

## PhD offer

CIFRE Lesaffre - SayFood

# Modelling the impact of environmental factors on postbiotics stability in relation to their efficacy

## Modélisation de l'impact de facteurs environnementaux sur la stabilité de postbiotiques en lien avec leur efficacité

ABIES Doctorate School – Université Paris-Saclay SayFood – Paris-Saclay Food and Bioproduct Engineering Research Unit

Disciplinary fields: Material sciences, Physicochemistry, Food science

### Context and objectives

Lesaffre is a global leader in the field of yeasts and fermentation. The company designs, produces, and provides innovative solutions for baking, taste and food pleasure, health and wellbeing, and biotechnology. Phileo, a Lesaffre affiliate, is widely regarded as a major player in the animal nutrition and health field, using solutions based on the fermentation of yeast and bacteria.

On the feed market, the concept of postbiotics is relatively new but experiencing significant and rapid growth. Postbiotics are used in livestock to improve their health and performance. They act on the animals' intestinal environment by regulating the bacterial flora, strengthening digestive immunity, reducing inflammation, and improving food digestibility. They are considered a natural, effective, and cost-efficient alternative to antibiotics and chemicals used in animal feed, addressing consumers' growing concerns for animal health and the environment.

The concept of postbiotic stability is complex. Its definition depends on the composition of the product, as well as its storage and final use. It is therefore necessary to know the initial physicochemical properties of the product and their evolution during storage. Knowledge of the interaction between the product and the environmental conditions is a key factor in ensuring that product efficacy is properly preserved. Mathematical modelling of these complex interactions is becoming an essential tool for ensuring the quality of the final product and responding to demands for new packaging or different storage conditions. Thus, the **main objectives of this thesis** are to **define stability markers** in at least two postbiotics, to **characterise their evolution during storage** (using accelerated ageing tests) and to **model** this behaviour.

**Presentation of the hosting research unit and working environment.** The thesis will be hosted in the research unit SayFood (UMR 0782 AgroParisTech/INRAE/Université Paris-Saclay), France's largest laboratory on food and bioproducts sciences. SayFood is characterized by an interdisciplinary research approach aiming to produce fundamental and applied research results to foster sustainable food systems (https://umr-sayfood.versailles-grignon.hub.inrae.fr/). SayFood moved in 2022 to the new campus of the Université Paris-Saclay in the south of Paris. The modelling will be held in collaboration with CentraleSupéléc (Université Paris-Saclay member). This thesis includes laboratory stay in the industrial partner in Lille.

**Skills and experience:** Solid theoretical and practical knowledge of physicochemical properties of powders. An interest in modelling would be a plus. A good level of written English is essential.

### Please send CV and cover letter to:

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Deadline for application : 24 May 2024