 was mostly described as “umami”, “alcoholic” and “intense” by the Chinese group (Fig 1d).

Finding 3: Wine 8 was preferred by the Chinese group but disliked by the Western group.

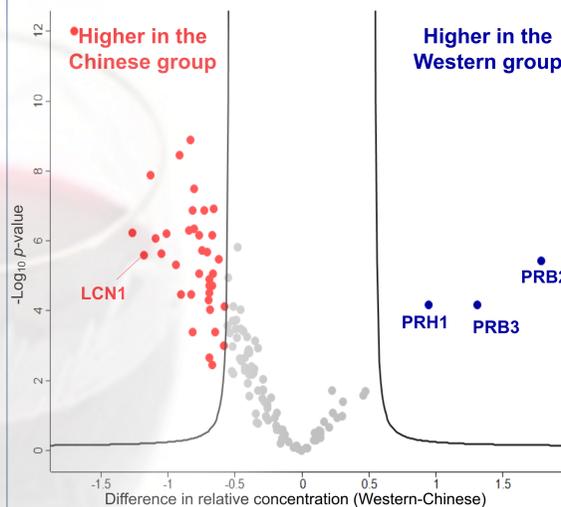
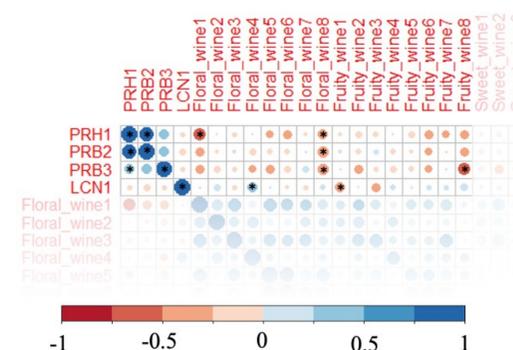


Fig. 2. Volcano plot comparing variation in salivary protein compositions between Western and Chinese panellists. Proteins with significantly (FDR=0.01, s0=2) difference between the two groups were located outside the curve. Proteins with reported impacts on the sensory perception were labelled with their gene names.

Salivary Proteomics

Finding: There are significant differences in sensory related protein concentrations between the two ethnic groups (Fig. 2). The Western group was richer in salivary proline-rich proteins (PRPs) while the Chinese group was more abundant in lipocalin-1(LCN1).

Fig. 3. Pearson correlation analysis amongst intensities of sensory attributes (“floral”, “fruity”, “sweet” and “astringent”) perceived from wine samples by panellists and relative concentrations of their salivary PRH1, PRB2, PRB3 and LCN1. Significant correlations at the 0.05 level were labelled with “*” notations.



Pearson Correlation

Finding: PRPs levels were negatively correlated with perceived intensities of “floral” and “fruity” attributes while some positive correlations were observed between LCN1 and these two attributes.