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Enzyme treatments during pre-fermentative maceration of white winegrapes: effect on volatile organic compounds and chromatic traits

AIM: Volatile organic compounds (VOCs) are very important for the characterisation and quality of the final white wine. An oenological practice to increase the extraction of aroma compounds is the cold pre-fermentative maceration [1,2], although it may also release phenolic compounds that confer darker chromatic traits to white wines, not appreciated by consumers. This practice could be improved by the use of enzymes in order to facilitate the release of the odorous molecules. In this study, the effect of different enzyme treatments during skin contact on the chromatic characteristics and volatile composition of white musts from four winegrape varieties was evaluated. METHODS: Different enzymes presenting distinct single activities (pectolytic and non pectolytic) were added to the must of four white winegrape varieties (Arneis, Greco, Falanghina and Chardonnay) and then subjected to cold pre-fermentative maceration. For each enzyme and variety tested, three berry replicates of 500 g each were randomly selected, added with 10 mg/kg of potassium metabisulphite and crushed. Enzymes were added at a dose of 10 mg/kg. Then, the must was left in contact with the skins for 13 h at 12 °C. Furthermore, other three berry replicates of 500 g each were used as control following the same procedure without enzyme addition. At the end, the musts obtained were separated from the skins and analysed for total polyphenolic index (TPI), chromatic parameters (absorbance at 420 nm and CIELab coordinates), as well as free and glycosylated VOCs. Volatile composition was determined by solid-phase extraction followed by GC-MS analysis [3]. RESULTS: The use of enzymes during cold pre-fermentative maceration resulted in musts having different technological parameters, such as must yield, pH and organic acids content. The chromatic characteristics related to yellow/brown colour (absorbance at 420 nm and CIELab coordinates) and TPI values were dependent on the enzyme used. Indeed, pectin lyase, polygalacturonase and arabinase reduced the yellow colour component of the must obtained when compared to the control sample. Regarding VOCs, different enzymes modulated the release of free forms differently, which are olfactively perceptible, but also they increased the extraction of glycosylated compounds into the grape must. Particularly, most of enzymes tested had a positive effect on the release of terpenes, however the release of norisoprenoids, C6 compounds, alcohols and benzenoids was influenced by both the enzyme used and the variety treated [4]. CONCLUSIONS: The use of different enzymes influenced technological parameters, chromatic characteristics and VOCs contents but some effects were variety dependent. This study may aid oenologists to better understand the action of these enzymes and thus to manage cold pre-fermentative maceration according to the oenological objective.

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