

CHARACTERIZATION AND OPTIMIZATION OF BIOCONSERVATIVE PRODUCTION THROUGH THE USE OF FERMENTERS ET5BIOPRESERV

Francisco Jose Cervantes, Silvia Balbastre, Patricia Sánchez, Ana Martínez-Abarca, Isabel Manzano, Rebeca Vidal, Jose Fernandez (jfernandez@ctnc.es). National Technology Centre for the Food and Canning Industry CTNC, Molina de Segura, Murcia, Spain.

INTRODUCTION

BIOPRESERV project was conceived in response to a sectoral problem posed by the use of artificial preservatives for the production of processed foods with a shelf life expectancy that is sufficiently high to enable them to reach foreign markets with sufficient guarantees of quality and food safety.

The aim of this project is to find biopreservatives capable of providing food safety to foods, in order to help the functional food sector by providing solutions to its conservation problems.

The aim of the project is to search for bacteriocins for their application in the food industry.

Matrices	Colonias analizadas	Colonias productoras
Carne de pollo	27	0
Grasa de ternera	13	0
Músculo de ternera	15	2
Suelo	12	0
Tomate fermentado	7	0
Alcachofa fermentada	5	0
Zanahoria fermentada	13	0
Estómago de cabrito	38	12
Estómago de cordero lechal	27	2
Leche cruda de cabra	47	0

ACTIVITIES

Bibliographic search for bioactive compounds with antimicrobial capacity from natural sources . A bibliographic study was carried out to gather information on the different bacteria present in different natural sources, which could be susceptible to being used as probiotics or prebiotics, due to their antimicrobial capacity. The search concluded with the selection of lactic acid bacteria and streptococci as the main producers.

Use of meat, dairy and vegetable matrices for the isolation of LAB . Once the natural sources of animal origin (milk and meat or animal entrails) and vegetable origin (frozen pepper, natural broccoli, figs, artichokes and different fermented vegetables) have been selected, we try to isolate lactic bacteria from them by performing cultures in specific media.

Measurement of antimicrobial capacity. In the first phase of the study of antimicrobial capacity, antibiograms were carried out, i.e. a first screening in a Petri dish, by means of the appearance of inhibition halos of the antimicrobial capacity of the extracts obtained by filtration of the cultures. The target microorganisms chosen for these tests were *Listeria monocytogenes* and *Clostridium perfringens*.

Stability studies of antimicrobial activity against temperature and pH factors. The extracts were subjected to changes in temperature and pH to check whether or not they maintain their properties and whether these are long-lasting. It was concluded that at temperatures above 70°C for periods of more than 20 minutes, the extracts lose their effectiveness.

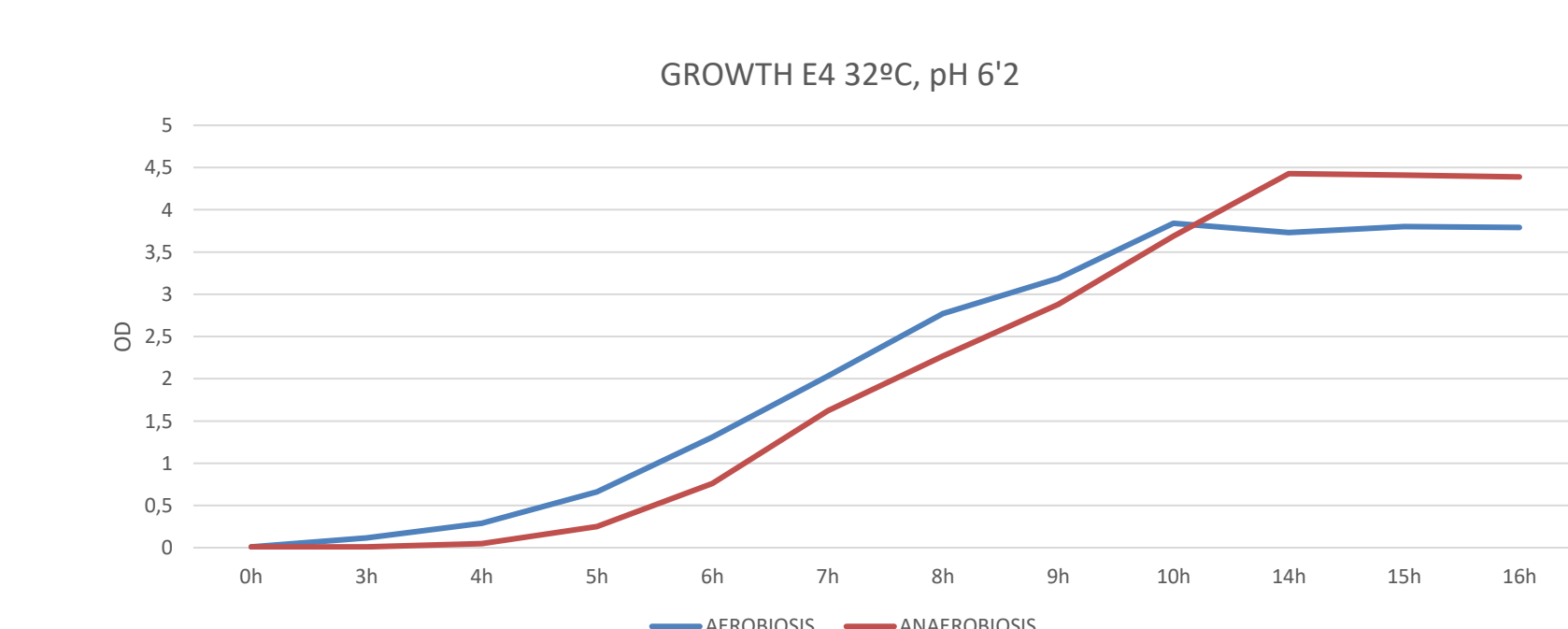
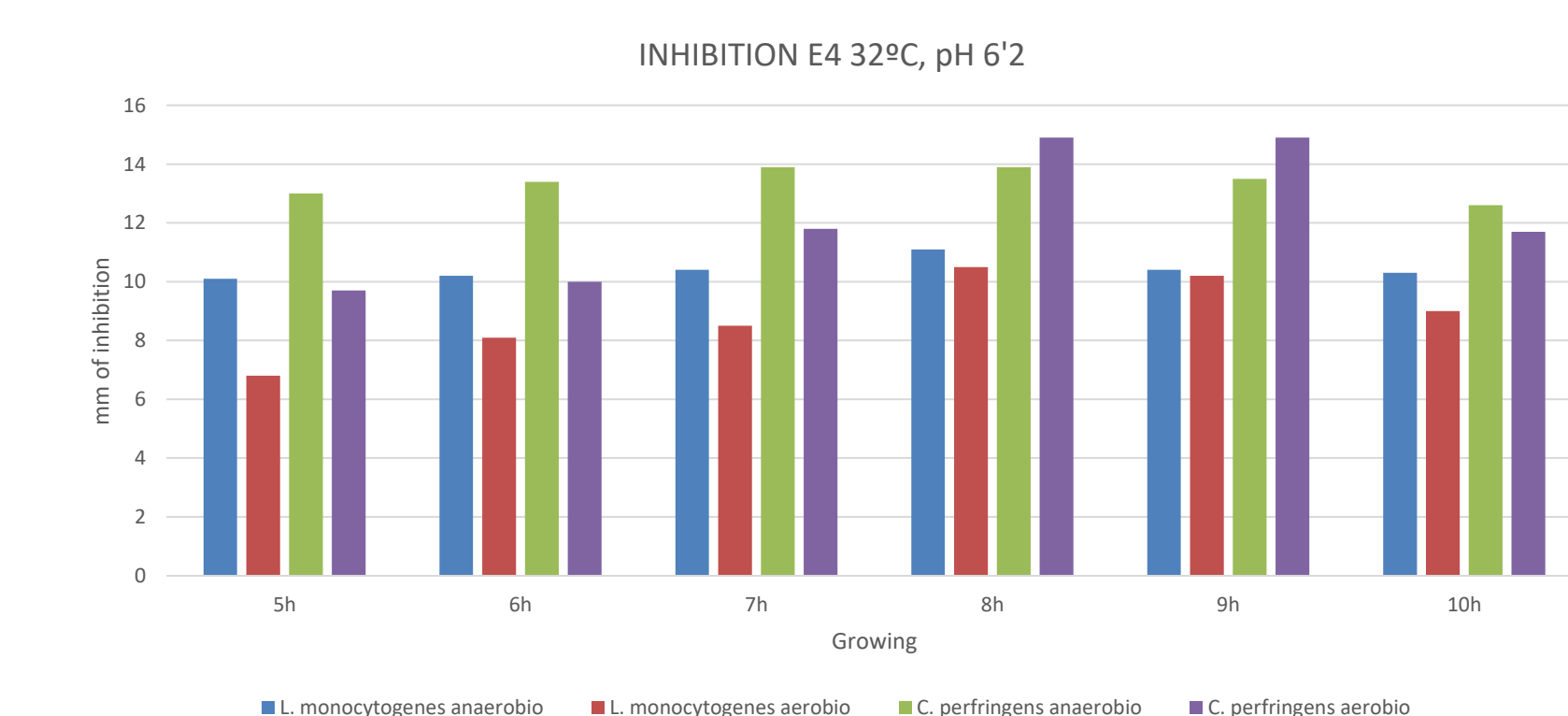
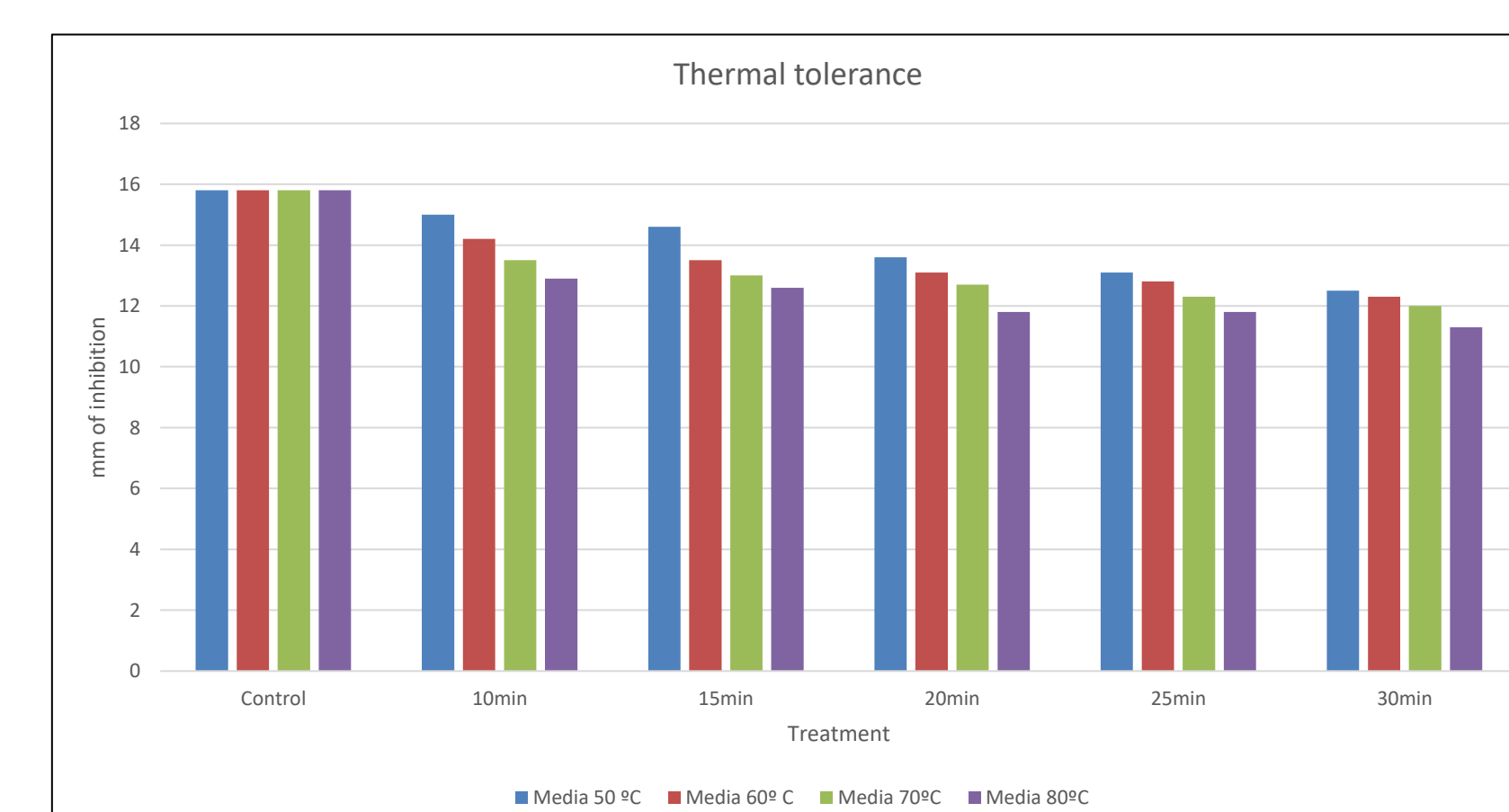
Optimization of bacteriocin production by microbial growth in a fermenter . Production of bacteriocins by modifying the physical-chemical variables (pH, T^a, nutrients, etc.) of the cultures.

Isolation and purification of bioactive compounds using different techniques. Use of different purification and concentration techniques.

CONCLUSIONS

The Conclusions obtained from the study are:

- Isolation of lactic acid bacteria producing bacteriocins is possible in both plant and animal matrixes.
- Enterococcus* genus has predominated in the isolation of bacteria producing antimicrobial peptides.
- Optimum temperature for bacteriocin production was 32°C.
- Although more biomass is obtained under anaerobic conditions, it is under aerobic conditions where the bacteriocin achieves greater inhibition zones.
- Optimal cultivation time was established at 8-9 hours, coinciding with the entry into the stationary phase of the culture.
- The following relationship can be established: bacteriocin concentration reaches its maximum at the end of the growth phase and begins to decrease as the culture progresses into the stationary phase.
- The isolation of bacteriocins was carried out by ammonium sulphate purification, with loss of activity occurring in some cases.



ACKNOWLEDGEMENTS

Region of Murcia Development Agency INFO, Modality 1, nº 2023.08.CT01.000002



“Una manera de hacer Europa”
Fondo Europeo de Desarrollo Regional

