COMPARATIVE ANALYSIS OF FATTY ACID PROFILES IN *Listeria monocytogenes* ISOLATES FROM FOOD PROCESSING ENVIRONMENTS GROWN AT 37 ºC AND 10 ºC: EXPLORING POTENTIAL PERSISTENCE MARKERS

Rui Magalhães, Manuela Machado, Paula Teixeira

Universidade Católica Portuguesa, CBQF - Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia, Rua Diogo Botelho 1327, 4169-005 Porto, Portugal

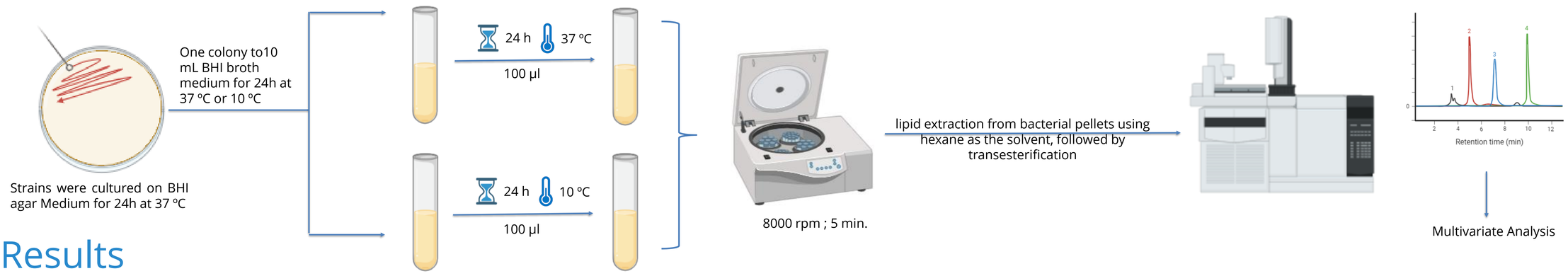
Introduction

Listeria monocytogenes, the causative agent of listeriosis, is a major foodborne pathogen. It is a ubiquitous, facultative anaerobic, gram-positive bacterium. Listeriosis can be a severe illness particularly affecting vulnerable groups: the elderly, immunocompromised individuals, pregnant women and neonates. *Listeria monocytogenes* exhibits remarkable adaptability to diverse and challenging environments, demonstrating an exceptional capacity to thrive in conditions such as refrigeration temperatures or high salt concentrations or other factors found in food processing environments (FPE). This resilience is a key factor in its ability to persist within food processing facilities and proliferate in various food products. Only certain strains are routinely isolated from these FPEs (persistent strains) while others are isolated sporadically (non-persistent strains).

Objectives

The aim of this study was to identify specific membrane fatty acids that could function as persistence markers within a collection of L. monocytogenes isolates from the GenoPhenoTraits4Persistence project culture collection. These markers may help distinguish between persistent (P) and non-persistent (NP) strains in the future.

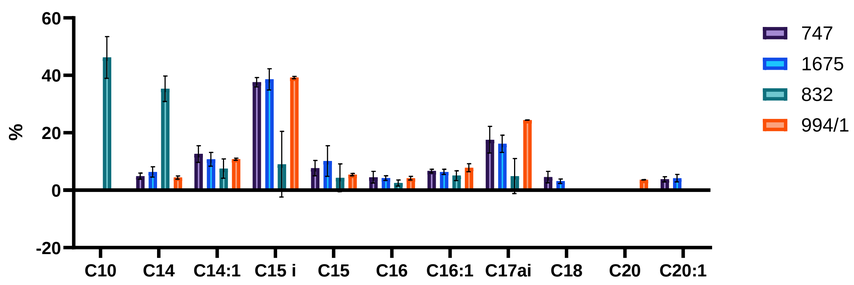
Methods



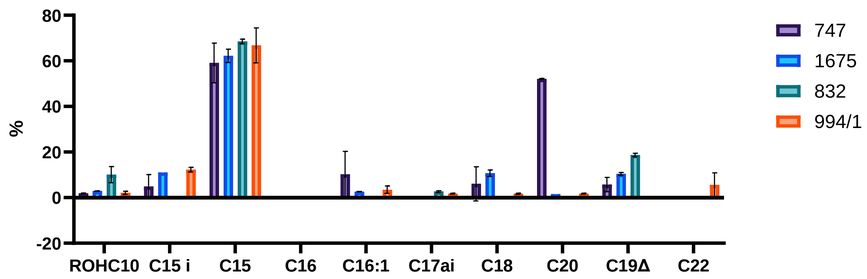
Results

Fatty acids profile

37 ºC

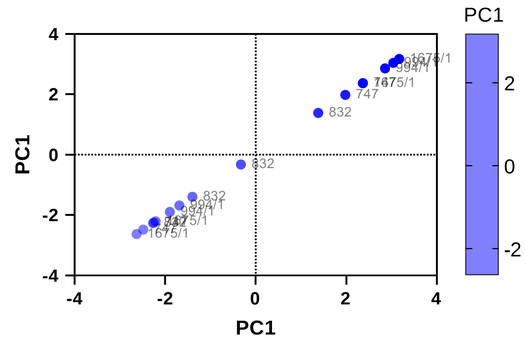


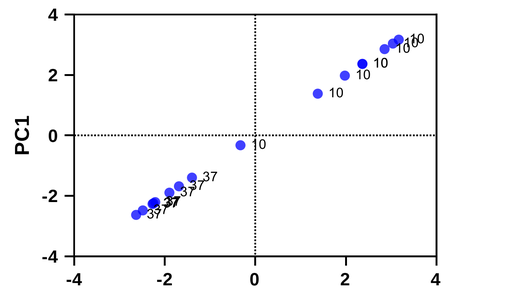
10 ºC



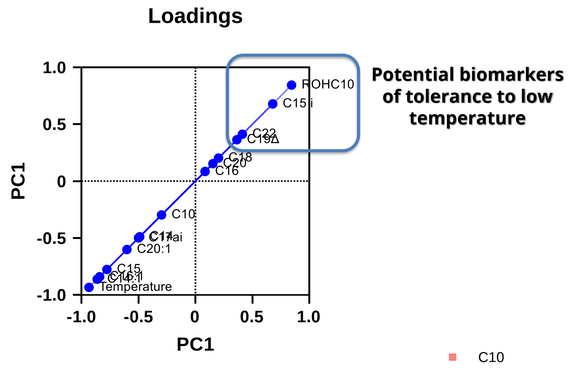
Multivariate Analysis

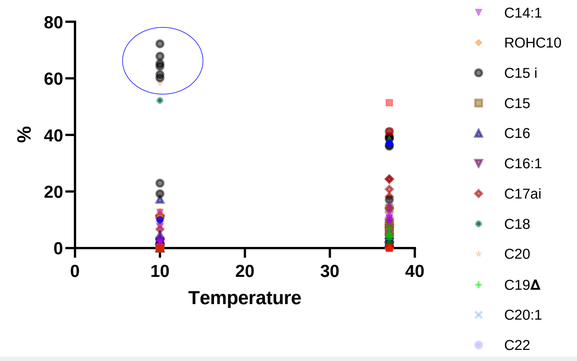
PCA





Fatty acids *vs* Temperature





Conclusions

The results revealed the presence of key branched-chain fatty acids (iso-C15 and iso-C17), which are associated with the ability of *L. monocytogenes* to resist environmental stresses, particularly temperature fluctuations. Additionally, ΔC19 was detected in strains grown at low temperatures. This fatty acid is responsible for the adaption of membrane fluidity in response to environmental stress. These findings provide valuable insights into the lipid composition of *L. monocytogenes* and highlight potential markers of tolerance to adverse conditions (low temperature). These markers will be further investigated to understand whether they play a role in persistence, providing a deeper understanding of the mechanisms underlying the bacterium's ability to adapt and survive in food processing environments.

Acknowledgements

This work was supported by National Funds from FCT - Fundação para a Ciência e a Tecnologia through project GenoPhenoTraits4Persitence - Genomic and phenotypic traits contributing to persistence of *Listeria monocytogenes* in food processing environment (PTDC/BAA-AGR/4194/2021), DOI 10.54499/PTDC/BAA-AGR/4194/202. We would also like to thank the scientific collaboration under the FCT project UIDB/50016/2020.