WETENSCHAPPEN &
BIO-INGENIEURSWETENSCHAPPEN

The Research Group of

Industrial Microbiology and Food Biotechnology (IMDO)

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

MSc. Christina Charmpi

to obtain the degree of Doctor of Bioengineering Sciences

Title of the PhD thesis:

An interdisciplinary perspective on traditional meat products: from microbes to consumers

Promotor:

Prof. Dr. ir. Frédéric LEROY

The defence will take place on

Thursday, March 24, 2022, at 17 h

Depending on COVID-19 regulations, the capacity to physically attend the defence in Auditorium D.0.05 on the Campus Humanities, Sciences and Engineering of the Vrije Universiteit Brussel, Pleinlaan 2, 1050 Elsene, may be limited. Contact frederic.leroy@vub.be for more information.

Members of the jury

Prof. Dr. Dominique MAES (VUB, chairwoman)
Prof. Dr. Bruno POT (VUB, secretary)
Prof. Dr. Malaika BRENGMAN (VUB)
Dr. Ellen VAN DROOGENBROECK (VUB)
Prof. Dr. ir. Stefaan DE SMET (Ghent University)
Prof. Dr. Jørgen LEISNER (University of Copenhagen, Denmark)
Prof. Dr. ir. Frédéric LEROY (VUB, promotor)

Curriculum vitae

Christina Charmpi was born on July 29, 1989, in Athens, Greece. She graduated from secondary school at the 2nd General Lyceum of Nafplion, Greece, in 2007. Subsequently, she obtained a Master of Science (MSc.) in Agricultural Economics and Rural Development, from the Agricultural University of Athens (AUA), Greece, in 2013. She also obtained a MSc. in Food Science and Technology and Human Nutrition, with a specialization in Food Processing and Preservation, from AUA, in 2016. She started her PhD in November 2017 at the Research Group of Industrial Microbiology and Food Biotechnology of the Vrije Universiteit Brussel under the supervision of Prof. Dr. ir. Frédéric Leroy. Christina Charmpi is (co-)author of seven scientific papers published in peer-reviewed international journals, among which three times as a first author. She also gave two oral presentations at scientific events and presented three posters.

Abstract of the PhD research

Processed meats, such as fermented meat products, are the result of empirical findings that are rooted in history and improved the preservation of raw meat, which evolved in a large variety of products. These products are also to be seen as societal constructs within the conceptual framework of *traditional foods*. This PhD study focused specifically on the microbiological and consumer aspects of fermented meat products, and how they relate to the objective and subjective generation of quality, safety, naturalness, and traditionality.

First, the impact of meat types and processing parameters on bacterial diversity was investigated using $(GTG)_5$-PCR fingerprinting of genomic DNA of isolated colonies. For pork of variable qualities, lactic acid bacteria (LAB) emerged as the predominant group, followed by Gram-positive catalase-positive cocci (GCC). Within the LAB, a shift from *Latilactobacillus sakei* to *Latl. curvatus* was encountered as pH increased. The GCC counts increased at higher salt levels, but in-group species diversity remained unaffected, consisting mostly of *Staphylococcus equorum*, *S. saprophyticus*, and *S. xylosus*. Low salting and high pH values enhanced undesirable enterobacterial growth. Furthermore, the analyses showed that the use of different meat types can affect the microbial patterns.

As a case study, Faroese *skerpikjøt* (wind-dried sheep leg), an underexplored traditional meat product, was studied with a complementary combination of $(GTG)_5$-PCR fingerprinting of genomic DNA and high-throughput amplicon-based sequencing of bacterial whole-community DNA. The group of GCC was predominant (in particular *S. equorum*), whereas for the LAB, *Latl. curvatus* was found in abundance in only one sample. The spoilage microorganism *Clostridium putrefaciens* prevailed in some samples. Biogenic amines were found in non-alarming concentrations.

In the last part of this PhD project, the focus was on consumer research. Fermented meat labels available in the Belgian retail were investigated with respect to their traditional and naturalness features. For the quantification of these properties, a content analysis tool was developed. Overall, traditional elements were often encountered, in contrast to naturalness. A link between a higher degree of tradition and naturalness with higher prices was found. To explore this further, a survey was conducted to investigate how consumers perceive the subdimensions of tradition (time, geography, know-how, and storytelling). Storytelling had the strongest influence on perceived quality and purchase intentions. Whereas the know-how subdimension was valued when consumers were asked consciously, this did not appear to trigger stronger purchase intentions when answered unconsciously.

The combined findings underlined the value of traditional meat products, even if they also cautioned against some practices. It was shown how variation in meat type and process technology, which were driven by the interest of consumers in more traditional and natural set-ups, could affect the microbial dynamics and lead to unwanted bacterial consequences if not properly performed. The study showcased that the use of traditional elements on food labels could be effective to convince consumers but also needed to be approached with care. While storytelling features seemed particularly effective, some elements of traditionality may be misinterpreted (as was the case for a reference to artisan 'smoking').