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# LC-MS METABOLOMICS SHOWS A SMART WAY TO REDUCE SULFITES IN WINE

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What does happen in wine in the presence of oxygen? What is the fate of exogenous antioxidants such as $SO_2$? A consortium between a winery, a wine stopper producer and a MS metabolomics laboratory, was build to answer the above questions towards an ambitious project. The experimental design included 216 bottles of 12 different white wines produced from 6 different cultivars (Inzolia, Muller Thurgau, Chardonnay, Grillo, Traminer and Pinot gris). Half of them were bottled using the standard industrial process with inert headspace and the other half without inert gas and with extra headspace. After 60 days of storage at room temperature, the wines were analysed using an untargeted LC–MS method [1, 2].
The use of a detailed holistic analysis workflow, with several levels of quality control and marker selection, gave 35 metabolites putatively induced by the different amounts of oxygen [2, 3]. These metabolite markers included ascorbic acid, tartaric acid and various sulfonated compounds observed in wine for the first time (e.g. S-sulfonated cysteine, S-sulfonated glutathione and S-sulfonated pantetheine, sulfonated indole-3-lactic acid hexoside and sulfonated tryptophol). The consumption of $SO_2$ mediated by these sulfonation reactions was promoted by the presence of higher levels of oxygen on bottling [2].
The reaction between $SO_2$ and other antioxidants present in wine, like glutathione, results in depleting each other concentration [2]. So instead to have a synergic or additive protection due to the presence of multiple antioxidants, the wine is less protected from oxidations because of the antagonism between the antioxidants. This phenomenon, unknown until today, was pushing often winemakers to increase the added dose of $SO_2$ without knowing why, and as result to increase sulfites concentration in wine.

**References**

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