Exploring Douro Biome Terroir Complexity: Constructing Quality Port Wines using Selected Endogenous Non-Saccharomyces
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Introduction
Port wine is a fortified wine produced in the Douro Appellation (Portugal) having intrinsic aroma characteristics such as the terroir particularities, varieties and winemaking procedures, including the yeast strains.
Traditionally, Port wines have been produced by spontaneous fermentation, incorporating the diversity and complexity of the biome terroir.
Recent advances (Goddard M.R., 2008) have shown non-Saccharomyces species (NSAC) to dominate the early phase of fermentation, establishing these yeasts as “key-players”, contributing metabolic complexity to Port Wine.

Aims
- Study of biome terroir Douro
- Isolation & characterization of dominant strains
- Quality evaluation of Port produced using best NSAC strains
- Top 2 Douro grape varieties: Touriga Nacional (TN) & Touriga Franca (TF)
- Sensory Evaluation and Aroma Profiling

Results

- Yeast Profiling – 500 NSAC strains
- Yeast Characterization – 96 strains from 3 principal species
- Best Strain Selection: 15 strains; 5 from each principal specie
- Fermentation – 15 best strains
- Wine Volatile Profiling – boot 5 strains (2 LT; 2 MP; HU) + Mix (KT+MP+HU)

Phenotypic Characterization

- L. thermotolerans
- H. uvarum
- M. pulcherrima
- 5 best/most diverse strains were selected for biomass production
- Selection criteria: Enological performance

Conclusions
- NSAC Douro yeast strains add complexity modulating Port wine aroma
- LT contributes citrus floral notes, and acidic freshness (lactic acid)
- Best HU strain produces significantly lower [ethyl acetate]
- HU contributes chocolate/caramel aroma/taste
- MP favours fruity profile
- LT+MP+HU “Douro Terroir Blend” preferred with greatest complexity
- Indigenous Port wine Terroir yeast strains, which respect regional typicity, present enormous oenological potential

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