# Micro Biotec'13

## PORTUGUESE CONGRESS OF MICROBIOLOGY AND BIOTECHNOLOGY

6th – 8th December | Aveiro Portugal

# Abstracts Book

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Food Microbiology & Biotechnology

P067

# THE ANTIMICROBIAL EFFECT OF PULSED ELECTRIC FIELDS (PEF) AGAINST *BRETTANOMYCES/DEKKERA* YEASTS

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PEF is known to provoke a dramatic increase in cell membrane permeability caused by externally applied short and intense electric pulses (1). One possible application of PEF is on the microbiological control of food by the inactivation of pathogenic and spoilage organisms in food matrixes including liquids (2). Puertolas et al (3) applied this technology on several wine spoilage microorganisms. *Brettanomyces / Dekkera* are well known to be involved in the production of volatile phenols in wines imparting aroma defects that may affect wine quality (4). The monitoring and control of these organisms is of major importance for wine producers.This work aimed to evaluate the effect of PEF on the survival of *Brettanomyces / Dekkera* in a continuous system, taking into account the energy efficient needed for industrial scale.Cell suspensions prepared by diluting YM culture medium with sterile water (1:10) were submitted to the following PEF parameters: electric field 10 kV/cm, pulse width 50 µs, pulse frequency 50 Hz, pulse current 13 A, using a EPULSUS-PM1-10$^{@}$ modulator. A cell inactivation effect was observed leading to a reduction of 3 logarithmic cycles of the initial population in 2 min for both strains tested (*Dekkera bruxellensis* PYCC 4801 and *Dekkera/Brettanomyces* 2). When only distilled water was used as cell suspension medium exposed to 100 µs, 100 Hz and 3 A of pulse width, frequency and current respectively, for 5 min, cell survival was almost unaffected. The electroporation medium composition and the way it influences properties such as medium conductivity seems to play an important role on the efficiency of the method. This is a preliminary study approaching for the first time the application of a continuous PEF system to wine spoilage organisms. Future work will focus on the influence of PEF parameters, medium composition and strain variability on PEF efficiency, along with the minimum energy needed for the microbial inactivation.

(1) Kanduser, M. and Miklavcic, D.2008. *Electrotechnologies for Extraction from Food Plants and Biomaterial.* E. Vorobiev, N. Lebovka (eds.), Springer Science+Business Media, LLC
(2) Barbosa-Cánovas, G.V., Fernández-Molina, J.J., Swanson, B.G., 2001. Pulsed electric fields: A novel technology for food preservation. Agro Food Industry Hi-Tech 12: 9-14.
(3) Puértolas, E., López, N., Condón, S., Raso, J. and Álvarez, I. 2009. Pulsed electric fields inactivation of wine spoilage yeast and bacteria. Int J Food Microbiol. 130: 49-55.
(4) Chatonnet, P., Dubourdieu, D. and Boidron, J.N., 1995. The influence of *Brettanomyces/Dekkera* sp. and lactic acid bacteria on the ethylphenol content of red wines. Am J Enol Viticult 46 (4): 463-467