

Innovating Sustainable Proteins: Whey Protein from Fermentation and Egg-Free Solutions in the EGGcellent Project



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SUMMARY

Vivici develops nutritious and tasty food ingredients through fermentative whey protein production. Using the industrial yeast *Pichia pastoris*, we produce β -lactoglobulin (BLG) and optimize efficiency through combined strain and process improvements. Our R&D team tests multiple yeast variants for higher yields and improved protein quality in a dedicated fermentation lab with Applikon miniBio fermentors.

Vivici also contributes to the EGGcellent consortium alongside Proeon Foods, Planet B.io, and Getinge, to develop a sustainable, tech-driven egg substitute that addresses food security and climate impact.

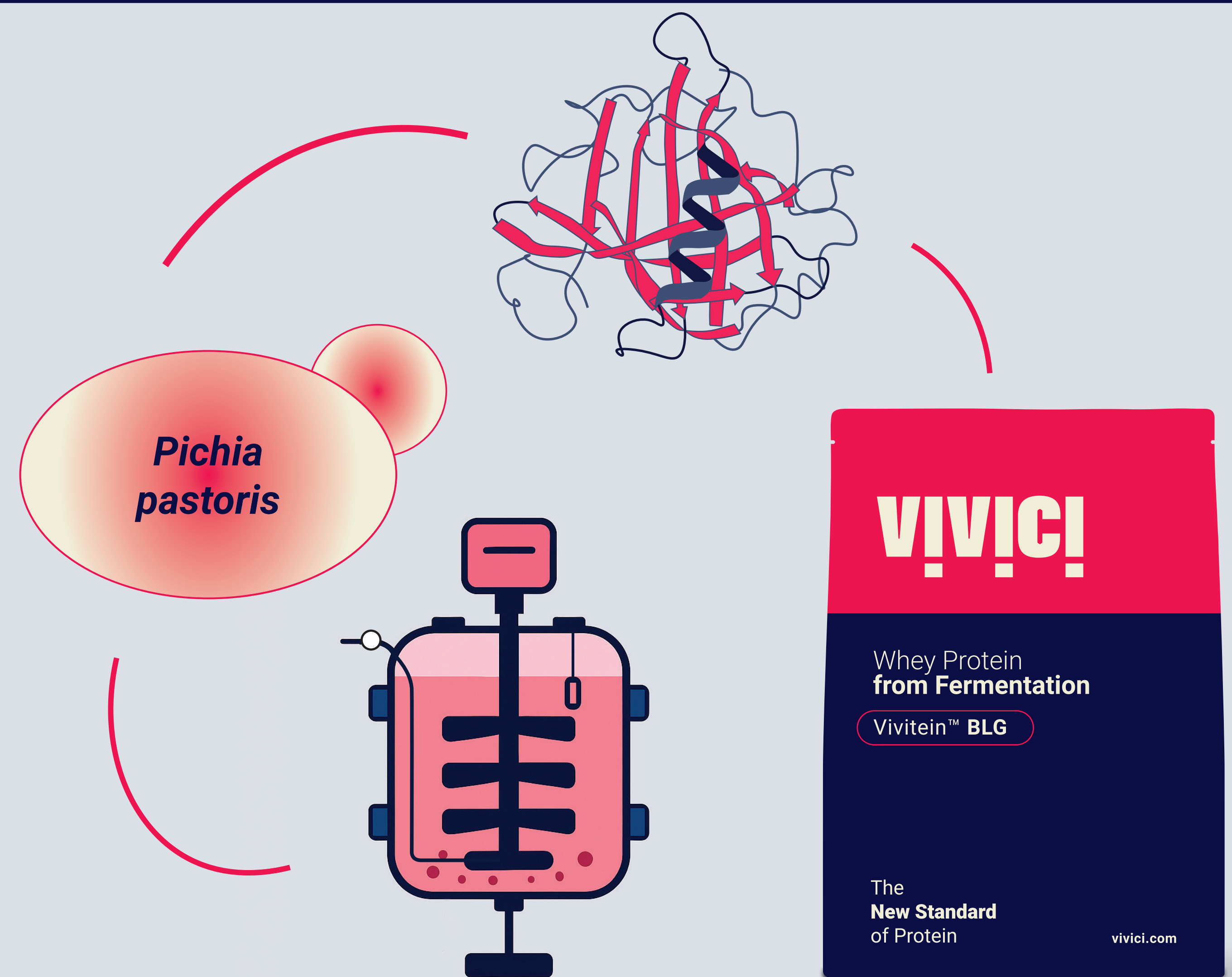


Figure 1. Schematic view of β -lactoglobulin production

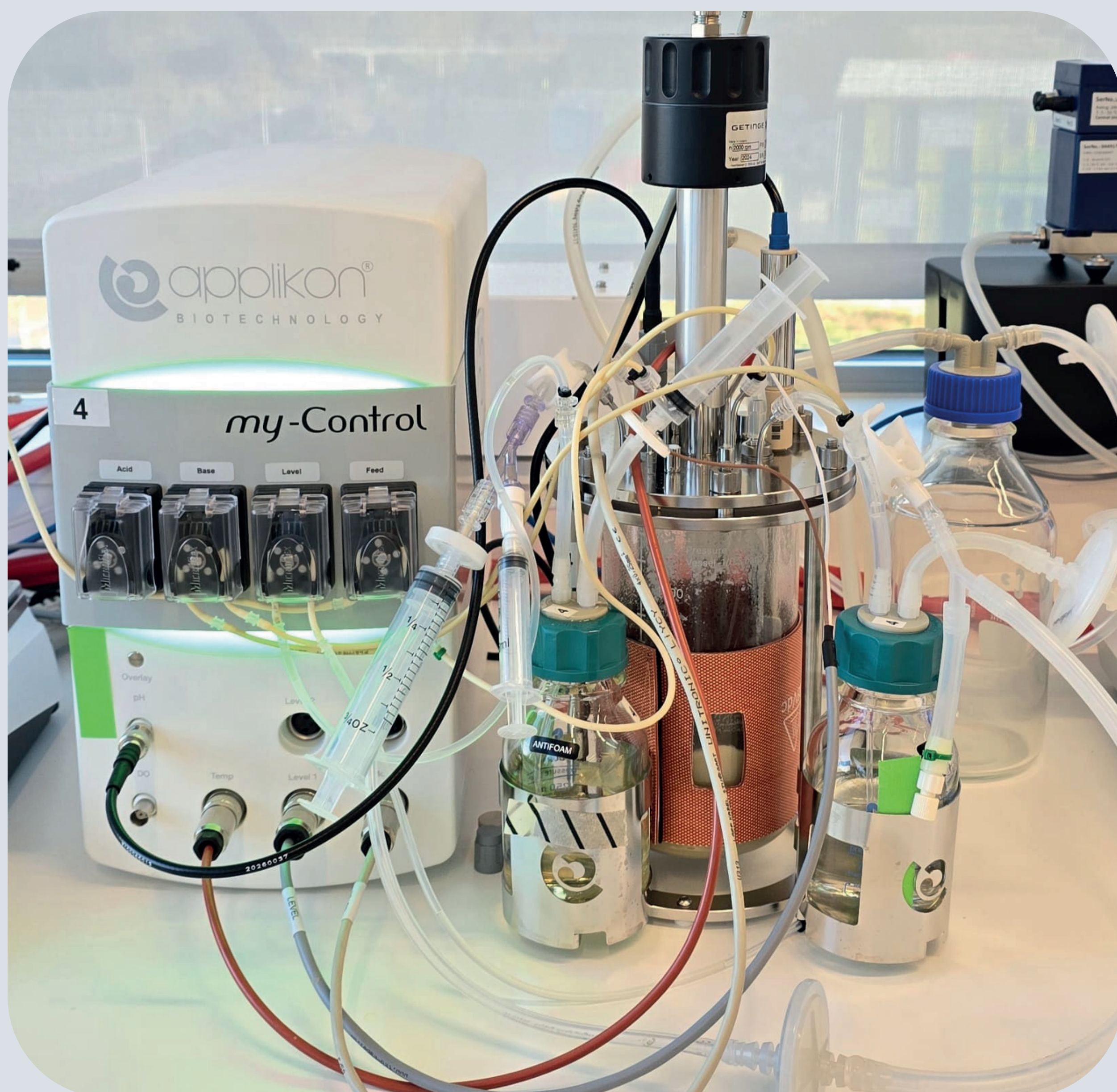


Figure 2. Getinge Applikon miniBio 1000 ml setup used for the cultivation

BIOREACTOR SETUP

Validation of the hardware, software, media/sterility tests and finally the successful run of Vivici's *Pichia pastoris* production strains for β -lactoglobulin (BLG). After these steps, the bioreactors have been internally approved for project work.

Online: dO_2 , pH, temperature, stirring, airflow, O_2/CO_2 off-gas. Offline: dry biomass, OD_{600} , BLG, metabolites.

Microbial growth and microscopy monitor sterility.

STRAIN TESTING

Pichia pastoris strains are selected for evaluation in lab-scale fermentor. Their performance is assessed using both online and offline data across various cultivation conditions, considering metrics such as titer, productivity, yield, protein composition, and sensory attributes, among others.

RESULTS

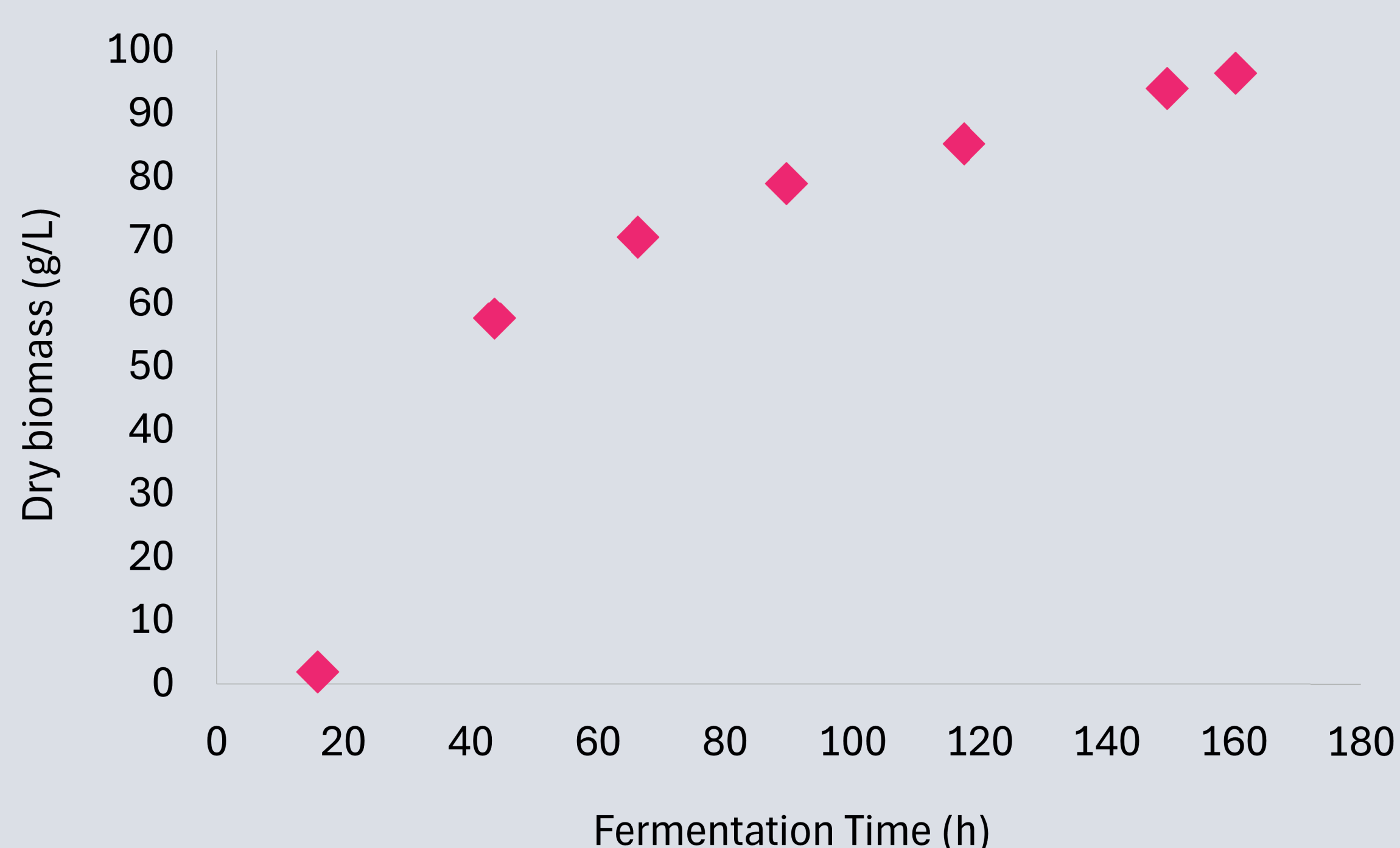


Figure 3. Dry biomass of *Pichia pastoris* over fermentation time

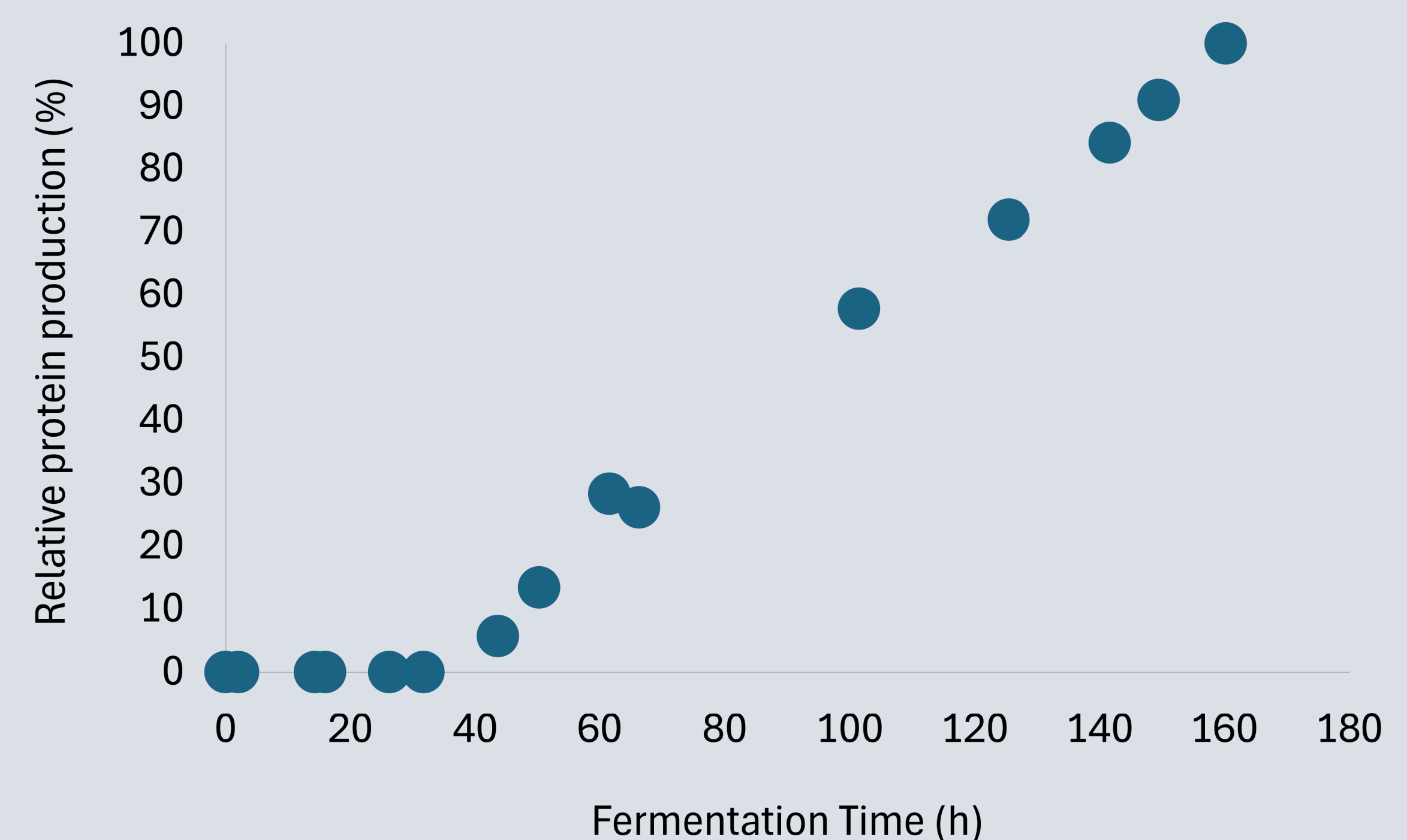


Figure 4. Production profile of BLG by *Pichia pastoris*

Promising initial results have been obtained under various fermentation conditions using different strains. The automation of control is being fine-tuned using Lucillus® PIMS software.