

Abstract

Discerning Wine Astringency Sub-Qualities by Tribological Approaches in a Model System—What Is the Role of Saliva? [†]

Shaoyang Wang ¹, Heather E. Smyth ^{1,*}, Sandra M. Olarte Mantilla ¹, Jason R. Stokes ^{2,3} and Paul A. Smith ⁴

¹ Centre for Nutrition and Food Sciences, Queensland Alliance for Agriculture and Food Innovation, The University of Queensland, Coopers Plains, Brisbane, QLD 4108, Australia; shaoyang.wang@uq.edu.au (S.W.); s.olartemantilla@uq.edu.au (S.M.O.M.)

² School of Chemical Engineering, The University of Queensland, St Lucia, Brisbane, QLD 4072, Australia; jason.stokes@uq.edu.au

³ Australian Research Council Centre of Excellence in Plant Cell Walls, The University of Queensland, St Lucia, Brisbane, QLD 4072, Australia

⁴ Wine Australia, P.O. Box 660, Kent Town, SA 5071, Australia; paul.smith@wineaustralia.com

* Correspondence: h.smyth@uq.edu.au

[†] Presented at the third International Tropical Agriculture Conference (TROPAG 2019), Brisbane, Australia, 11–13 November 2019.

Published: 17 January 2020

Abstract: Astringency is an important indicator of wine sensory quality. As a complex sensation that the loss of in-mouth lubrication is recognised as an important mechanism, astringency can be perceived as a set of different sub-qualities. In addition to sensory evaluations, chemical approaches measuring interactivity of astringents-proteins have provide ways of astringency quantification, but they do not capture how specific wine components elicit those sub-qualities. In this study, we developed several tribological approaches, which considered saliva interactions, in an effort to explore if any salivary lubrication change is linked to different sensorily perceived wine astringency sub-qualities. In model wine systems with defined matrix compositions, we found that model wines with equivalent responses in chemical assay for astringency possessed various astringency sub-qualities. In particular, the sub-quality drying corresponded to samples exhibiting higher boundary friction. High-acidity matrix induced pucker, which is found to be independent of drying. It was also linked to a faster salivary film collapse. The rough seemed to be a secondary astringency sub-quality combining drying and pucker, because these 2 sensations were found either elicit rough independently. Polysaccharide reduced the drying in a low-tannin-high-acidity matrix. This is the first study demonstrating that astringency sub-qualities are likely to have different perceptive mechanisms by using tribological measures. The outcomes would provide insights into employing those tools to help manage wine matrix to attain preferable mouthfeels and astringency characteristics.

Keywords: wine astringency; astringency sub-qualities; sensory evaluation; tribology; saliva

Funding: This research was funded by Wine Australia (WA Ph1704), the China Scholarship Council and the International Organisation of Vine and Wine.

Acknowledgments: Authors acknowledge the efforts of the sensory panellists for participating in sensory assessments. The Commonwealth Scientific and Industrial Research Organisation is acknowledged for providing laboratory facilities as well as the Queensland Department of Agriculture and Fisheries, through their investment in the Queensland Alliance for Agriculture and Food Innovation.

Conflicts of Interest: The authors declare no conflict of interest.



© 2020 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).