Impact of inoculum size on mead aroma compounds formation by wine strains of *S. cerevisiae*

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Mead is a traditional drink, containing 8-18% (v/v) of ethanol, which results from the alcoholic fermentation of diluted honey performed by yeasts. It has been reported that mead fermentation is a time-consuming process, and an important objective of mead makers is to reduce the fermentation time without decreasing the quality of the end product. A significant time can be saved in the fermentation process by increasing the pitching rate, *i.e.*, the amount of suspended yeast cells added to a batch fermenter. However, an increase in the inoculum size could also have deleterious side effects on the flavour profile of the final beverage. Therefore, the aim of this study was to investigate the impact of the inoculum size of two commercial winemaking strains of *Saccharomyces cerevisiae* (Lalvin QA23 and Lalvin ICV D47) on the mead volatile aromatic compound production. Honey must was prepared according to the recipe developed by our team, supplemented with potassium tartrate, pH adjusted to 3.7 with malic acid and the nitrogen concentration adjusted to 267 mg/L with diammonium phosphate. The appropriate amounts of inoculum were pitched into the honey-must to obtain five different pitching rates. Mead produced was analysed for major volatile compounds by GC-FID and for minor volatile compounds by GC-MS. A total of twenty-seven fermentative aroma compounds including alcohols, esters, volatile phenols, volatile fatty acids and carbonyl compounds were identified and quantified in meads. It was observed quantitative differences in aroma profiles, confirming the contribution of both yeast strain and inoculum size on the sensory characteristics of meads. Of the twenty-seven volatile compounds quantified, fourteen could contribute to mead aroma and flavour because their concentrations rose above their respective thresholds. In general, the formation of these compounds was particularly pronounced at low pitching rates. The esters ethyl hexanoate, ethyl octanoate and isoamyl acetate were the most powerful odorants detected in all meads. In addition to this quantitative analysis of the impact of strain selection and inoculum size on mead aroma, a complementary sensorial evaluation of the meads would yield further useful information for mead producers.

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