Maceration additions of marc differently modulate Shiraz wine texture depending on grape harvest timing

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INTRODUCTION
Harvest timing decisions are impacted for reasons such as a compressed vintage putting strain on winery infrastructure or a desire for a lower alcohol end product. For red varieties, immature grapes possess lower tannin concentrations and can result in texturally deficient wines. Here, Shiraz was harvested from the same vineyard two weeks apart and underwent triplicate fermentation (40 kg Shiraz must) with the addition of naturally tannin-containing Chardonnay marc (10 kg per ferment), and/or pectolytic enzymes known to modulate wine tannin (Laffort LAFASE® HE GRAND CRU).

1) HARVEST TIMING
Wine tannin results from dynamic extraction into solution and binding back to grape cell wall polysaccharides (namely pectin) during maceration. Tannin is inherently lower in early harvest grapes (EH) resulting in lower tannin wine.

2) PECTOLYTIC ENZYME ADDITION (E)
The pectin structure degrades and reduces the extent of binding back. This results in higher wine tannin concentrations for both commercially mature (CH) and early harvest (EH) grapes.

3) CHARDONNAY MARC ADDITION (M)
The addition of Chardonnay marc has mixed results. For EH ferments, marc provides extra tannin to be extracted into the tannin-deficient solution. The saturated CH ferments experiences more back binding due to already high tannin and extra pectin present.

4) ENZYME AND MARC ADDITION (E&M)
Enzyme and marc addition yields the highest wine tannin concentrations for both EH and CH ferments. The additional tannin provided by the marc is not removed as readily as in (3) due to the degradation of pectin and reduced back binding.

CONCLUSIONS
• Enzyme and marc additions increased the tannin concentration in early harvest (EH) wine 250% (EH – 266 mg/L; EH+E&M – 661 mg/L).
• No intervention to EH grapes provided the tannin or astringency of the commercial harvest (CH) control (820 mg/L).
• Marc additions altered wine tannin concentration differently depending on the nature of the solution (up for low tannin EH, down for high tannin CH).
• The gradient in tannin concentrations gave a gradient in astringency responses.
• There were minor colour changes due to interventions, but mostly due to harvest timepoint/maturity.
• Grape marc and enzyme additions are a promising tool for increasing tannin levels in wine where a deficiency is expected.

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