

Modeling the growth of the soldier fly larva

Development of a mathematical model aimed to the automatic and optimal regulation of the working parameters of a bioreactor

Challenge

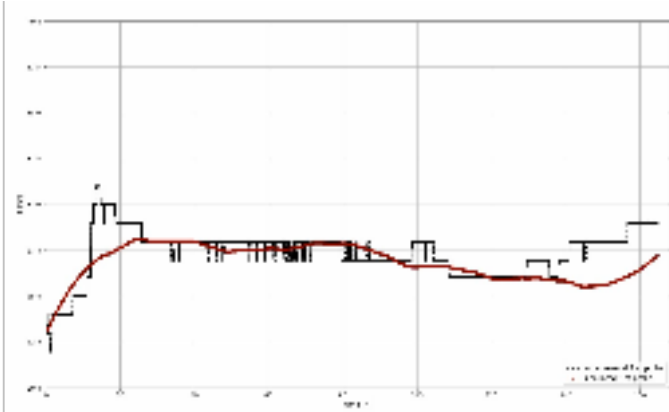
BEF Biosystems' experimental solution, developed with support from IP4FVG and in collaboration with Optimad, arises from the startup's necessity to automate the adjustment of parameters in their cutting-edge bioconverters designed for insect breeding.

The project's objective is to create and integrate an expert system capable of automating and supporting the optimal configuration of operating parameters in a bioreactor used for larvae breeding. This tool is pivotal for enhancing the management of the bio-converter, currently reliant on manual control grounded in experiential knowledge.

In collaboration with BEF Biosystems, OPTIMAD developed a mathematical model that reproduced the biological and thermodynamic behavior of the biosector. How? Through simulation and optimization techniques.

Solution

This model not only replicates but also optimizes the growth curve of insects within the bioconverter and enhances the thermal efficiency of the tank housing them. Utilizing this model, the company aims to create automated machine control and management software, enhancing machinery efficiency for large-scale deployment.



OPTIMAD will support BEF Biosystems by constructing a digital twin of the biological system. This twin will predict larvae population growth in the tank, accounting for site-specific environmental conditions. The goal is to establish an automatic control system, ensuring the optimal growth of larvae based on the derived insights.

About BEF Biosystems

BEF Biosystems is an innovative biotechnology company founded in 2016 on the initiative of Beppe Tresso, specialized in the breeding of insects, in the production of technologies for the management of their life cycle and in the production of derivatives for animal feed.



OPTIMAD is an Independent Software Vendor and Service Provider in the field of scientific computing. OPTIMAD's solutions enable the digital transformation of product development cycles and design processes. Our technologies embrace mathematical modelling and numerical simulation to ensure predictive capability and blend them with Machine Learning and Artificial Intelligence to lower engineering costs and uncertainties.

