Early fermentation characteristics of non-*Saccharomyces* yeasts in red and white grape must, a targeted approach

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The early fermentation characteristics of five different non-Saccharomyces yeasts were evaluated in two different grape musts: Sauvignon blanc and Syrah. The species used were *Saccharomyces cerevisiae, Kazachstania gamospora, Lachancea thermotolerans, Metschnikowia pulcherrima, Torulaspora delbrueckii* and *Zygosaccharomyces kombuchaensis. K. gamospora* and *Z. kombuchaensis* were laboratory strains while the others were commercially available wine strains. A divinylbenzene/carboxen/ polydimethylsiloxane (DVB/CAR/PDMS) fiber was used to extract volatile compounds from the headspace of the fermented musts once they had reached 2% ethanol concentration since this is approximately the point at which *S. cerevisiae* would be added to complete the fermentation. The extracts were analyzed using a GC-MS/MS method that for the first time was able to target 91 different compounds known to be found in wine and/or produced by yeast during fermentation. Compounds classes targeted included alcohols, carboxylic acids, esters,furans, ketones, phenols, pyrans, terpenes, and thiols. Compounds were normalized against the internal standard 2-octanol and could thus be semi-quantified. PCA plots show clear and distinct separations between all yeast groups and strong grouping between replicates. Further analysis shows that while each yeast profile is unique, with a few exceptions, all of the non-*Saccharomyces* yeast species produced lower concentration of esters and alcohols than the *S. cerevisiae* control. All species with the exception of *Lachancea thermotolerans* produced significantly more of the furans 5-hydroxymethyl-2-furaldehyde and 5-methylfurfural. In general the profiles of each yeast are conserved in both the Syrah and Sauvignon Blanc must suggesting that the metabolic production is consistent regardless of matrix differences.

MACROWINE 2014

Stellenbosch, South Africa 7 - 10 September

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