Hanseniaspora vineae, a unique fermentative *non-Saccharomyces* yeast for the improvement and diversification of wine profiles

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INTRODUCTION

Apiculate yeasts from the *Hanseniaspora* genus are predominant on grapes, and among them, *Hanseniaspora uvarum* is well known for its abundance in grapes and musts and is considered a spoilage yeast due to its high production of volatile acidity. Although we know that less than 10% of non-Saccharomyces yeasts display relevant aromatic characteristics, a selection study was initiated 10 years ago, using grapes from Uruguayan vineyards to identify and isolate new strains of non-saccharomyces displaying a strong aroma impact.

Figure 1: *Hanseniapora vineae* yeast with the typical shape of apiculate yeasts.

A SENSORY APPROACH TO THE SELECTION OF A NEW *NON-SACCHAROMYCES* YEAST

An original screening method was developed to isolate and identify several strains with high aroma impact, with a focus on *Hanseniaspora*. The key step was the sensory evaluation after fermentation on synthetic must, as summarised in Figure 2. 95% of the 34 isolated strains of *Hanseniaspora vineae* had a higher aroma impact.

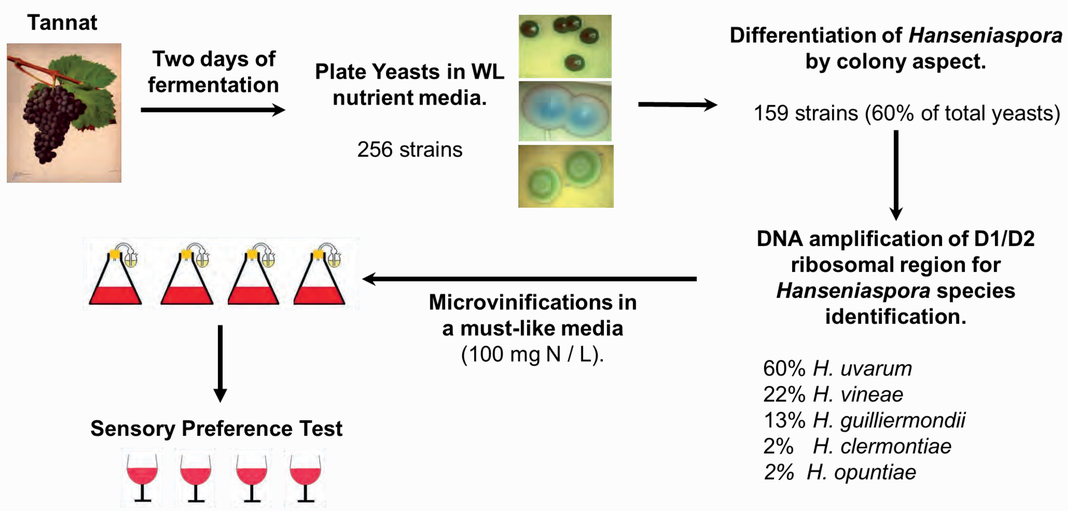

Figure 2: Summary of the selection process

Further experiments allowed us to select HV205 based on:

- the overproduction of 2-phenylethyl acetate compared to generic *Saccharomyces cerevisiae* (SC) – Figure 3a.
- the fast autolysis (Figure 3b) with early release of polysaccharides during lees ageing that increases body.

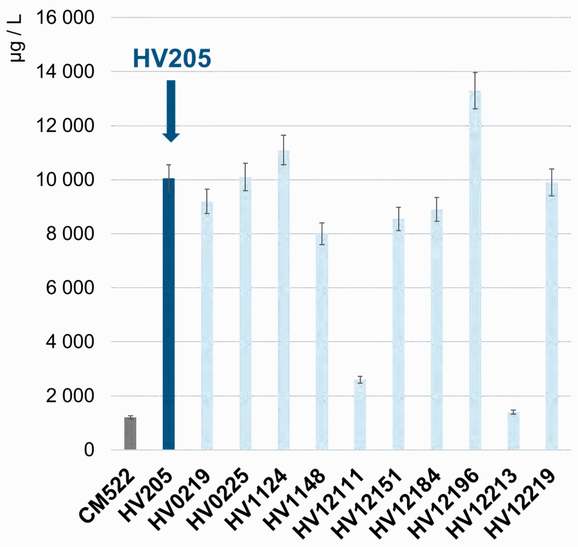

Figure 3a: Production of 2-phenylethyl acetate by *SC* (CM522) compared to *Hanseniaspora vineae* strains (HV) on Maccabeo must.

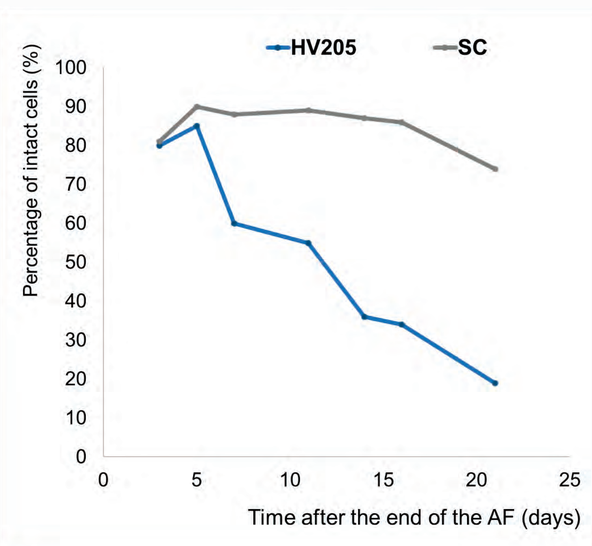

Figure 3b: Comparative autolysis kinetics of generic SC compared to HV205.

APPLICATION TRIALS

Following the development of the production and drying processes, the selected strain HV205 was made available as an active dry yeast for application trials in various enological conditions.

The effect of HV205 on 2-phenylethyl acetate overproduction was confirmed in all cases, as shown in Figures 4 and 5 for Albillo fermentation in Spain in 2019 and sparkling base wine production in Italy in 2020.

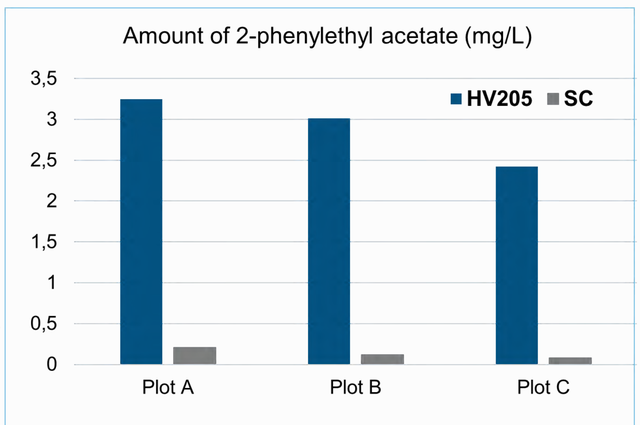

Figure 5: The amount of 2-phenylethyl acetate in three Chardonnay sparkling base wines fermented with SC or HV205 in pure cultures from three different vineyards (A, B, and C) (Italy 2020).

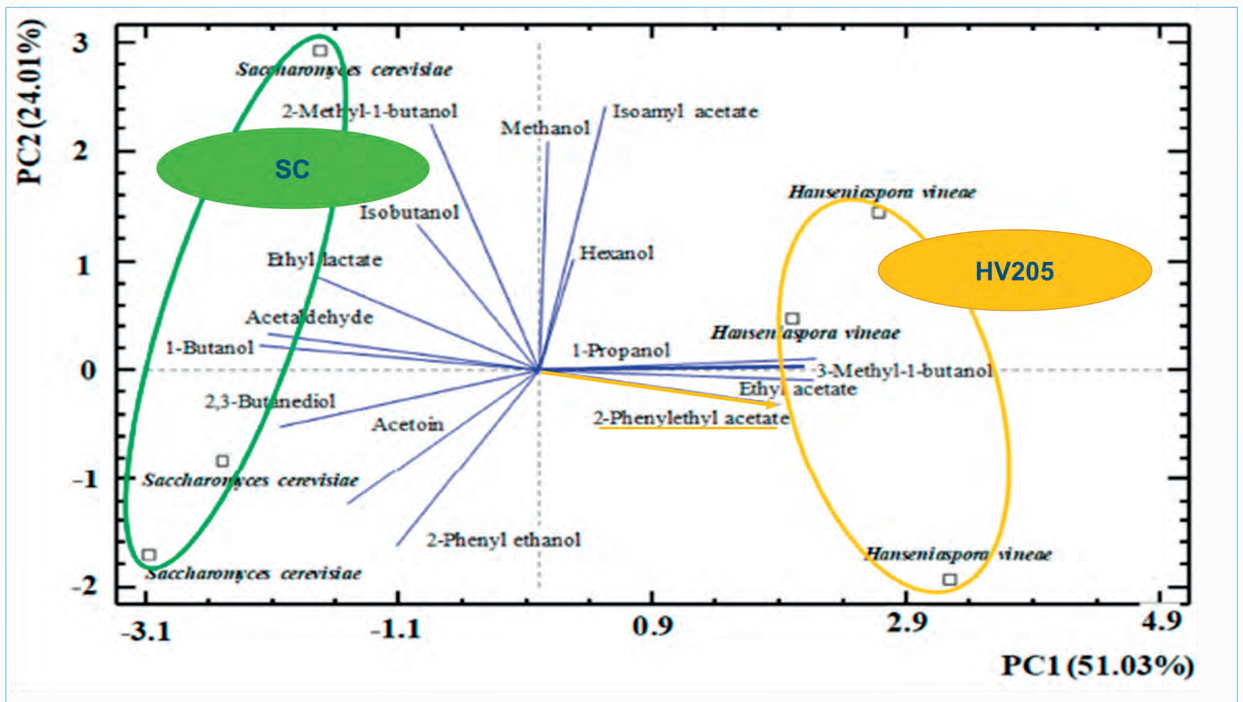

Figure 4: ACP on the volatile compounds composition comparing SC with HV205 on Albillo white wines fermented with the respective pure cultures (Spain, 2019).

HV205 had a beneficial impact on colour in rosé wines made from a 50/50 blend of Tempranillo and Albillo and fermented in stainless steel tanks or barrels, as indicated either visually (Figure 6a) or analytically (Figure 6b).

a

Rosé wines	L	a	b
SC	85.33±0.81[b]	17.95±0.56[b]	11.30±0.81[b]
HV	84.73±0.23[b]	17.18±1.82[b]	8.60±1.45[b]
SCW	80.50±0.71[a]	19.09±0.48[a]	12.23±0.20[a]
HVW	80.50±0.01[a]	19.48±0.28[a]	8.88±0.23[a]

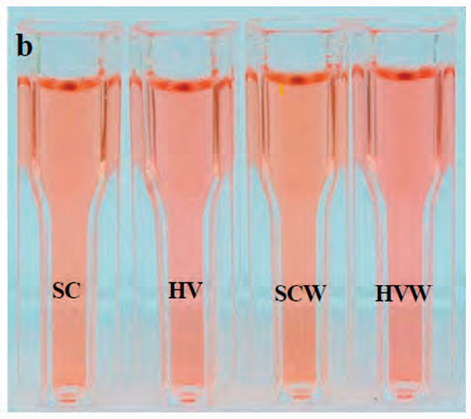

Figure 6: Impact of HV205 compared to SC con the colour of rosé wines (Tempranillo/Albillo 50/50) fermented in stainless steel tanks (HV and SC) or in barrel (HVW and SCW). **a** CIE Lab analysis; **b** visual;

In addition, laboratory ferments on Sauvignon Blanc must using SC and various HV strains allowed us to highlight the protein stabilisation induced by HV205, see Figure 7. More research needs to be done to find out if this observation was caused by proteolytic activity or by the early release of polysaccharides by HV205.

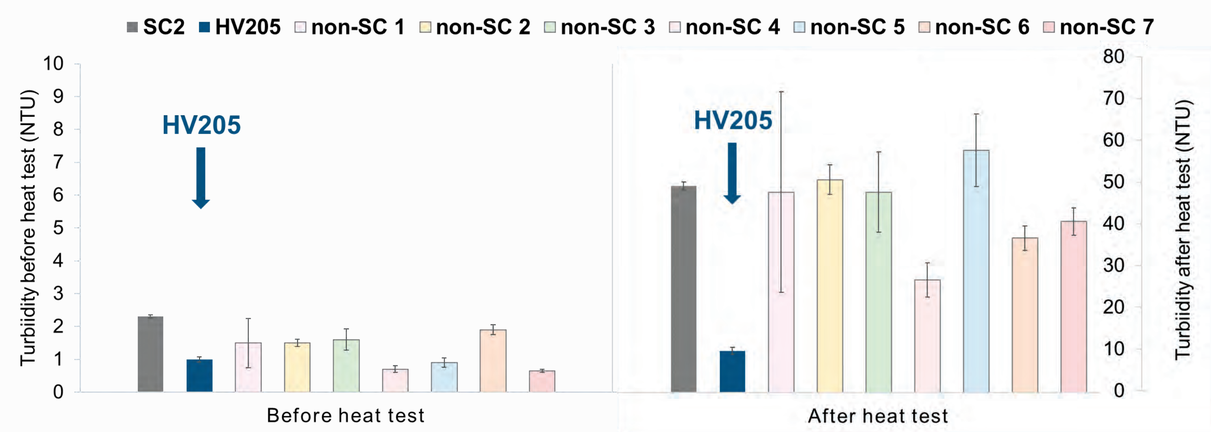

Figure 7: Wine NTU before and after heat test (80°C, 30 min) after fermentation of a Sauvignon Blanc must with various yeast strans (2022)

CONCLUSIONS

Hanseniaspora vineae HV205 presented very unique traits. As a fermentative yeast, it could ferment until 10–11% alc. and thus adapted to the production of base wines for sparkling in pure cultures. For "classical" wines, sequential inoculation with a SC is recommended to achieve the fermentation securely. Its strong aroma impact can be very interesting for producing complex wines from neutral varieties or having a wine for blending. Its contribution to the mouthfeel due to fast autolysis is also of interest to fastening ageing on lees.

The strain HV205 is commercialised as Fermivin VINEAE.