

Case Study: IKA HABITAT Bioreactors to support research in traditional and precision fermentation processes using fungi, yeast and bacteria for novel food, feed and ingredients



Introduction

This leading Australian research institute is dedicated to solving national challenges through science and innovation. In the area of precision fermentation, the institute is actively developing microbial platforms and bioprocessing technologies to produce functional ingredients, alternative proteins, and bio-based materials. Its work integrates synthetic biology, metabolic engineering, systems biology and biochemical engineering to accelerate innovation in food and industrial biotechnology.

Challenges

“Before integrating the IKA HABITAT bioreactor into our workflow, the research institute faced several limitations in its capacity to support early-stage bioprocess development and technology transfer. As part of a broader strategy to enable precision fermentation processes, the institute works closely with industry partners and clients to develop and scale up microbial bioprocesses. However, a critical gap existed between lab-scale development and pilot-scale implementation.”

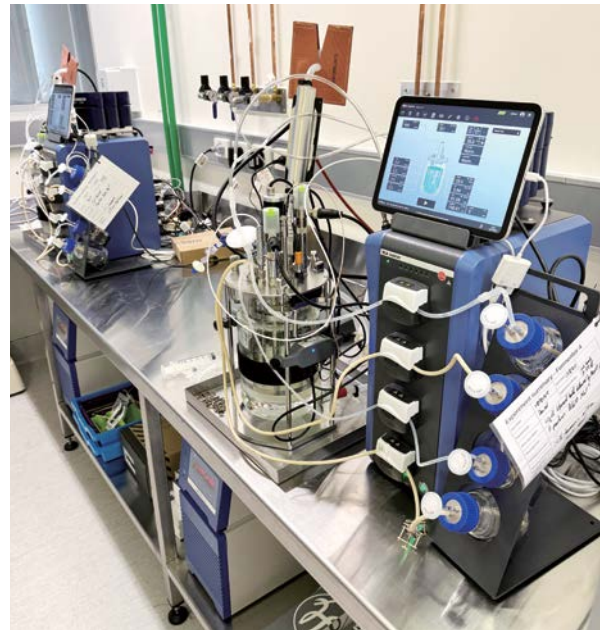


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Solution

This technology transfer gap has now been effectively closed, particularly due to the extensive instrumentation capabilities of the system, including pH, dissolved oxygen (DOT), biomass, and off-gas sensors. These features enable the acquisition of critical process parameters that are essential for informed scale-up procedures.

The research institute required a bioreactor system that offers a high degree of flexibility to accommodate a wide variety of microbial fermentation processes. This flexibility is crucial for adapting to diverse process requirements from industry partners and clients. By supporting dynamic process changes and providing robust data capture, the system enables the development and optimization of fermentation workflows that can be efficiently transferred into our 400 L pilot plant. This capability is central to our mission of accelerating early-stage bioprocess development and facilitating seamless technology transfer from lab to pilot scale.



Results

Process equipment has been reliably provided by IKA, supporting our operations. Four HABITAT bioreactors are now operated in the lab. We gave positive feedback on the support provided by IKA to make adaptations and constant improvements.



Quote

"The IKA HABITAT fermenter stands out as a smartly engineered benchtop system that delivers robust functionality at a fair price. It directly addresses common challenges in early-stage fermentation workflows, offering thoughtful design features that streamline usability and process control. Highlights include a flexible off-gas cooler that enables autoclave compatibility, clearly labeled head plates for intuitive setup, and a reliable antifoam detection system paired with a precisely controllable antifoam pump. This effectively prevents overdosing of antifoam agents and ensures process stability."

Further information:

[Precision fermentation – CSIRO's food innovation centre](#)



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Dr David Wollborn

Dr David Wollborn studied molecular biotechnology at Bielefeld University, writing his master thesis abroad at the Joint Bioenergy Institute (JBEI) in Emeryville, California, USA. After completing an internship at Evonik Industries (Animal Health & Nutrition), he did his doctorate at the Chair of Biochemical Engineering at RWTH Aachen University. This was followed by a bioprocess engineer position at a Sydney, Australia based start-up as fermentation team-lead, trying to produce 'milk without the cow'. In 2023, Dr Wollborn moved on to a position as Senior Engineer at an Australian Research institute continuing to help building the infrastructure for a biobased economy in Australia.

His work is focused on the development of sustainable bioprocesses, using precision fermentation in the Agriculture and Food space. The research focus is on bioprocess development, pilot-scale fermentation and downstream processing development.



IKA-Werke GmbH & Co. KG

Janke & Kunkel-Straße 10, 79219 Staufen, Germany
Phone: +49 7633 831-0, sales@ika.de, www.ika.com

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