

Combined use of *Saccharomyces cerevisiae* and *Torulaspora delbrueckii* to reduce volatile acidity production in high sugar fermentation

Volatile acidity, mainly acetate, can play a significant role in wine aroma and an excessive concentration of this alcoholic fermentation by-product is highly detrimental to wine quality. The amount of volatile acidity produced by *Saccharomyces cerevisiae* is usually low (0.25 to 0.50 g/l) but may be higher under certain fermentation conditions. In particular, during fermentation of high gravity must such as botrytized musts, the volatile acidity content may be 1.8 g/l or even higher, i.e. over the EEC legal limit of 1.5 g/l expressed in acetic acid. An approach consisting of using non-*Saccharomyces* yeasts to minimize volatile acidity production during high sugar fermentation was investigated. Several yeast cultures belonging to three non-*Saccharomyces* species (*Candida zemplinina*, *Candida stellata*, *Torulaspora delbrueckii*) and three *Saccharomyces* species (*Saccharomyces uvarum*, *Saccharomyces capensis*, *Saccharomyces cerevisiae*) were primarily evaluated in sterile medium for their volatile acidity and ethanol productions. As expected, results showed that there was a higher ethanol concentration in *Saccharomyces cerevisiae* culture. *Torulaspora delbrueckii* exhibited the lowest volatile acidity production while consistently showing a low ethanol rate. Botrytized must fermentations by combination of *Torulaspora delbrueckii* and *Saccharomyces cerevisiae* were carried out. Mixed and sequential cultures with *Torulaspora delbrueckii* and *Saccharomyces cerevisiae* in the ratio 2:1 to 100:1 were performed. The metabolic interactions between the two yeast species showed a positive influence on acidity production and fermentation time, especially in mixed cultures. The presence of *Torulaspora delbrueckii* allowed reduction of the final volatile acidity production up to 50% and the higher the *Saccharomyces cerevisiae* concentration, the shorter the fermentation time was. Results showed that, although *Torulaspora delbrueckii* yielded low ethanol, it is recommendable in association with *Saccharomyces cerevisiae* for fermenting musts with high sugar contents to reduce volatile acidity production.