

MICROBIAL POPULATION ASSOCIATED TO THE FERMENTATION PROCESS OF “NEGRINHA DE FREIXO” TABLE OLIVES PRODUCED IN PORTUGAL



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INTRODUCTION AND OBJECTIVES

“Negrinha de Freixo” is a typical table olive cultivar of the Northeast of Portugal, processed according to the natural fermentation methodology (Fig. 1). Due to its distinctive characteristics, the “Negrinha de Freixo” table olives have obtained marks of Protected Designation of Origin (PDO). Despite its importance, no information about the microflora composition occurring in the fermentation process is available.

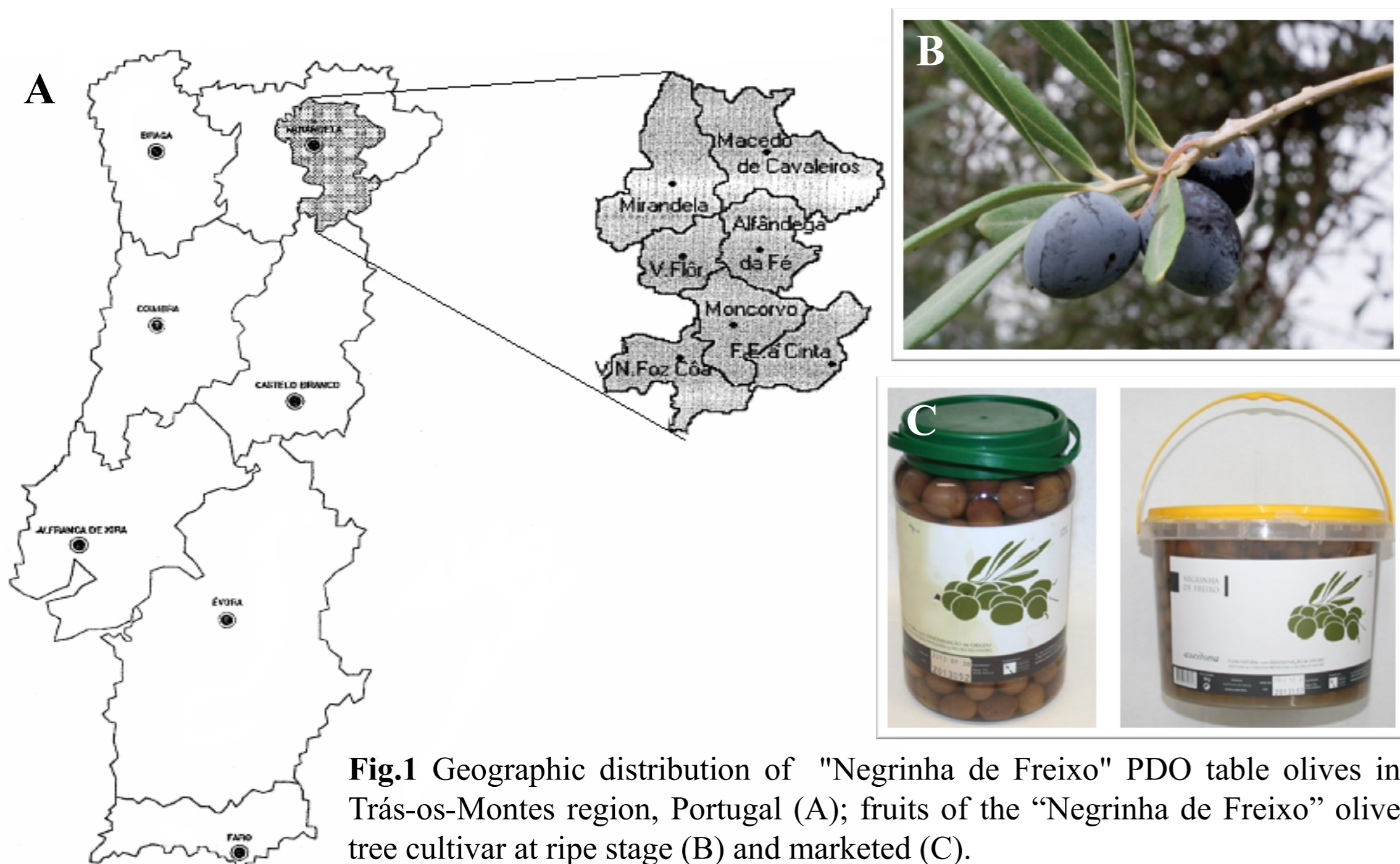


Fig.1 Geographic distribution of “Negrinha de Freixo” PDO table olives in Trás-os-Montes region, Portugal (A); fruits of the “Negrinha de Freixo” olive tree cultivar at ripe stage (B) and marketed (C).

Objective: Evaluate the chemical and microbiological population changes throughout the spontaneous fermentation process of the “Negrinha de Freixo” table olive.

MATERIAL AND METHODS

Table olives were kindly provided by an association of producers, located in Northeastern Portugal. Both olives and their brine were collected from three vats at different fermentation phases (raw material and after 4, 17, 27, 32, 44, 54 and 149 days). Chemical analysis were performed only in brine whereas the characterization of the microbial population were performed both in brine and olives (Fig. 2).

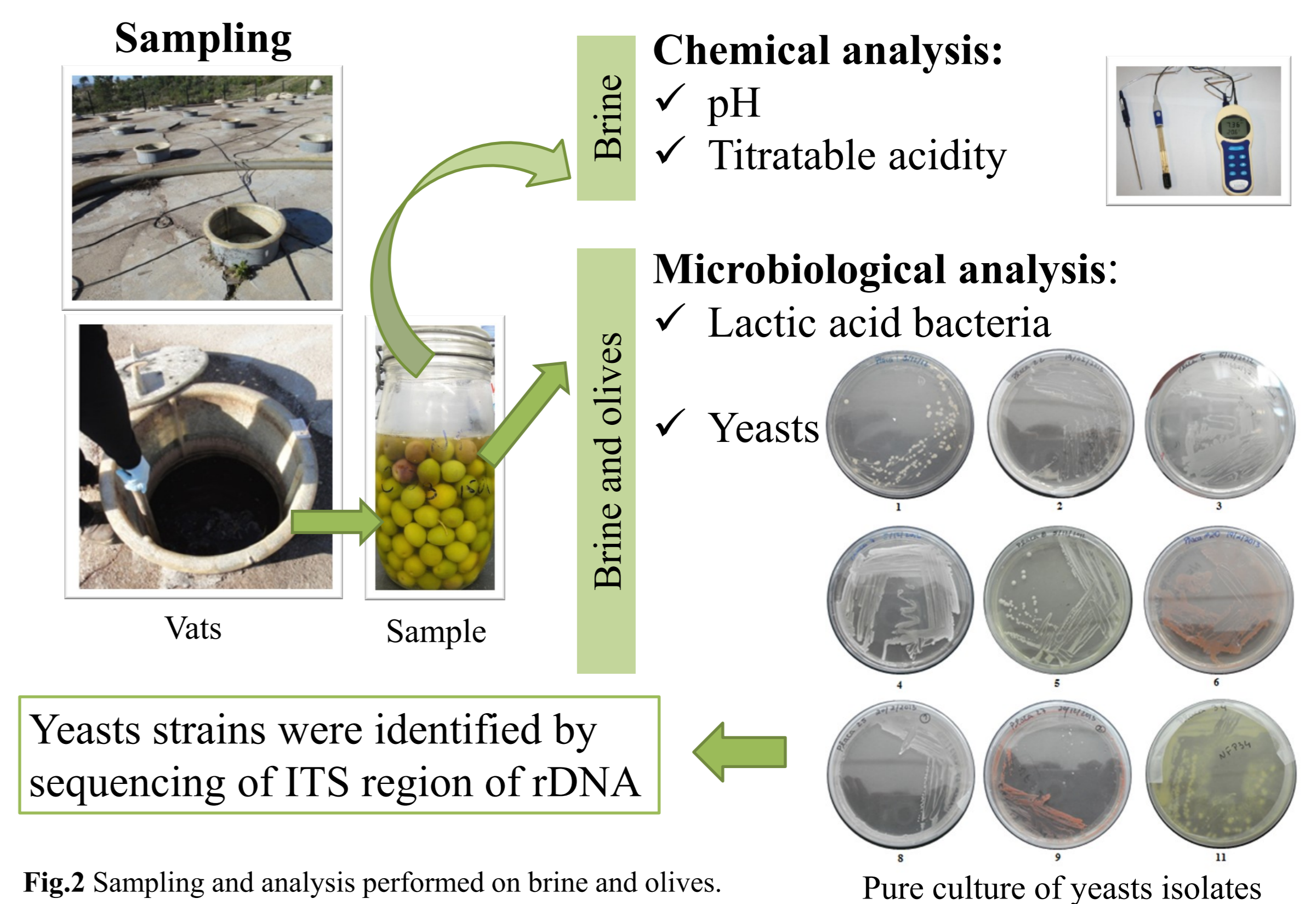


Fig.2 Sampling and analysis performed on brine and olives.

RESULTS AND DISCUSSION

Microbiological analysis

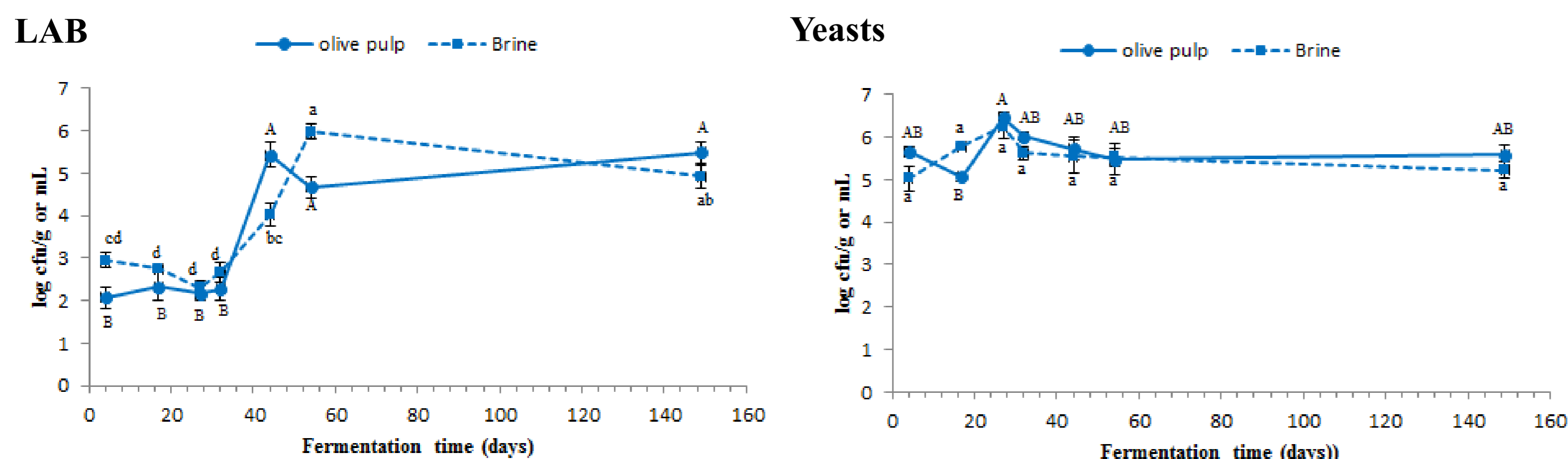


Fig. 3 Population dynamics of lactic acid bacteria (LAB) and yeasts in olive pulp and brine during fermentation of “Negrinha de Freixo” (mean \pm SE, n = 3). Bars with different lowercase (brine) and uppercase (olive flesh) letters indicate means values with significant differences ($p < 0.05$).

Chemical analysis

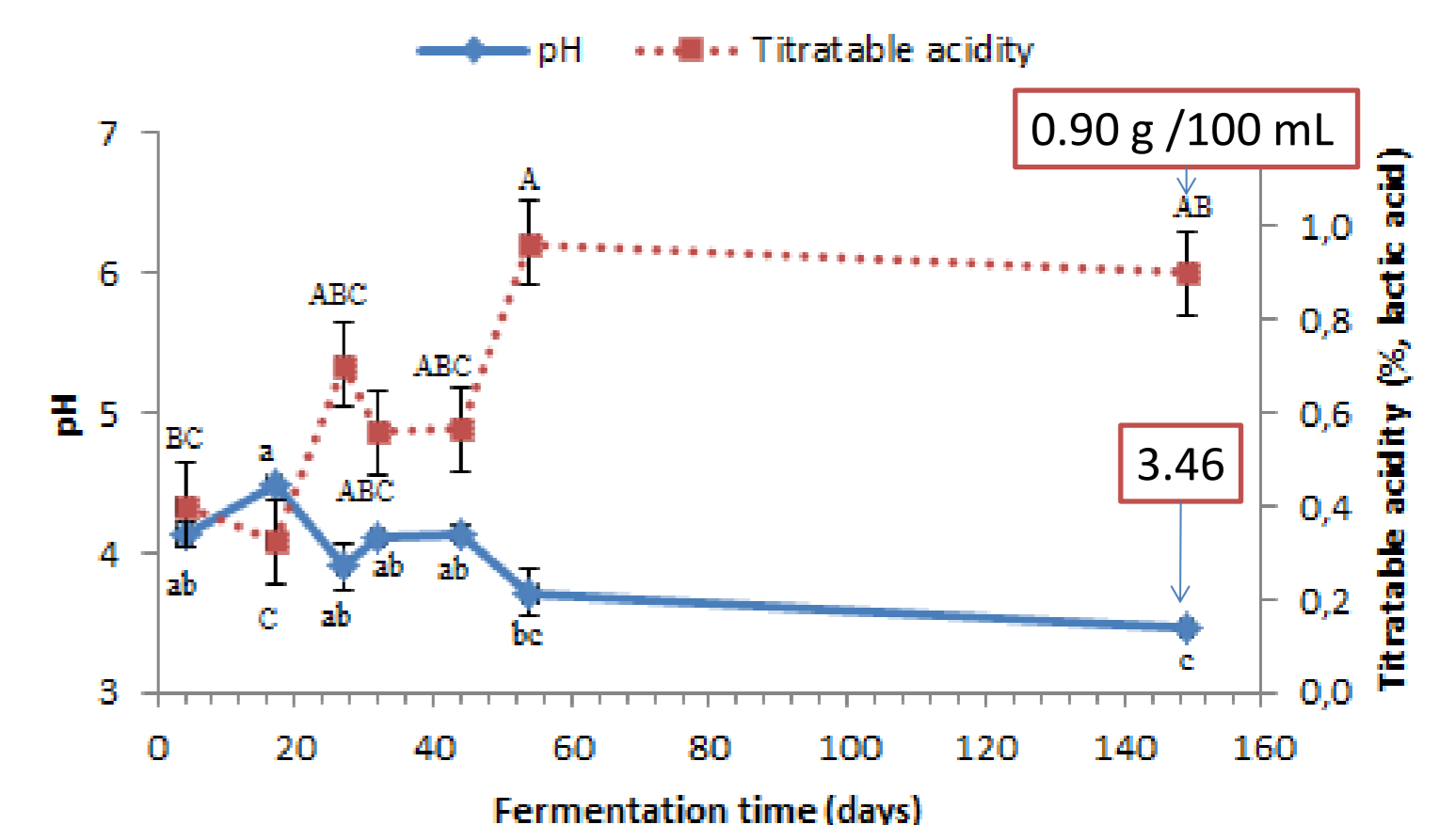


Fig. 5 Changes in pH and titratable acidity in brine over the fermentation (mean \pm SE, n=3). Bars with different lowercase (pH) and uppercase (titratable acidity) letters indicate means values with significant differences ($p < 0.05$).

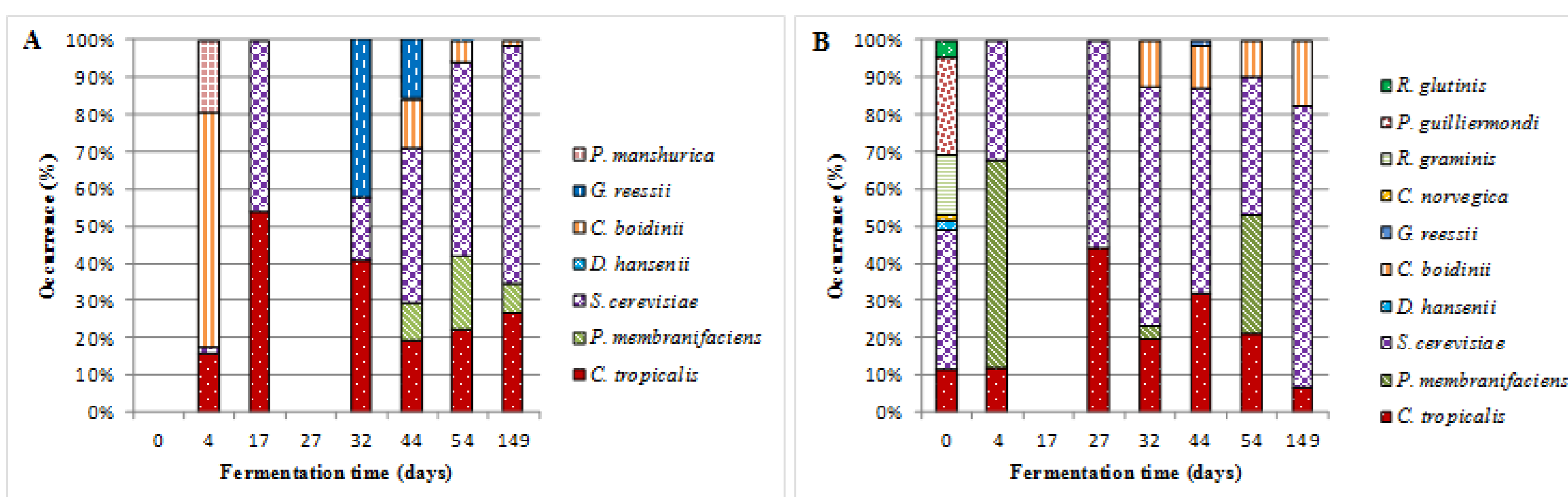


Fig. 4 Relative abundance of the yeast species identified in brine (A) and olive pulp (B) during the fermentation. Yeasts identification was not performed on day 27 (for brine) and 17 (for olives).

CONCLUSIONS

- Natural fermentation process of *Negrinha de Freixo* table olives is divided into two phases:
- **In the first phase** (during the first 32-54 days of fermentation) the action of the yeasts contributed to an increase of titratable acidity and a decreased of pH values;
 - **In the second phase**, LAB and yeasts contributed to the maintenance of pH and acidity.

Throughout the fermentation there was a greater yeasts diversity in brine than in olives. The yeasts *S. cerevisiae*, *C. tropicalis*, *P. membranifaciens* and *C. boidinii* were the most abundant species in brine and olives.