



Lee Enterprises
Consulting

Case Study

Client

Agricultural Technology
Developer

Project Number

22015

Team Members

Dr. Tony Cartolano
Dr. Greg Potter
Dr. Daren Daugard

Evaluation of Fermentation-Derived Sustainable Crop Protection

Summary of Client and Challenge They Faced

A developer of sustainable crop protection products sought to understand the variables influencing the profitability of a proposed fermentation-derived product. The firm required an evaluation of existing technologies, manufacturing techniques, and estimated cash flow for the long-term development of the product. This techno-economic analysis would need to assess the current maturity of the fermentation technology and provide guidance for future development efforts.

Our Approach to the Solution

LEC formed a multi-disciplinary team to assess the technology and business model for the product development. An LEC expert in fermentation helped the technology developer create a process flow diagram with a material balance, determining the inputs and the outputs necessary to scale the process.

Our process engineer constructed a capital estimate and a manufacturing cost strip based on the process flow diagram. A cash-flow analysis was developed to determine the break-even price for the product based on a



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20-year project life. Finally, sensitivity analyses were conducted to evaluate the effects of various project options on long-term profitability.

Client Results and Benefits

The current state of development of the lab-scale process showed the technology had not yet reached full maturity. The techno-economic model created by LEC revealed the potential challenges the technology developer would face scaling the proposed unit operations for product isolation and purification. The overall analysis revealed the existing fermentation process would necessitate high capital expenditures at scale, indicating the crop protection developer should proceed with caution or wait until the technology showed greater promise. The LEC evaluation saved the company from making a costly mistake by entering the market too early.