

## VACANCIES

The **Research Group of Industrial Microbiology and Food Biotechnology (IMDO)** of the **Department of Bioengineering Sciences (DBIT)** of the **Vrije Universiteit Brussel (VUB, Brussels, Belgium)** wants to hire

four PhD students to perform doctoral studies in food biotechnology

Each of these collaborators will contribute to an internally or externally financed research project. All projects involve microbiological work, making use of culture-dependent and culture-independent advanced techniques, (meta)genomic and/or (meta)transcriptomic work including bioinformatics, and/or (meta)metabolomic work, making uses of various chromatography separations and detection systems including mass spectrometry. The topics to choose from are the following:

### 1) Cocoa fermentation

Cocoa fermentation is the first step in the curing process of raw cocoa beans before the fermented and dried cocoa beans can be used for chocolate production. This PhD research project aims at performing starter culture-initiated cocoa fermentation processes, next to spontaneous ones, in cocoa-producing countries, making use of different cocoa varieties and microbial cultures, to enable controlled and steered fermentation processes regarding flavour and health-related compounds.

### 2) Sourdough production

Sourdough is a mixture of flour and water that is fermented by lactic acid bacteria (LAB) and yeasts, either spontaneously or after addition of a starter culture. To study these fermentation processes, both laboratory fermentations with flour as the sole non-sterile component and fermentations made under bakery conditions are carried out. This PhD research project aims at getting insights into the field-cereal-flour-sourdough-bread axis in general and the aroma and taste formation of liquid and firm, active wheat sourdoughs within a reasonable processing time in particular, through the investigation of the impact of the flour used and the interactions between LAB and/or yeasts by means of the co-cultures applied, to ultimately improve the bread flavour and taste and enhance presumptive health-promoting properties.

### 3) Meat fermentation

Fermented meats are produced based on the activity of particular species of lactic acid bacteria and coagulase-negative staphylococci, which offer a variety of functionalities. The use of selected strains may, for instance, provide alternatives to the use of (curing) salt(s), which are now added for reasons of colour and food safety but are increasingly under scrutiny because of a potential association with the risk of colorectal cancer. Also, certain bacteria may improve the health profile of fermented meats by generating compounds of nutritional interest. Yet, more information is needed whether bacteria with such features are sufficiently competitive during meat fermentation and whether they are able to express their activities *in situ*. The finality of this PhD project will be to meet a persistent market demand for process modifications, clean labels, and healthier end-products, through the use of functional starter cultures.

### 4) Lambic beer production

Lambic beers are traditionally produced in Belgium in the proximity of the Senne river valley through the spontaneous microbial inoculation of wort, which is prepared from barley malt, unmalted wheat, aged dry hops and water, that initiates a long-lasting fermentation and maturation process carried out in wooden barrels. This PhD research project aims to unravel the impact of the raw materials and barrel fermentation and maturation process on the microbiota and flavour development.

#### Profile:

The candidate has a university degree of MSc in Bioengineering Sciences (Chemistry and Bioprocess Technology or Cell and Gene Biotechnology) or equivalent, with in-depth knowledge of and great interest in (food) microbiology, biochemistry, bioinformatics, fermentation technology, and/or food science and technology. Important additional qualifications are: sense of initiative, team spirit, sense of responsibility, motivation and dynamism, a hard-working mindset, persistence, stress resistance, and good communication and reporting skills. Good knowledge of the English language (oral and written) is required.

#### We offer:

A young, creative, dynamic, pluralistic, diverse, and international working atmosphere. Possibilities for national and international cooperation with renowned laboratories and companies. Interesting work field with many perspectives for a future career. Salary as PhD student.

**All vacancies mentioned above can be filled in immediately. If you are interested, please take contact with and send your curriculum vitae to:**

**Prof. Dr. ir. Luc DE VUYST**

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