Extension/UAES – Production and Safety of Food Products

New and Improved Food Processing Technologies
Work in this area focuses on development or improvement of methods, techniques, or processes to maintain or improve quality or functionality, stabilize or preserve foods, or prepare foods for further processing.
Areas of work include but are not limited to:
• Food physical processes (i.e., thermal and non-thermal pasteurization/ preservation, size reduction, separation, concentration)
• Food bioprocesses (i.e., enzyme and microbial applications, fermentation, genetic engineering of foods and food ingredients)
• Food chemical processes (i.e., salt, sugar, acid, preservatives, colorants, antioxidants, chemical modification)
• Food processing efficiencies (i.e., management of energy, water, wastes)
• Improved or new food packaging technologies
• Food process modeling, automation, and sensors
• Processing technologies for new food uses of agricultural products
• Food bioengineering and food process engineering
• Maintaining or enhancing bioactive components in food and food ingredients.
Exclude:
• Utilization of food processing wastes
• Economics of food processing
• Nutrient composition of foods
• Nutrient requirements and bioavailability

New and Improved Non-Food Products and Processes
Work in this area includes agricultural commodities used in consumer products such as paper, textiles, biofuels, adhesives, paints, and other biobased products. This area also includes work on animal byproducts as raw materials for the textile, leather, soap, feed, pharmaceutical, and other industries. Work also includes alternate, non-food uses for agricultural commodities and timber products to expand markets for these products, yielding new, improved, or less expensive consumer products and providing additional sources of income to producers, processors, and marketers.
Areas of work include but are not limited to:
• Developing new non-food products from agricultural and forest resources
• Developing ethanol and biofuels from agricultural materials
• Identifying, characterizing, and measuring chemical, physical, and sensory properties of non-food products
• Determining the relationships among the chemistry, structure, and quality parameters of raw materials and their functionality and end use properties in non-food products
• Development or improvement of applications for non-food products to enhance utilization, including structural wood engineering, performance evaluations, and environmental impacts
• Development or improvement of methods, techniques, or processes to produce or manufacture non-food products
• Efficiency in converting agricultural and forest commodities to new and improved non-food products (i.e., management of energy, water, wastes)
• New non-food products from underutilized co-products from process streams

• New non-food uses for agricultural products.
Exclude:
• Improvements in products through production practices or breeding
• Evaluation and utilization of textiles and textile products
• Utilization of waste materials
• Development of foreign markets

Nutrient Composition of Food
This area is concerned with the determination of the quantities of nutrients and other food components in food; development of analytical methods; development and maintenance of data banks of information on food composition; development of software and other systems to facilitate use of data on food composition, including recipe calculations; development and evaluation of educational materials and strategies on food composition; and dissemination of information on food composition for professionals, students, and the public.
Areas of work include but are not limited to:
• Composition of food, including nutrients and other food components
• Databank development and utilization systems
• Analytical methods
• Development, evaluation and dissemination of educational strategies and information on food composition.
Exclude:
• Development of foods for improved health, e.g., nutraceuticals, functional foods
• Production of improved food plants and animals

Requirements and Function of Nutrients and Other Food Components
This area concerns fundamental knowledge about relationships of food eaten by people to their physical development, physical activity, and mental status, and to the maintenance of optimal health. It is concerned with defining nutrient requirements and functions throughout the life span and in response to the environment. Functions include cellular and molecular regulation of gene expression by specific nutrients. This area is also concerned with development of methods to quantify relationships of nutritional status to well-being to provide a scientific basis for establishing Dietary Reference Intakes and Dietary Guidelines. Programs on nutrient requirements and function are concerned with the development and evaluation of education activities, strategies, and materials, and with the dissemination of related information for professionals, students, and the public.
Areas of work include but are not limited to:
• Functions of nutrients and other food components
• Relationship of nutrients and other food components (such as phytochemicals) to gene expression, health, physical and mental development, performance, and longevity
• Requirements for energy, fat, protein, amino acids, fatty acids, minerals, and vitamins related to age, sex, and life stage, including maternal and infant nutrition, physical activity, and physiological, psychological, and environmental conditions
• Interrelationships among nutrients and non-nutrient components of food as they affect absorption, metabolism, growth, and maintenance requirements
• Methods of evaluating nutritional status

• Development, evaluation and dissemination of education programs, strategies, and information on nutrient requirements and function.
Exclude:
• Development of foods for improved health; e.g., nutraceuticals, functional foods
• Aspects of health unrelated to food and nutrition

Ensure Food Products Free of Harmful Chemicals
Work on toxic residues of agricultural origin is conducted to determine the levels and circumstances under which chemicals may be safely used in production of plant and animal food products. There is widespread public concern over the potential hazards created by the use or introduction of chemicals in the production of farm products. The focus of work under this KA is on human health.
Areas of work include but are not limited to:
• Safe or acceptable levels of residues and environmental contaminants on or in farm products for human consumption
• Behavior and fate of pesticides, antibiotics, hormones, and other applied chemicals and environmental contaminants, on or in food plants and animals and their products
• Methods to remove or mitigate the effects of chemicals harmful to human health
• Rapid, accurate methods for monitoring pesticide residue, antibiotic, environmental, or other contaminants on or in food plants and animals and their products
• Assessing risk to human health from harmful chemicals in food plants and animals and their products
• Determining consumer attitudes and developing techniques to communicate relative risks of harmful chemicals in food plants and animals and their products
• Hazard analysis and critical control points (HACCP).
Exclude:
• Work focusing on food plant or animal productivity or economics, animal health, or fates and effects of chemicals on the environment
• Economics of food safety

Protect Food from Contamination
This area includes work on pathogenic food borne microorganisms and parasites in raw, minimally processed, or inadequately processed and preserved foods. Work on mycotoxins and natural and induced toxicants in foods--including allergens and seafood toxins--is also included. The focus of work under this KA is on human health.
Areas of work include but are not limited to:
• Production of food animals and crops free of microorganisms, parasites, natural toxins, or other biological agents harmful to humans
• Prevention of transmission of pathogenic microorganisms and parasites from human carriers to livestock and food systems
• Maintenance of food security in handling, processing, packaging, and distributing food products
• Improved methods of food handling, processing, storage, and preparation for greater food security
• Methods for preventing or eliminating mycotoxins in peanuts and other field crops
• Methods for preventing, removing, or controlling naturally occurring and induced toxins and allergens in agricultural products

• Assessing risk to human health from pathogenic microorganisms and natural toxins in food animals and crops and their products
• Determining consumer attitudes and developing techniques to communicate relative risks of pathogenic microorganisms and natural toxins
• Basic work on growth and mechanisms of pathogenesis of food borne microbial pathogens
• Education on safe food handling.
Exclude:
• Work focusing on animal health
• Prevention of transmission of non-food borne parasites to humans through food animals
• Control of pests in food plants that is not focused on safeguarding human health
• Economics of food safety

Primary Program Emphasis Areas – Areas of Work Defined

2007 Addendum

Production and Safety of Food Products

New and Improved Food Products
This area includes work to improve or develop new food products. Work also includes development of knowledge to influence quality and functionality of foods in complex food systems.
Areas of work include but are not limited to:
• Chemical and biochemical reactions in foods
• Measuring/characterizing food components and functions
• Identifying, characterizing, and measuring chemical, physical, and sensory properties of foods
• Determining relationships among the chemistry, structure, and quality parameters of food components and their functionality and end use properties in foods
• Designing and formulating foods for improved human nutrition or for enhancement of human health (i.e., nutraceuticals, functional foods, and medicinal plants)
• Quality and safety parameters affecting development of new and improved food products
• Developing new food products from process stream co-products
• Sensory physiology and sensory evaluation
• New food uses for agricultural products.
Exclude:
• Live food plants and animals to improve food quality or functionality (i.e., breeding, feeding, cultural, or production management practices)
• Development of foreign markets
• Quality maintenance during storing and marketing of food products
• Utilization of food processing wastes
• Nutrient composition of foods
• Nutrient requirements and function

Quality Maintenance in Storing and Marketing Food Products

Work in this area includes understanding and minimizing food quality losses during preservation, storage, distribution, and marketing to enhance the quantity and quality of foods delivered to consumers, minimize food costs, and enhance profitability for food producers and marketers.
Areas of work include but are not limited to:
• Chemical and biochemical changes after harvest/slaughter or during handling and storage
• Effective ways to reduce physiological deterioration and losses due to insects, spoilage microorganisms, rodents, and other pests
• Effects and means of controlling temperature, humidity, and atmosphere in storage and transportation
• Containerization/packaging or storage and handling methods to maintain optimum conditions for quality maintenance
• Relationships among variables of handling and storage and loss in quality
• Segregation/identity preservation and handling systems.
Exclude:
• Prevention, reduction, or elimination of pathogenic microorganisms, mycotoxins, and naturally occurring toxins in foods
• Characterization of quality parameters and their interactions for new and improved food products
• Quality maintenance of non-food agricultural and forest products

Home and Commercial Food Service
This area of work focuses on development of guidelines to ensure the wholesomeness, nutritional value, taste, and appearance of commercially and home prepared foods. Work also includes development of approaches to improve preparation, handling, and storage of food that reduce waste, assure quality, and increase consumer appeal.
Areas of work include but are not limited to:
• Factors affecting quality of food prepared at home or commercially
• Improving methods of preparing, handling, holding, and serving food, including automation and/or computerization
• Development of methods to provide effective, efficient management in institutional and commercial food services
• Product labeling to improve consumer information about product quality, preparation and handling, storage, nutritional values, and unit cost of foods for home and commercial use.
Exclude:
• Safety of commercially and home prepared foods
• Nutrient composition of food and diets