KU LEUVEN

CONTACT

Dr. Kurt Gebruers
Coordinator LFoRCe
kurt.gebruers@biw.kuleuven.be

Prof. Jan Delcour
Chair LFoRCe
jan.delcour@biw.kuleuven.be

LFoRCe - KU Leuven
Science, Engineering and Technology Group
Kasteelpark Arenberg 20 box 2463
3001 Leuven, Belgium
Phone: +32 16 32 16 34
Fax: +32 16 32 19 97

www.lforce.kuleuven.be

Food science and innovation partner of:

KU LEUVEN

LEUVEN FOOD SCIENCE AND NUTRITION RESEARCH CENTRE

LFoRCe

Leuven Food Science and Nutrition Research Centre

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LFoRCe joins **topnotch expertise** in the **Feed-Food-Health** area from **30 KU Leuven research teams** of 12 Departments in Science, Engineering and Technology, Biomedical Sciences, and Humanities and Social Sciences. The R&D potential counts **44 permanent staff members**, **nearly 500 researchers**, and includes an **elaborate analytical know-how and instrument base**, and access to **state-of-the-art lab-scale to pilot-scale research facilities**. LFoRCe fosters (i) cutting-edge (interdisciplinary) research in an (inter)national environment with regard to (a) **advanced food technologies**, (b) **health-related properties of foods, ingredients and food constituents**, and (c) **social/consumer aspects** related with food and health, and (ii) the transfer of innovative concepts to relevant industrial stakeholders through public-private collaborative projects and licensing. Our fields of expertise include:

Cereals, processing, cereal products and functional ingredients

- Study of the relation between structure, function, processing and quality of cereal constituents, ingredients and additives on multiscale levels for a wide range of cereal-based food products and beer, and for different cereal species.
- Conversion of cereal constituents and ingredients during processing (unit operations) and the role of additives, and plant and microbial enzymes herein.
- Improvement of cereal processing and cereal product quality with regard to shelf life, organoleptic and health-related properties.
- Production of Ingredients (with specific technological or health-related functionality) from cereals and by-products from the cereal processing industry.

Fresh produce, processing and processed fruit and vegetable products

- Study of plant-environment interaction at multiscale levels.
- Sustainable fruit and vegetable production by optimal use of inputs and application of adapted cultural techniques, and biological and biotechnological methods.
- Exploitation of plant biodiversity towards improved (a)biotic stress resistance, yield and product quality.
- Development and optimization of post-harvest (novel) preservation technologies for fresh produce based on a multiscale research approach. Development and use of advanced predictive models therefore.
- Creation and preservation of food/beverage (micro-)structures and organoleptic properties, and optimization of micronutrient content and bio-accessibility through targeted intelligent processing and reversed engineering starting from consumer PAN-profiles (Preference, Acceptance and Needs) taking into account physiological processing during digestion.
- Application of different processing technologies, including thermal processing, high pressure processing, high pressure homogenization, pulsed electric field processing, low temperature processing, split-stream processing and enzyme technology.
- Targeted component analysis and fingerprinting to assess the impact of conventional and novel processing technologies. Development of (multiple) indicator systems therefore.
- Development and use of predictive models for solving problems of design, optimization and control of process unit operations and production chains.
- Classical analysis and advanced technology based (high-throughput) analysis of various quality and safety parameters along the food chain. Online and offline quality assessment and statistical control. Development of sensor and imaging technologies therefore.
- Sensory, fast flavor and molecular (off-)flavor analysis (also for cereal and meat products).

Animal production, meat processing and meat products

- Genetic improvement (breeding), immunology, physiology, metabolism, reproduction management and zootechnical performance of domestic animals. Animal disease resistance and vaccine development.
- Monitoring and optimization of egg and milk quality, egg hatching, and animal health, welfare and performance.
- Optimization of quality, conversion efficiency and health-related functionality of feed and ingredients.
- Study of the impact of animal production parameters, housing, transport and slaughter conditions on meat quality.
- Study of the functionality of raw materials, ingredients and additives in meat processing and impact of processing conditions on product quality and safety [microbial and (bio)chemical] parameters.
- Meat processing, development of novel meat products and production technologies.

Food microbiology: safety, quality, shelf life and microbial food ingredients

- Impact of (bio)chemical, physical and biological parameters on survival, growth, inhibition, competition and inactivation of pathogens and spoilage microorganisms along the food chain.
- Development of new or improved technologies for higher microbial food safety, shelf life and quality, including strategies against bacterial resistance to processing methods.
- Process microbial ecology, microbial population dynamics, risk assessment and (bioinspirational) management in food production environments.
- Improvement of industrial fermentation processes, with special emphasis on the development of improved yeasts with regard to *e.g.* fermentation properties, sugar metabolism, flavor profile, ethanol tolerance and flocculation.
- Cultivation, harvest and extraction of algae for the production of valuable food and feed ingredients.

Food and health

- Impact of food and ingredients on colonic bacterial metabolism and effects thereof in healthy subjects and patients (IBD, ulcerative colitis, IBS, kidney failure). Biomarker development (*e.g.* based on stable isotopes).
- Role of gastrointestinal peptides, gut receptors and food components in the regulation of gastrointestinal motility and food intake.
- Relationship between gene expression in fat tissue, metabolic parameters, obesity/metabolic syndrome, cardiovascular disease (*e.g.* atherosclerosis) and diabetes. Role of inflammation and oxidative stress herein.
- Exercise and nutrition for performance, prevention of diet-related conditions and treatment/management thereof in specific target groups.
- Assessment of bioavailability and intestinal absorption of compounds.