Ohio Third Frontier: Technology Asset Grant Program
Letter of Intent

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Lead Applicant: Graminex Nutrio LLC
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Project Title: Commercialization of a Leading Edge Value Extraction and Processing System for Functional Food Ingredients

Grant Funds to be requested: $2,500,000.00

Building Construction:	$2,020,650
Equipment Year 1:	$4,229,221
Equipment Year 2:	$3,607,577
Total:	$9,857,448 + 10% Contingency = **$10,843,192.80**

Collaborators: Graminex LLC and Harvest Innovations, both having locations in Deshler, OH

Acquisitions with TAG Funds: Building Construction: Facilities for extraction and processing; Equipment Fabrication: Specialized decanters/jet cookers/material transfer system; Acquisition of Specialty Equipment: spray dryers/pumps/vessels

Overview

Graminex Nutrio LLC is being formed as an extension of Graminex LLC. The focus is to meet the needs of the emerging health and wellness food industry, commonly referred to as functional foods. This new venture will be located in Northwest Ohio to guarantee efficient raw material processing for two established product lines; pollen food processing of Graminex and advanced soybean processing of Harvest Innovations, both in Deshler, Ohio. Graminex Nutrio will offer both collaborators increased stability for raw materials and more importantly, the ability to expand their markets to new and innovative functional foods. By enhancing agricultural production and processing infrastructure around a new center for functional ingredient production, additional industry participants will benefit by locating to this Ohio region. Areas of processing expertise will include separation, extraction, clarification, filtration, concentration, and drying of many raw ingredients including specialized agricultural products, such as grains, legumes and vegetables. There will be four main areas of product concentration; functional food, medical food, nutraceutical and dietary supplement. Graminex Nutrio will quickly establish itself as a premier manufacturer in these different market segments, while establishing Northwest Ohio as a national center for functional ingredient production. The supply chains created by

the facility and collaborators will prove to be an attractive incentive to bring additional food processors to the region.

Problem Statement

Several societal trends are driving the increased consumer demand for food products providing health benefits beyond basic nutrition. These “functional foods” are being produced by international companies such as PepsiCo (Gatorade and Quaker Oats), Coca-Cola (Odwalla, Vitamin Water), General Mills (Cheerios, Yoplait), Nestle (PowerBar), Dannon (Activa, Greek Yogurt), Kellogg (Kashi, Special K), Kraft (CapriSun, Balance Bar) and Abbott Laboratories (Similac), resulting in strong, successful food and beverage brands. The demand for ingredients is outpacing the growth in processing technologies and manufacturing facilities. Raw material production that is capable of producing wholesome ingredients that are free of harmful chemicals, economically feasible and in significant quantity has not been addressed.

The collaborators in this project have each developed technical expertise and laboratory/pilot scale equipment to produce ingredients required for functional food products. Significant research and development for extraction and processing systems has been preformed over the past two and a half years. A facility is needed to turn these small scale systems into a commercially viable business, making it the first of its kind in the USA, and establishing Ohio as a center for production.

A secondary problem this facility will address is the global shortage of natural, quality nutritional ingredients, including protein, fiber, starch, amino acids and phytosterols. Protein is a major ingredient in the current functional food market. Viable sources for longer term protein supplies will need to move away from inefficient animal protein production processes to more efficient vegetable protein sources. These underutilized, viable protein sources must be developed in large commercial quantities in order generate cost effective protein.

Project Goals and Objectives

The primary objective of this new venture will be to supply new and innovative ingredients that combine leading edge extraction and processing technology with specialized agriculture production. One of the initial objectives of Graminex Nutrio will be to provide non-solvent extracted soybean proteins to established markets. Currently soybean processing is done by extracting oil using hexane, which leaves behind proteins with chemical residues. A unique mechanical process developed by the collaborators involving high temperature, short time heat treatment of soybeans, coupled with mechanical expulsion of oil, replacing the hexane process, leaving behind proteins without chemical residues. This protein will be processed and sold to the functional food market to large companies such as Kellogg, Silk Soy Milk and Abbott Nutrition.

To support these sales, increased acreage will be devoted to the production of non-GMO crops in Northern Ohio. Food safety and traceability will be at the foundation of this project in regards to raw material traceability, source of origin, product batch traceability, GMO contamination concerns and overall public health safety. Non-GMO raw materials will enter the facility and exit a natural process that preserves the genetic purity required by functional food manufactures. This will also be possible for organically grown crops requiring guaranteed identity preservation for the steadily growing organic food market.

Consumer driven global markets centered on new functional food ingredients will be the long term focus of Graminex Nutrio. This includes expansion of current collaborators’ products, involving unique amino acid based flower pollen extracts. Development will be focused on globally launching new

ingredients including highly concentrated red clover isoflavones, quality alfalfa chlorophyll extract and unique value-added fiber products. The ultimate goal of Graminex Nutrio will be to find and develop new sources for everyday essential nutrients that are required for better overall health and wellness, thereby addressing a major international trend in the food industry, and establishing Ohio as a center for the development and production of functional foods and ingredients.

Technical and Commercial Approach and Work Plan

The technical expertise in this project is the efficacy of the new processing technology for not only high protein soy products, but also for nutritional and functional food ingredients. The process protocols provide for retaining protein solubility, water and fat binding, emulsification and freeze-thaw stability, which are all determinants of successful product formulation in functional foods.

The system that will be developed by this project will be capable of accomplishing all processing steps; separation, extraction, clarification, filtration, concentration and drying for the two initial product lines; pollen and soy protein that will be processed under contract on day one. It will also include the ability to extract natural colorants, phytochemicals, isoflavones and other substances of high value for the functional food market in year two and beyond.

This state of the art food facility will produce ingredients at a commercial scale in order to reach the market quicker. Production will commence on day one and be doubled by year two to meet current market demands for these types of natural ingredients. By piecing together the highest quality raw materials grown in Ohio with this leading edge technology, increased market demand will be a significant opportunity.

Commercial Maturity of the Technology/Market Acceptance

Market research demonstrates consumer behavior is trending towards natural foods with nutritionally functional ingredients. Graminex Nutrio's unique extraction and processing technology allows larger producers that are blocked by supply constraints, to add these functional food ingredients to their vast product lines. The addition of functional ingredients like protein, fiber, amino acids and Omega 3 has already happened in food staples like milk, eggs, bread and juices. The functional food market is established and accepted by the mainstream consumer more so than traditional dietary supplements. Consumers can now purchase their value-added nutrition in the same foods that they already consume on a daily basis.

Soy protein and other protein extracts are already widely accepted in the food industry for nutritional content, functional properties and health benefits. Currently protein products are produced using antiquated technology that leaves solvent residues that are unacceptable. Large food processing and manufacturing companies have recognized this and are searching for natural protein products to service this large consumer driven market. New natural products are readily accepted and welcomed by formulators and consumers in the marketplace if supply and pricing issues can be managed.

Project Impacts

The significant economic and employment impacts have been quantified and will be submitted with the proposal for evaluation. These impacts will be generated in a number of different areas. The creation of the scientific, technical and production infrastructure will:

- Benefit local and regional growers of non-GMO oilseed crops. It will also benefit growers of specialty crops such as rye, clover, radishes, carrots, cruciferous crops, and berries, all of which

are high value added crops. Since many of the crops grown for processing can be “double cropped,” the economic benefit and resultant jobs are significant.

- The Ohio seed industry will be essential to develop and produce specialty seed stock.
- Ohio is home to many of the largest manufacturers of functional foods, including Abbott Nutrition, Dannon Yogurt, Kellogg, Kraft, and others. Graminex Nutrio by virtue of its location will shorten the supply chains for these companies, and therefore make Ohio the “go to” location for functional foods.
- Ohio, through organizations such as the Center for Advanced Functional Food Research and Extension (CAFFRE) located at Ohio State University, the Center for Innovative Food Technology (CIFT) in Toledo and the Ohio Agricultural Research and Development Center (OARDC) in Wooster, possesses one of the most robust research and technical support structures in the Nation. The location of this type of center proposed for Deshler, will enhance and be enhanced by, this support structure.

Sustainability

Greater health awareness by consumers and potentials for premium pricing in the industry are helping to fuel growth in the functional foods market. Graminex Nutrio has and will continue to identify opportunities for functional ingredient development. Future growth in this area will demand ingredients from sources that have not previously been exploited. Graminex Nutrio will be capable of meeting the current market demand and have expansion capabilities for servicing the global need to get more value from our food raw materials to feed the growing population.

In order to support the growing need for functional foods, new product lines will be developed with the assistance of partner companies and regional R & D institutions. Areas of future concentration will be regionally grown crops, including the purple carrot, for natural coloring and dietary fiber, red clover, for allergen free natural isoflavones, alfalfa for chlorophyll and fiber, and others that are currently being pursued with industry partners. To expand Graminex Nutrio, Harvest Innovations and Graminex have initiated discussions with other Ohio and national company partners, including Abbot Laboratories, Estee Lauder, Red Bull and Croda Health Care. These companies all have products containing the types of functional food ingredients Graminex Nutrio produces. These projects will likely involve new partnerships and supply chain growth, to the benefit of the Northwest Ohio regional economy.