

The Research Group of
Industrial Microbiology and Food Biotechnology (IMDO)

has the honour to invite you to the public PhD defence of

MSc. Despoina Angeliki STAVROPOULOU

to obtain the degree of Doctor of Bioengineering Sciences

Coagulase-negative staphylococci in fermented meat products: community dynamics and amino acid conversion

Promotor:

Prof. Dr. ir. Frédéric Leroy

The defence will take place on

Monday, October 22, 2018, at 17 h

in Auditorium D2.01 of the Campus Humanities, Sciences and Engineering of the Vrije Universiteit Brussel, Pleinlaan 2, 1050 Elsene, and will be followed by a reception.

Members of the jury

Prof. Dr. ir. W. VERSÉES (VUB, chairman)

Prof. Dr. ir. E. PEETERS (VUB, secretary)

Prof. Dr. ir. F. LEROY (VUB, promotor)

Prof. Dr. ir. W DE MALSCHE (VUB)

Prof. Dr. ir. S. DE SMET (UGent)

Dr. R. TALON (INRA, France)

Curriculum vitae

Despoina Angeliki Stavropoulou (28/06/1989, Athens, Greece) graduated from the 2nd General Lyceum of Keratsini (Athens, Greece) in 2007. She obtained her MSc. in Food Science and Nutrition (Food Microbiology) from the Agricultural University of Athens (AUA) in 2013. In January 2014, she started her PhD research at IMDO-VUB, under the supervision of Prof. Dr. ir. Frédéric Leroy and Prof. Dr. ir. Luc De Vuyst. Her research dealt with the community dynamics of coagulase-negative staphylococci during meat fermentation and their amino acid metabolism. She is co-author of nine scientific papers published in peer-reviewed international journals, featuring six first-author papers. She gave eight oral presentations at national and international scientific conferences and symposia.

Abstract of the PhD research

Fermented meats are the result of an age-old preservation method, with a long-standing culinary tradition and gastronomic value. Traditional fermented sausages, which are most often produced by spontaneous fermentation, are habitually perceived as superior products, mainly due to their unique sensory properties obtained during fermentation. Contemporary variants are usually produced on an industrial scale with the use of starter cultures to ensure safe and uniform products. Besides lactic acid bacteria and optional moulds, coagulase-negative staphylococci (CNS) form one of the main microbial groups involved in the process. Generally, they contribute to the development of colour and flavour.

Although certain CNS are already routinely applied as starter cultures in the production of fermented meats, as is particularly the case for selected strains of *Staphylococcus carnosus* and *Staphylococcus xylosus*, there seems to be margin for further development. The present study had the mission to explore to which degree the group of CNS holds potential for meat fermentation improvement, based on the use of both conventional and non-conventional starter cultures. In parallel, the purpose was to demonstrate whether such CNS cultures are able to persist during diverse types of production processes, especially with respect to the intensity of acidification.

It turned out that CNS form a heterogenic group both in terms of metabolic capacity and competitiveness. *In vitro* assessments showed inter- and even intraspecies variability regarding amino acid conversions, indicating that further consideration is needed, especially when developing new starter culture formulations. Candidate strains should also be able to overrule the background microbiota and maintain themselves during processing. The present study indicated that both the intensity of acidification and the fermentation temperature strongly affected the competitiveness of specific species whether added as starter cultures or not. Also, safety issues may emerge, as pathogenic bacteria could develop under specific combinations of pH and temperature.

Taken together, the success of a promising CNS starter culture is not always guaranteed and should be carefully assessed, especially in relation to the processing conditions.