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News

Fundamental Research

Renewable energies

On the 13th of October, the first edition of the IFPEN-ANRT thesis prize was awarded to Alexandre Mallet, a PhD graduate from the University of Montpellier, for his thesis “Near infrared spectroscopy applied to solid organic waste: how to avoid water effects”, conducted as part of a CIFRE (industrial agreement for training through research) scheme signed with the French SME BioEnTech. A retrospective of the experience with a focus on the company, the winner and his supervisors.

## About BioEnTech

BioEnTech, a spin-off of the laboratory of environmental biotechnology (LBE) in Narbonne, develops, markets and installs software and analytical solutions to secure and optimize anaerobic digestion units. Now almost 10 years since it was founded, it has 14 staff members, with experts in bioprocesses, instrumentation and data science\*.

### “Near infrared spectroscopy applied to solid organic waste: how to avoid water effects”, the benefits of a doctoral thesis for BioEnTech

After initial developments on a method to rapidly characterize organic matter through spectroscopy, the challenge for BioEnTech was to be able to deploy this measuring technique on site, without preparing the matter (freeze-drying and grinding), which had to be done up until now. Thanks to the doctoral thesis, important scientific and technical obstacles were resolved in order to overcome the

effects of water and thus envisage deploying a fast organic waste analyzer on site.

### **The Cifre scheme, a great opportunity**

For BioEnTech, the Cifre scheme provided the opportunity to tap into the expertise and resources of two renowned public partner laboratories, to train and take on a future key employee, to support and legitimize its in-house expertise, while solving a complex problem that would enable it to create value and boost its competitiveness.

Today, BioEnTech is focusing on its operational and commercial development with the aim of industrializing its products and services. However, several research topics are under discussion with the partner laboratories to renew the Cifre experience.

### **The prizewinner : Alexandre Mallet**

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### **The supervisors' perspective**

**Jean-Michel Roger, Director of Research in Near Infrared Spectrometry and Chemometrics at the joint research unit UMR ITAP INRAE - SupAgro and Jean-Philippe Steyer, INRAE Research Director at the Laboratory of Environmental Biotechnology (LBE) in Narbonne supervised Alexandre's work.**



Jean-Michel Roger



Jean-Philippe Steyer

### **What is a joint doctoral thesis between a company and a university?**

It is an adventure that is shared and jointly constructed between an academic partner and a private partner. The use of the term “partners” is not without merit, as it is essential that everyone contributes to the subject, with their respective talents and expertise, without ever seeking to focus on their own objectives. A Cifre doctoral thesis does not simply consist of “subsidizing” an engineer, nor does it imply doing fundamental research, but rather involves doing applied research and this research can be extremely productive!

### **How did the collaborative venture with BioEnTech come about?**

We have been in touch with this start-up since it was created and Alexandre's work is part of the

second Cifre thesis that we undertook together. So this is a long-term collaborative venture, based on mutual trust, which means that we can write a common and coherent story.

### **How does this doctoral thesis contribute to your laboratory's research activities?**

The work on the thesis brought us a lot closer to what is happening in the field and gave us the opportunity to tackle problems that we would not have considered if we had stayed in our laboratories. This step increase in TRL has helped us to improve our expertise.

### **What was it like working with Alexandre Mallet?**

Working with Alexandre has been amazing! He was highly motivated by the adventure from the start of his thesis and told us that he “had a lot of fun” solving a problem. Over the course of these three years, we have been impressed by his intellectual curiosity, his capacity to reason and his ability to find solutions to sometimes very complex questions... Always with a broad smile!

\* On the 18th of October, Suez announced that it was acquiring BioEnTech

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