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Development of an autochthonous starter for PDO **NP PURPAN** ÉCOLE D'INGÉNIEURS "Rocamadour" cheese. Sciences du vivant | Agriculture Agroalimentaire | Marketing | Management

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INTRODUCTION

Raw milk autochthonous microbiota play an important role in the diversity of cheeses [1]. This flora reflects a "terroir", an essential component in Protected Designation of Origin (PDO) cheeses. However, over the past twenty years, a decrease in lactic acid bacteria in raw milk has resulted in the use of industrial starters [2]. Thus, these ferments, all genetically close, contribute to cheeses standardization. Many raw milk cheeses and PDOs are affected.

The aim of this work was to select Lactococcus lactis strains isolated from raw goat milk of PDO area in order to create an autochthonous starter culture. "Rocamadour" is a PDO raw goat milk cheese. For their production, industrials starters are added. Using autochthonous strains as starter could be a solution to improve cheese identities.

MATERIAL AND METHODS

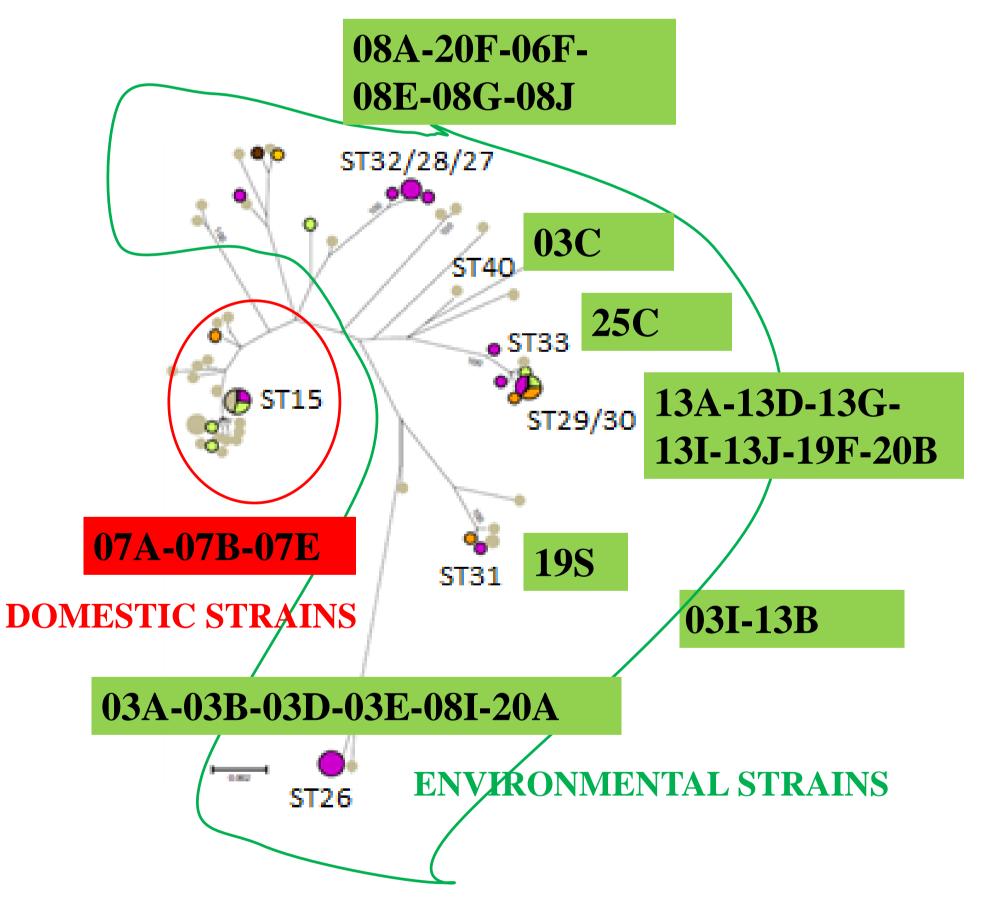
27 strains of Lactococcus lactis isolated from goat milk of PDO Rocamadour area were isolated and characterized :

- Sequencing of six loci of MLST (bcaT-glyA-pgk-pdp-pepXp-recN) [3] was realized (pict.1),
- Measurement of acidifying activity was studied by iCINAC system [4] and a research of LacE gene [3] (metabolism of sugar) were made (pict.2),
- Study of strains growth in the milk by the research of *prtP* gene, whose presence suggests a potential ability to produce amino acids for strains growth (pict.2),
- Analysis of aromatic properties by Vosges Proskauer test [5]
- Research of genes *citP* and *citDEF* [3] involved in the production of aroma compounds (pict.2),
- Study of the capacity to inhibit Listeria monocytogenes (Pasteur's strains n°103575 and n°105699) by method of Spot test agar [6] (pict.2),
- Induction of phages by expositon at the mytomycin [7] and removal of the positive strains (pict.2).

One mix composed of three strains (EIP07A-EIP13D-EI20B) was selected based on these genetic, phenotypic capabilities and on strains's compatibility.

This autochthonous starter was tested in cheese manufacture (pict.3) and a sensory test was realized with an experimented panel (pict.4).

RESULTS

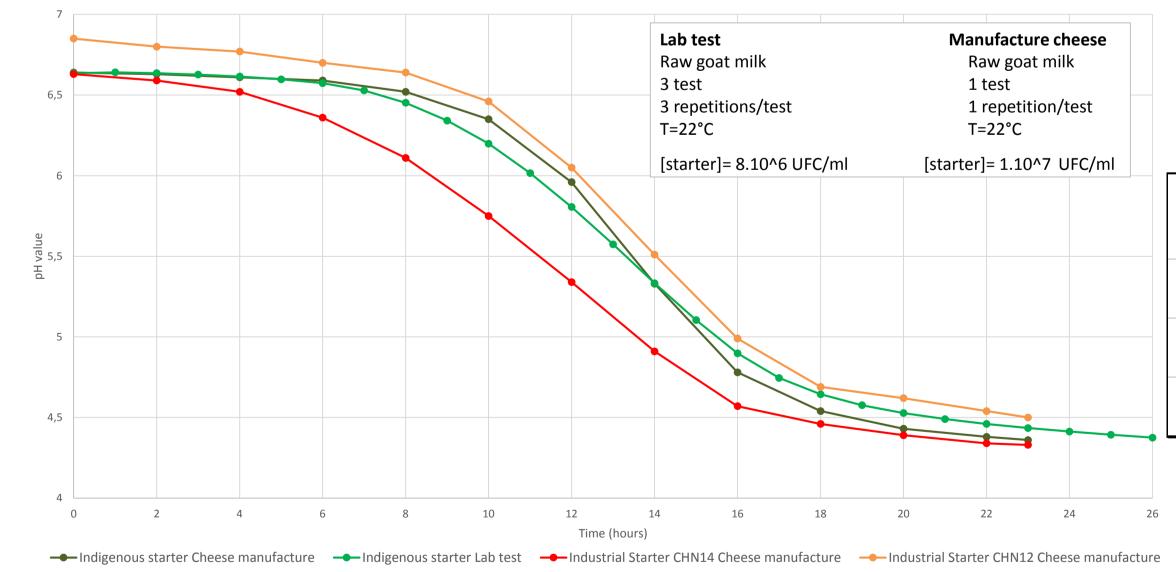


Picture 1: Phylogenetic tree from concatenated sequences of the six loci of MLST **[3]**

□ High genetic diversity was observed since the 27 strains represented 10 sequences type

Strains	Genetic diversity [3]	Acidifying properties [3]	Growth of strains [3]	Aromatic properties [3] [5]			<i>Listeria</i> Inhibition [6]	Phage Induction [7]	Acidifying properties [4]						
	Sequence Type	gene <i>lacE</i>	gene prtP	gene <i>citP</i>	gene <i>citDEF</i>	Voges Proskauer Test	Test Spot Agar	Mitomycin test	Time at max speed (h)	EndpH	Time to obtain pH 4,6 (h)	Lentency (h)	pH at max speed (h)	Max speed	
EIP07A	15	+	-	-	-	++	-	-	19,91	4,49	25,73	7,40	5,20	-0,00285	
EIP13D	29	+	+	-	-	-	-	-	18,63	4,49	25,77	6,46	5,47	-0,00330	
EIP20B	29	+	+	-	-	-	-	-	19,47	4,44	24,60	7,53	5,25	-0,00355	
									19,33	4,47	25,37	7,13	5,31	-0,00323	moyenne
									0,65	0,03	0,66	0,59	0,14	0,00035	écart type

Picture 2 : Table of the phenotypic and genetic properties of selected strains



Picture 3 : Comparison of acidification profiles between indigenous and industrial starters

Products	Rippening	Aspect (3)	Smell (2)	Texture (5)	Flavor (10)	Score (20)
Autochtonous starter		2	2	3	7	14
Industrial starter CHN12	D +8	2	1,5	3	5,5	12
Industrial starter CHN14		1,5	1,5	2	5	10

Picture 4 : Sensorial test with experimented panels

□ It could contribute to the authenticity of raw milk cheese.

□ Autochthonous starter composed of *Lactococcus lactis* can have the same technologic properties than complex industrial starter.

CONCLUSION AND PERSPECTIVES

These resullts are interesting and suggest that indigenious starters could be an alternative to industrial starters. In order to confirm this trend, it's necessary to repeat cheese manufacture. A backslopping on 10 days will be conducted to control starter resistance. Finally, other tests could be realized with new combinaisons of indigenous strains.

REFERENCES

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