Saccharomyces cerevisiae and *Dekkera bruxellensis* interactions in alcoholic fermentations: growth and 4-ethylphenol production

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The yeast *Dekkera/Brettanomyces bruxellensis* can cause enormous economic losses both in wine industry and fuel-ethanol processes due to production of phenolic off-flavour compounds and low ethanol productivities. In winemaking this microbial hazard is usually tackled by the use of chemical preservatives such as sulphur dioxide. In spite of this, *D. bruxellensis* strains are frequently found in wines at low levels (*ca* 10^3 cells/ml) where they can metabolise residual sugars producing phenolic off-flavours compounds, such as 4-ethyl phenol.

In the present work we investigated *S. cerevisiae* and *D. bruxellensis* interactions during alcoholic fermentations and evaluated the effectiveness of antimicrobial peptides secreted by *S. cerevisiae* to prevent growth of the main wine spoilage yeast and the production of 4-ethylphenol. Several fermentations were performed with single cultures of *D. bruxellensis* and mixed cultures of *S. cerevisiae* and *D. bruxellensis*, both in synthetic grape juice (SGJ) and grape must. Yeast growth (culturability and viability) and fermentation performance (i.e. sugars consumption, ethanol and 4-ethylphenol production) of those fermentations was accessed by different methods, namely by florescence *in situ* hybridization and flow cytometry. Results showed that *S. cerevisiae* significantly reduced the growth of *D. bruxellensis* and the production of 4-ethylphenol both in SGJ and grape must fermentations performed with mixed cultures. Moreover, our work also showed that antimicrobial peptides secreted by *S. cerevisiae* are effective to prevent growth of *D. bruxellensis* and production of phenolic off-flavor compounds in wine.

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