



ΓΕΩΠΟΝΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ
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Effect of *Saccharomyces* species interaction on alcoholic fermentation behaviour and aromatic profile of Sauvignon blanc wine

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Introduction

Enhancing the sensory profile of wine by the use of different microorganism has been always a challenge in winemaking. During winemaking the consortium of microorganisms is rapidly differentiating and adapted to environmental changes. A plethora of genus and species have been identified and many factors shape their population structure. The unique microflora composition of each region is affected by the microclimate, the viticulture and the winemaking techniques.



The aim of our work was to evaluate the impact of different fermentation schemes by using mixed and pure cultures of different *Saccharomyces* species to Sauvignon blanc wine chemical composition and sensory profile.

Material & Methods

Sauvignon blanc must has been inoculated with mixed and pure cultures of *S. pastorianus* and *S. cerevisiae*. For the mixed fermentation schemes, one strain of *S. pastorianus* (Sp2) has been inoculated under different frequencies (99%, 95%, 90%, 80% and 70%) with two strains of *S. cerevisiae* (Sc1 and Sc2). Totally 13 fermentations trials, 3 monocultures and 10 mixed cultures, were realised in duplicate. The fermentation kinetics has been controlled by density measurement and classic oenological analysis (residual sugars, total acidity, volatile acidity, malic acid degradation, glycerol production etc) were performed based on OIV protocols. The population dynamics was conducted by the specific interdelta PCR reaction of the *Saccharomyces* species in the beginning and in the end of the fermentation process. Volatile aromatic compounds such as esters, superior alcohols and thiols were evaluated by GC/MS analysis. Sensory assessment was carried out for all wines by trained panel.

Results

All fermentation trials lead to dryness and the fermentation lasted from 9 days to 13 days. The population dynamics analysis revealed that the *S. cerevisiae* strain was the most predominant in the end of the fermentation process in any inoculation ratio tested. The wines fermented with *S. pastorianus*, either in pure or mixed cultures, were characterised by significant lower acetic acid production and greater malic acid degradation compared to the wines fermented with *S. cerevisiae* strains. The fermentation scheme as well as the used strain of *S. cerevisiae* clearly affected the production volatile compounds (Figure 1). Finally, the aromatic profile of the produced wines was highly affected from the inoculation ratio while the effect of the *S. cerevisiae* used strain was less important (Figure 2).

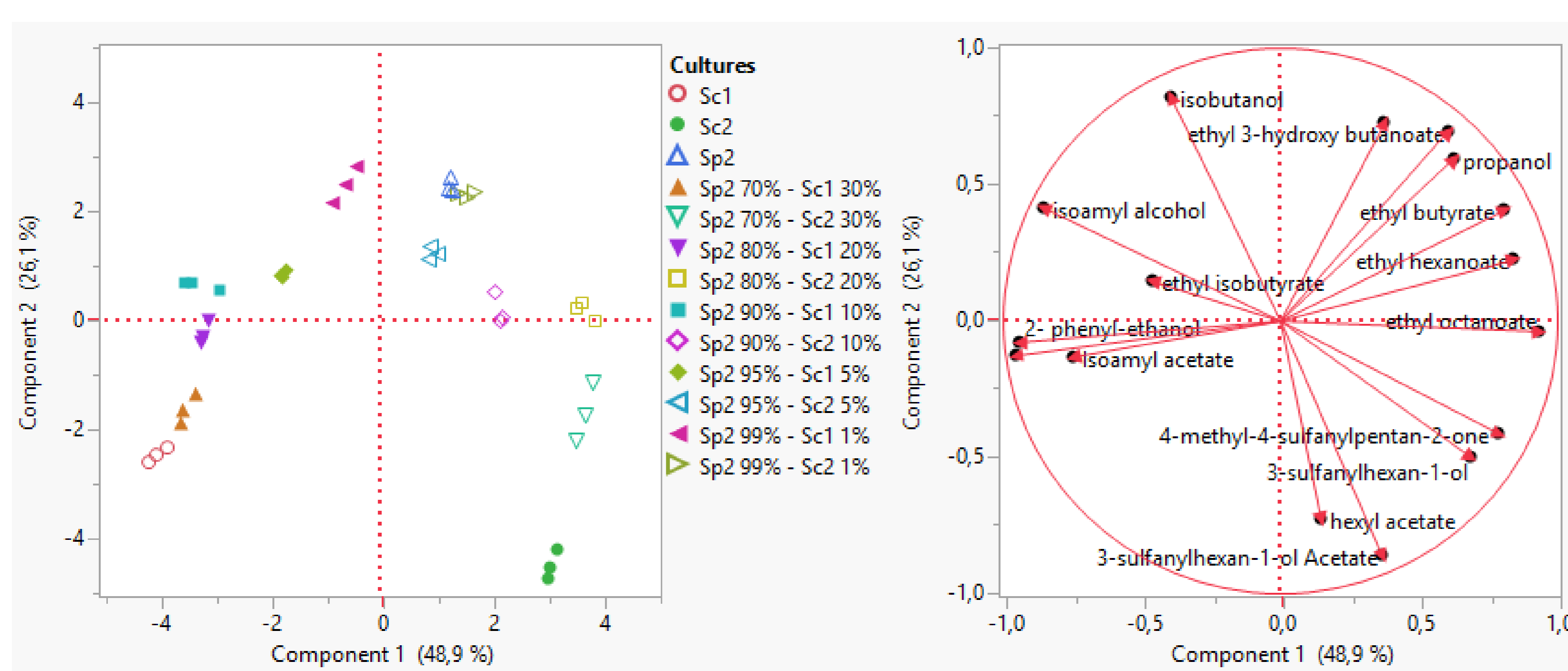


Fig. 1 Principal component analysis of volatile compounds of 39 Sauvignon blanc wines fermented with monocultures of *S. cerevisiae* and *S. pastorianus* (Sc1, Sc2 and Sp2) as well as with mixed cultures of both species in different inoculation ratio.

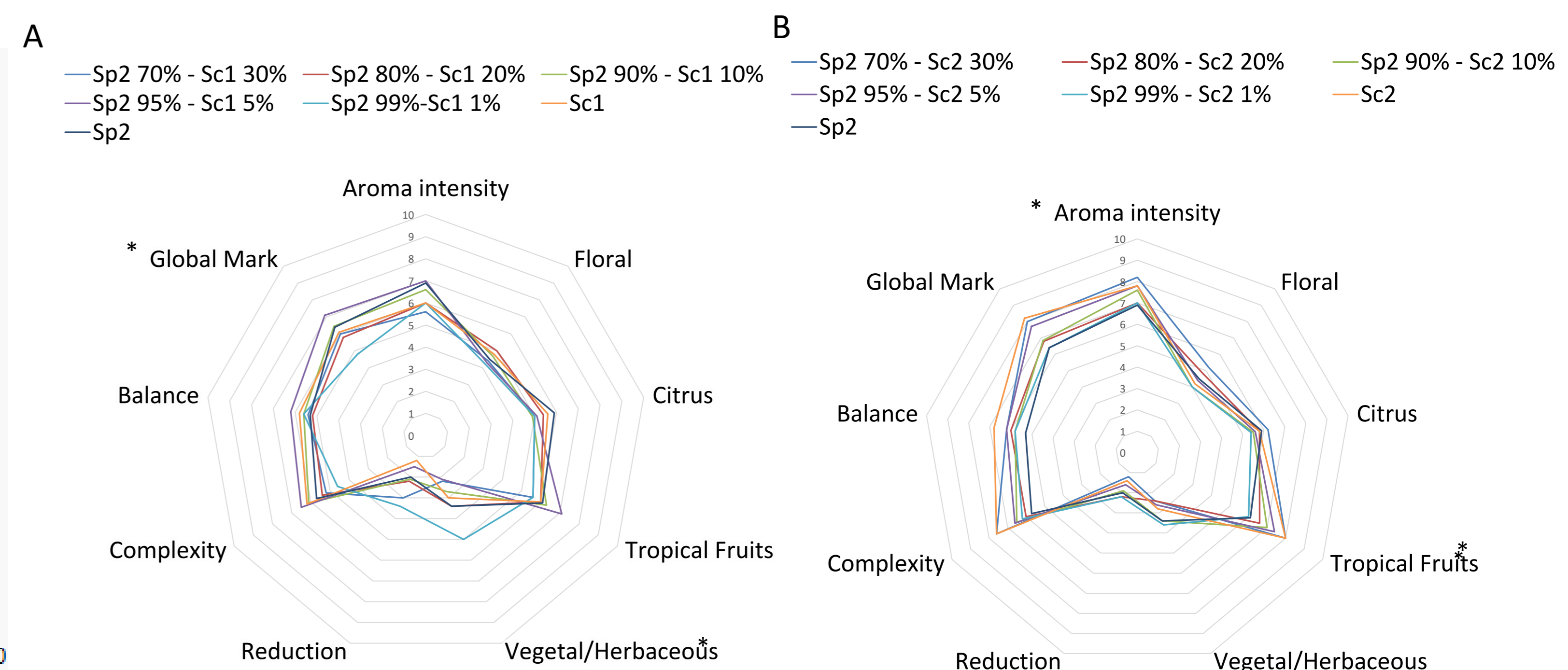


Fig. 2 Means of the sensory characteristics of the Sauvignon blanc wines produced with different fermentation schemes inoculated with *S. cerevisiae* 1 and *S. pastorianus* 2 (A) as well as with *S. cerevisiae* 2 and *S. pastorianus* 2 (B).

Conclusion

Our study based on different fermentation frequencies of mixed cultures of *S. bayanus* and *S. cerevisiae* strains, revealed the impact of the inoculation ratio on the 30 tested volatiles compounds, correlated to Sauvignon blanc aromatic profile. The species of *S. bayanus* starts to become an interesting candidate for co-inoculation with *S. cerevisiae* strains, able to nicely express the varietal character of the grape variety.

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