



Case Study

Client

Biotechnology Company

Project Number

22109

Techno-Economic Analysis of Animal-Free Protein Productions

Summary of Client and Challenge

A biotechnology company sought to scale up the production of a recombinant protein using precision fermentation. The challenge was to develop a comprehensive techno-economic model that would enable the company to evaluate different production scales and identify key cost drivers for both upstream and downstream processes. The company needed to ensure the feasibility of commercial-scale production while optimizing efficiency and reducing operating costs.

LEC Partners' Approach

LEC Partners was engaged to design and implement a techno-economic model to assist the client in their scale-up efforts. The consulting team focused on two primary production scenarios, analyzing different fermenter sizes and operational assumptions. This approach included:



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- ❖ **Process Definition:** Key process parameters for fermentation and protein recovery were outlined.
- ❖ **Model Construction:** LEC developed an Excel-based model that projected capital and operational costs for scaling production.
- ❖ **Scenario Evaluation:** The team evaluated the economic impact of producing the protein at both mid-scale and full-scale operations.

Client Results and Benefits

The techno-economic analysis provided the client with critical insights for future production planning:

- ❖ **Downstream Process Optimization:** Refining purification processes will significantly reduce costs.
- ❖ **Background Protein Minimization:** Reducing unwanted byproducts is key to lowering operating expenses.
- ❖ **Exploring Co-product Value:** The analysis revealed potential for valorizing biomass, creating additional revenue streams.
- ❖ **Consumables Accounting:** The client was advised to incorporate a detailed accounting of consumables, which could impact the overall economic viability of the project.



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This analysis provided the client with a comprehensive roadmap for scaling their precision fermentation operations. By optimizing both upstream and downstream processes, the client can significantly reduce production costs and improve the economic feasibility of commercial-scale production.

This case exemplifies how LEC Partners assists companies in the rapidly evolving field of precision fermentation, helping to meet both sustainability and commercial goals in industries ranging from food to biopharmaceuticals.