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AN ENOLOGY EXTENSION SERVICE QUARTERLY PUBLICATION

Effect of non-saccharomyces yeasts on the volatile chemical profile of Shiraz wine

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What the authors did. They investigated how 6 non-Saccharomyces yeasts influenced the volatile (aroma-related) chemical profile of Shiraz wine. The six yeasts were: Torulaspora delbrueckii (TD), Lachancea thermotolerans (LT), Pichia kluyveri (PK), Metschnikowia pulcherrima (MP), Candida zemplinina (CZ) and Kazachstania aerobia (KA), in sequential inoculation with Saccharomyces cerevisiae (SC)

Where they did it. South Africa

Why they did it. Traditionally, wines are inoculated with Saccharomyces yeasts that ferment sugars into alcohol. But historically, this hasn't always been the case. There are many other yeasts that are naturally present on grapes and that can actively metabolize and alter the must/wine environment. For a long time, these yeasts were considered undesirable and possible spoilage organisms, but that perspective is slowly starting to change. Non-saccharomyces yeasts may have the potential to produce interesting and desirable aroma compounds, increasing wine complexity.

Wine. What Where Why How

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How they did it. In a natural, non-inoculated fermentation, non-Saccharomyces yeasts tend to be active at the beginning of a fermentation, after which they become dominated by Saccharomyces yeasts. A similar approach was used in this study. The authors called it "sequential inoculation": they initially inoculated the must with non-Saccharomyces yeasts, let them ferment until the ethanol content reached 2% vol. then added Saccharomyces cerevisiae yeasts to finish the fermentations. Control fermentations were also conducted, in which wines were inoculated with S. cerevisiae yeast from the beginning. Once fermentations were complete the grapes were pressed and the wines allowed to clarify at -4C for a week, after which they were bottled.

What they looked for. The authors wanted to understand how each individual yeast influenced the volatile chemical profile of the wines produced. In order to do that, they used advanced analytical techniques that allowed them to identify the significant compounds of interest. They also monitored the speed and duration of the fermentation as well as basic wine parameters such as alcohol, pH, volatile acidity (VA) and titratable acidity (TA).

What they found. Overall, each of the non-Saccharomyces sequential fermentations showed a distinctaroma chemical profile. The most significantly different profiles were observed in the S. cerevisiae Control and in LT–SC sequential fermentations, where esters, acids and terpenes (important aroma compounds) constituted the major differences. In addition, all of the non-Saccharomyces sequential fermentations showed a higher amount of terpenes (desirable aroma compounds) compared with that of the Control. This is significant in that terpenes are grape cultivar specific, and S. cerevisiae is not capable to free terpenes from their bound form. It is just one example of how these yeasts can have a different effect on the volatile chemical profile of a wine depending on which grape must is used.

The L. thermotolerans–S. cerevisiae (LT–SC) sequential fermentations were characterized by the least amount of malic acid in the finished product.

The VA level varied among the non-Saccharomyces fermentations. The TD–SC, MP–SC and PK–SC sequential inoculations showed the same approximate VA level as that of the S. cerevisiae control, while all other fermentations had higher VA (that signals a potential problem, as high VA values are generally undesirable).

So what? The main idea is that some non-Saccharomyces yeasts may be used in conjunction with SC to produce more complex wines, with interesting aroma profiles. However one must pay attention to VA and malic acid production.

Yes, but….no sensory evaluation was done on the wines. So, while the chemical profiles indicate variability between the wines, we don't know (yet) how that translates into the actual aroma profiles of the wines.

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Use of unripe grapes harvested during cluster thinning as a method for reducing alcohol content and pH of wine

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What the authors did. They assessed the potential use of underripe grapes to decrease alcohol, acidify and reduce pH in wines made from fully ripe grapes.

Where they did it. Spain.

Why they did it. Nowadays, strongly colored full-bodied red wines are highly appreciated by the market. To produce such wines, winemakers need to make sure that the grapes are picked at a level of ripeness that offers maximum color intensity, structure and aroma potential. Yet, oftentimes picking grapes at maximum phenolic concentration can have its drawbacks, particularly in hot climates. Excessively high sugar levels, low acids and high pH values are common occurrences in such cases. High sugar levels can lead to stuck or sluggish fermentations, low acidity levels can affect the flavor profile of the wine while high pH can generate microbial instability and loss of color. Thus, finding a way to balance all wine parameters is most desirable.

How they did it. They used Grenache grapes from cluster thinning (that would have otherwise been discarded) to produce a low alcohol, high acidity, low pH wine (5% (v/v) ethanol, a titratable acidity of 17.8 g tartaric acid/L, pH 2.64). They stripped the color and aroma out of this wine using bentonite and activated charcoal and blended it with several musts produced from fully ripe Cabernet sauvignon, Merlot and Bobal grapes, then they fermented the treated musts. They also produced wines from grapes picked at a potential alcohol content of 13-14% vol. (Lower alcohol potential wines – LAPW) as well as wines made from fully ripened grapes, without any additions.

What they looked for. The authors wanted to understand how the addition of a wine fraction produced from underripe grapes to a conventionally produced red must will influence the color, chemical and aroma profile of the final wine. In order to do that, they used advanced analytical techniques that allowed them to identify the significant compounds of interest (basic wine parameters, phenolics, astringency and color parameters) and performed sensory analysis to establish the aroma/flavor profile of the final treated wines and compare those with the profiles of traditionally produced wines.

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What they found. All the treated wines had a lower alcohol content and pH than the corresponding wines made from fully ripened grapes. The tasters were unable to differentiate between the treated wines and the ones produced from fully ripened grapes in the case of Merlot and Cabernet sauvignon wines. The anthocyanin (color indicator) concentrations of the treated wines for all three cultivars were similar to those of their fully ripened counterparts. Some differences in overall color were noted.

So what? There's a lot of practical potential in this. Grapes that would otherwise be discarded can be used to produce acidic reserves that would eliminate the need for tartaric acid additions and pH adjustments. Even better, the flavor profiles of the wines (except Bobal in this case) seem to not be negatively impacted by these additions and alcohol levels are decreased to levels that ensure well balanced wines without any loss of aroma.

Yes, but… More research is needed with various other varietals, best suited for Texas (Tempranillo, Sangiovese). Different doses can be investigated. Consumer liking and acceptance should also be assessed.

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Organic label's halo effect on sensory and hedonic experience of wine: A pilot study

Vanessa Apaolaza, Patrick Hartmann, Carmen Echebarria, Jose M. Barrutia

What the authors did. They analyzed the influence of organic labelling on the sensory perception of wine.

Where they did it. Spain.

Why they did it. Understanding consumer behaviors, their liking of products, and their intentions to buy – in our case wines - is extremely important for any business that tries to sell something. External factors, unrelated to the intrinsic quality of a product, can greatly influence consumers. With wines in mind, labeling can be a major player on consumer evaluation of the product and decision-making (buy or don't buy). But how big a player?

How they did it. They used a single organic wine - Rioja Crianza 2010 - that was either accompanied by a sign indicating this was an organic wine or the same organic wine, but with no indication that it was organic. The authors asked 90 consumers to evaluate the wines and to fill out a questionnaire that asked, among other things, how much they liked the wine (hedonic evaluation), their– intention to buy the wine as well as instructed them to rate the intensities of several appearance (clarity, color intensity) aroma (intensity, finesse, pleasantness and citric, fruity, floral, spicy) and flavor attributes (bitter, sour, sweet, flavor intensity, flavor quality) on scales from 1 to 10.

What they looked for. In this particular study the authors sought to understand how organic labeling might influence consumers' liking of a wine, their perception of the wine's health benefits, the intensity ratings for a number of aroma and flavor attributes and the consumers' willingness to buy the organic labeled wine versus the regular wine. Will the organic label make the wine taste better? Will it make consumers like the wine more? The authors looked for differences in consumer evaluations between two identical wines labelled differently.

What they found. They found that organic labelling mattered. The organic labeled wine was rated higher in most measured sensory attributes, including two visual descriptors, eight aroma descriptors, four taste descriptors, as well as in the attributes smooth texture and good body, compared to the identical wine lacking the organic label. Furthermore, participants rated the organic labeled wine as healthier. Overall hedonic evaluation (liking) and purchase intention for the wine were also higher when exposed to the organic label.

So what? What this means is that consumers actually perceive wines differently based on the information presented on the label (in this case an indication of organic wines). It also means that organic wine producers may have an advantage over conventional wine producers in terms of consumer linking and consumer willingness to buy. Take home message – give your labels a lot of thought!

Yes, but…. Can attitudes toward organic designation vary across the world? Would Texas consumers be similarly influenced by an organic label? Is it possible/ feasible to have an organic winery in Texas?