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Exploring microbial diversity of naturally fermented PDO Nyons table olives

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Context & experimental design

Artisanal fermented foods constitute a significant part of the Mediterranean diet and represent a cultural heritage that needs to be preserved and protected. PDO Nyons table olives are produced according to a traditional process by a slow spontaneous fermentation in brine (Figure 1). The manufacture and unique sensorial properties of these olives only rely on autochthonous complex microbiota.

This study aimed at unravelling the microbial ecology and dynamics of Nyons table olives during a yearlong spontaneous fermentation (Figure 2). The core microbial species were determined for potential future directed fermentations.

Microbial populations were stable during the studied fermentations

- Early harvest R1
  - Organic olives
  - Conventional olives
- Late harvest R2
  - Organic olives
  - Conventional olives

Culture-dependent analyses revealed diversified fungal populations and species dynamics...

- Early harvest R1
  - Organic olives
  - Conventional olives
- Late harvest R2
  - Organic olives
  - Conventional olives

...confirmed by preliminary metagenetic analyses

- Day 21
  - Olive Brine
  - Olive Brine
- Day 42
  - Olive Brine
  - Olive Brine

Conclusion & perspectives

Four different Nyons table olive fermentations were monitored using culture-dependent and -independent analyses. Results suggest that yeasts are the key actors of the process with four species consistently found in high abundances. Metabarcoding analyses performed at early days of fermentation were well correlated and provided complementary information about fungal and bacterial communities. To better understand microbial dynamics, metagenetic analyses will be performed on the remaining sampling points. Moreover, volatiles, sugars and organic acids at the same stages of fermentation are currently being analysed to link microbial diversity and dynamics with olive aroma profiles and biochemical changes.

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