

TOWARDS THE DEVELOPMENT OF A PLANT-BASED CHEESE ANALOGUE: APPLICATION OF COMMERCIAL STARTER CULTURES

VILA REAL C. (1), TOPALOVIC K. (1,2), KHURANA S. (1,2), FIGUEIREDO B. (3), GOMES A. (1)

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

2 KU Leuven Ghent Campus, Faculty of Engineering Technology, Gebroeders De Smetstraat 19000 Gent, Belgium, Gent, Belgium

3 White and Green Natural, S.A., Zona Industrial de Vagos, Lote 104, 3840-385 Vagos, Portugal., Vagos, Portugal

The search for, and the development of plant-based cheese-like products have been increasing worldwide, driven by sustainability, health, ethical reasons, convenience and social trends. Highly targeted fermentation approaches have been used given their positive impact on sensory, nutritional, and technological properties.

The present work aims to evaluate the best growth conditions of commercial starter-co-cultures, on the fermentation of plant-based food matrices, towards the development of a cheese analogue.

Upon previous selection of the best conditions for oxygen tolerance (aerobiosis) and % of inoculum (0.5%), Vega™ Vibe (VV) (Chr.Hansen) was inoculated in MRS Broth and studied at 37°C, 40°C and 44°C, and microbial growth and pH were monitored over 24 h. Afterwards, VV was inoculated in a plant-based cheese formulation under the previous conditions and the same parameters were measured. Lastly, VV was studied in combination with 3 adjuvants starter cultures (*Lactiplantibacillus plantarum* - LP, *Lactobacillus helveticus* - LH or *Pediococcus* - P) in 3 co-cultures (VVLP, VVLH, VVP) inoculated at 0.5% and 0.25% (1:1, v:v), and incubated at 44°C, aiming the selection of the most effective combination in terms of acidification, to be further used.

In MRS-broth, the less favourable temperature was 44°C, while no differences in growth were observed between 37°C and 40°C. For the inoculation in the plant-based formulation, the highest temperature did not seem to be so impactful, and it was observed an increase of almost 1 log cycle over 24 h. In what concerns the 3 co-cultures, the combination that resulted in a faster acidification was VVLP, having reached pH ~5.5 in less than 90min, when inoculated at 0.5%, followed by VVLH and VVP. When inoculated at 0.25%, the co-cultures took more time to reach the same pH (130min, 180min, and 210min, for VVLP, VVLH and VVP, respectively).

The plant-based formulation seems to promote the growth of the starter-culture VV singly cultured or in co-culture with adjuvants starters, when inoculated at 0.5%, in aerobiosis, and incubated at 37-44°C. The most effective co-culture in reaching the pH of 5.5 in the least time was VVLP, showing promising results for its application for the development of cheese analogues