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Yeasts and bacteria phenotyping on a coffee pulp fermentation simulation medium for the selection of new starters to improve the final coffee quality

S4-P-06

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Introduction

Microorganisms play a key role in coffee fermentation by degrading mucilage and consuming coffee pulp nutrients to produce aroma and aroma precursors as acids, superior alcohols and other esters that will contribute to organoleptic properties of the resulting coffee. In order to better control this crucial step, the use of starters – yeasts and/or bacteria – is of growing interest. To face the plurality of post-harvest processes that lead to commercial coffee, several yeast and bacteria strains were evaluated on coffee pulp simulation medium to select appropriate candidates.

Materials/Methods

1L Bioreactors

Coffee fermentation simulation medium (adapted from Melo Pereira et al. 2014, Adriana Farah 2012; Avallone et al. 2001; Janissen and Huynh 2018).

15 Yeasts strains (*S. cerevisiae*)

2 Lactic Acid Bacteria strains (*O. oeni* and *L. helveticus*)

- CO_2 release (g)
- Microbial growth (CFU/mL)
- Central Carbon Metabolites (g/L)
- Volatile Organic Compounds

Results

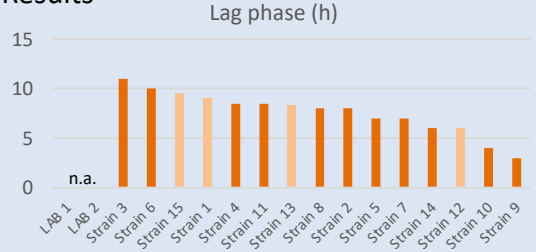


Figure 1: Ranking strains by lag phase property

Selection Criterions

- Lag phases < 10h
- Fermentation duration < 50h
- Viability > log 8
- Wide range of acids production and acidification properties

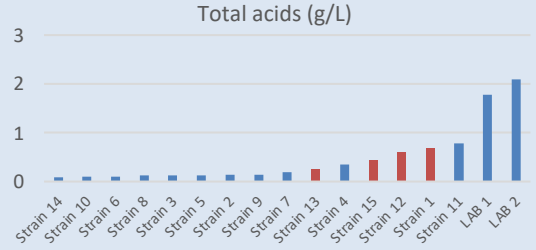


Figure 2: Ranking strains by total acid production

Discussions

- ✓ Short lag phase & good fermentation properties adapted for fast coffee fermentation processes
- ✓ Acidification sometimes needed to improve cup quality
- ✓ Good implantation to secure and better control coffee flora, avoiding spoilage
- ✓ Selection also based on diversity of yeasts/bacteria metabolism to explore diverse sensory profiles

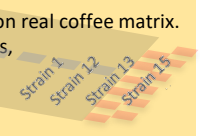
✓ Production of aroma or aroma precursors

2-Phenylethanol (Rose)
2-Phenylethyl acetate (Rose)
Ethyl decanoate (Grape, Pear)
Benzeneacetaldehyde (Honey, Rose)

Conclusion/Perspectives

Phenotyping of yeast strains led to the selection of four candidates further trialed on real coffee matrix. Resulting coffees turned out to be as different as strains genotypes and phenotypes, with improved cup score often related to a better aroma profile and a cleaner cup.

Research work is still under study to explore new selection criteria such as enzymatic activities for instance.



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