

Developing Functional Food Products from Plant Biotechnologies

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Project Description

Nutraceuticals, including micro and macro nutrient isolates, herbs and botanicals, and isolated reagents (e.g. hormones) have emerged as an important product class in the last decade. Nutraceutical growth is expected to continue to increase along with higher consumer income levels, an expanding elderly population, and greater awareness about health and nutrition.

While nutraceuticals have historically emerged from the identification of plants with existing health benefits, the biotech industry is beginning to take the nutraceutical concept to the next level. Increasing competency with genetics allows scientists to engineer specific functionality in plants. Research and experimentation has taken place in a number of areas, including: modification of oils and fatty acids, proteins and amino acids, carbohydrates and sugars, micronutrients and functional metabolites, reduction of toxins and allergens, and others.

Missouri and Illinois are well positioned to take advantage of new nutraceutical product opportunities because of excellent growing conditions and exceptional agricultural and biotechnical expertise. Bringing this collection of expertise in research, product development, production, manufacturing, and commercialization together in novel ways will reward not only entrepreneurs, but the states as well.

Because nutraceuticals derived from biotechnology is still an “infant industry” the identification of opportunities and the subsequent development of the immature industry is challenging. The objective of this project is to develop a model strategy that companies can use as they commercialize their nutraceutical product. The project sub-objectives are to:

(a) create detailed supporting materials (e.g. market analysis, supply chain design, etc.) required for a comprehensive nutraceuticals business plan, and

(b) develop a strategic business plan for a case study company that will facilitate the commercialization process for an agriculturally-based nutraceutical company.

The materials developed will be an instructive template for successive companies/stakeholders who want to develop a viable enterprise in the nascent nutraceuticals sector.

The analysis will be focus on the regulatory environment, the marketplace and the production supply chain issues that are most relevant for a new nutraceutical company. From the knowledge generated, appropriate business and marketing strategies/options will be outlined.

Some of the strategic issues that will be addressed are given below:

Regulatory

- Discuss the regulatory protocols that are necessary at the production field for the various types of products –conventional crops, regulated transgenic crops, plant made pharmaceutical crops.
- Describe the general regulatory protocols governing operations at the processing facility.
- Describe the regulatory protocol for making health claims about the product, or using the product in a medical capacity.
- Identify the steps and strategies for demonstrating efficacy and making health claims.
- Identify strategies for managing intellectual property.

Market

- Survey the market and inventory relevant products
- Calculate the value created by the product for the consumer and generalize a reasonable market price
- Calculate market potential and scenarios of likely market adoption
- Discuss the likely market channels that product will be sold through (consumer direct, manufacturer-wholesaler-retailer, etc.)

Supply Chain Design

- Compare the economics of extracting the nutraceutical from conventional crop varieties to specialty varieties with higher nutraceutical content to derive the break even premium price associated with nutraceutical content.
- Outline the costs of producing and processing the nutraceuticals to calculate a net return for the processing facility.
- Discuss relationship strategies between growers and the manufacturer (e.g. spot market transactions, contract relationship, co-investment, etc.)
- Discuss relevant issues in production contract terms between producer and manufacturer.
- Based on projected sales, regulatory issues (affecting management practices) and producer-process relationship; discuss the number of acres required, premiums and total farm revenues.
- Identify which processes and technologies (e.g. inventory/supply chain management software) would facilitate supply chain operations.

Business and Market Strategy

- Delineate the underlying processes taking place in each part of the value chain, complete with relevant descriptions of key activities and time tables, and likely costs.
- Define proper milestones so that specific activities are kicked off in sequence and at proper timetables (e.g. IPR reviews, regulatory reviews, etc.).
- Discuss labor and capital needs of the operations
- Calculate expected scenarios with gross and net sales as well as costs and profitability.