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Enhancing Spanish Olives with the Microbial Alliance *Lachancea thermotolerans* and *Lactiplantibacillus plantarum*

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INTRODUCTION & AIM

Traditionally, the fermentation of Spanish-style table olives has been primarily driven by lactic acid bacteria (LAB), which contribute to the development of acidity, preservation, and characteristic sensory profiles. In recent years, there has been increasing interest in the use of other microorganisms, particularly yeasts, to enhance fermentation outcomes. *Lachancea thermotolerans*, a yeast species frequently isolated from wine fermentations, exhibits metabolic and functional properties that may be beneficial for table olive fermentation. The objective of this study was to evaluate the impact of co-inoculating *L. thermotolerans* and *Lactiplantibacillus plantarum* on the fermentation dynamics and quality parameters of Spanish-style table olives.

METHOD

Fermentations were conducted using Verdial green olives, inoculated at the start of fermentation with pure cultures of *L. thermotolerans* and *L. plantarum*. In addition to the co-inoculated treatment, single inoculations of each microorganism were also performed. A spontaneous fermentation (uninoculated Control) was included for comparison. All fermentations (Figure 1) were carried out at 20 °C for 120 days. Sweetened with 2% NaOH for five hours at 18ºC.

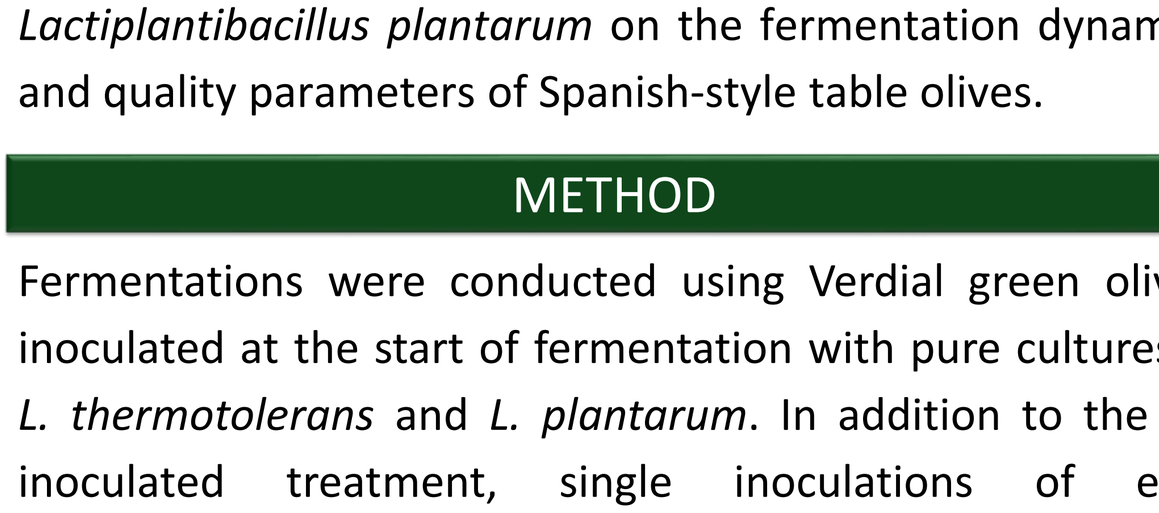

Figure 1. Different fermenters where the olive fermentation took place.

RESULTS & DISCUSSION

The presence of *L. thermotolerans* appeared to stimulate the growth of lactic acid bacteria during the initial 20 days of fermentation (Figure 2).

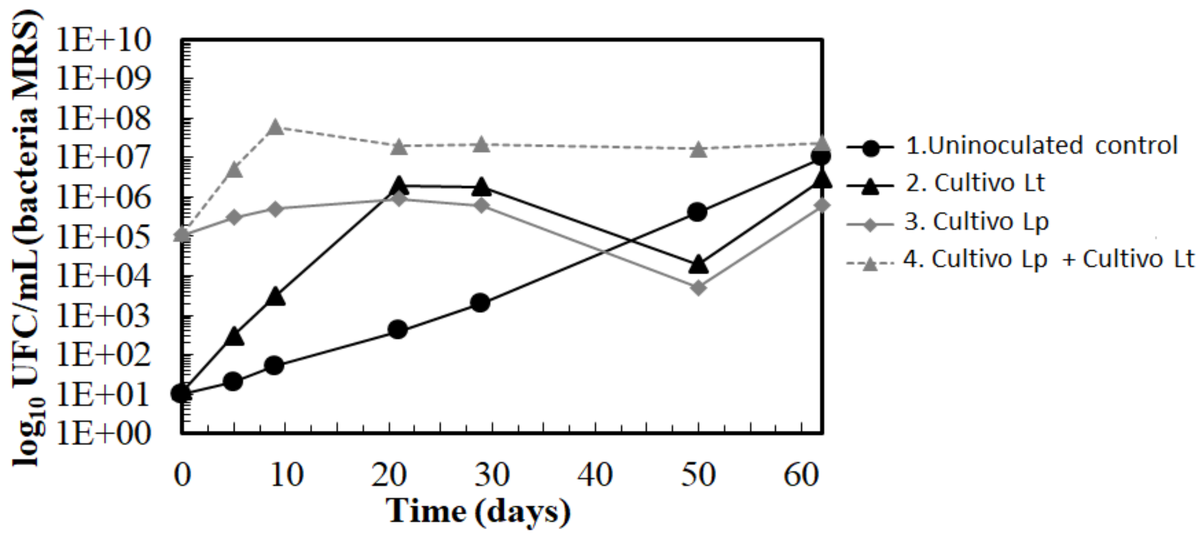

Figure 2. Growth of lactic acid bacteria during olive fermentation.

Co-inoculation of *L. thermotolerans* and *L. plantarum* resulted in the greatest organic acid concentrations, leading to a more pronounced pH decrease than the control. Furthermore, the combined inoculation improved several key quality attributes of the final product (Table 1). Particularly enhancing olive texture and color, as compared to the olives from the uninoculated fermentation. In addition, the co-inoculation also produced the olives with the best tasting scores.

Fermenter	pH	Attributes	Tasting score
1. Uninoculated Control	5.31	bitter (zapatería)	6
2. Culture *Lt*	4.91	winy	7
3. Culture *Lp*	5.03	butiric	8.2
4. Culture *Lt*+Culture *Lp*	4.43	acidic	9

Table 1. Parameters measured at the end of fermentation

CONCLUSION

Mixed starter cultures of *L. thermotolerans* and *L. plantarum* positively influence the fermentation dynamics and final quality of Spanish-style table olives. This represents a viable strategy for producing table olives with distinctive sensory and technological characteristics.