

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Food Safety

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
212	Diseases and Nematodes Affecting Plants			7%	
305	Animal Physiological Processes			3%	
311	Animal Diseases			11%	
501	New and Improved Food Processing Technologies			7%	
502	New and Improved Food Products			15%	
503	Quality Maintenance in Storing and Marketing Food Products			3%	
701	Nutrient Composition of Food			3%	
702	Requirements and Function of Nutrients and Other Food Components			3%	
703	Nutrition Education and Behavior			3%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources			7%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins			35%	
903	Communication, Education, and Information Delivery			3%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	25.0	0.0
Actual Paid	0.0	0.0	16.1	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	855771	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	855771	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The development and evaluation of improved technologies in food processing, on-farm food safety practices and the root cause of Salmonella have received increasing attention from faculty in several departments. Research is being conducted on several important food toxins and their causal organisms (e.g. Aspergillus), mastitis resistance as a component of on-farm food safety, the development of new thermal food preservation technologies, biotoxins and food safety, nanotechnology applications in food sensors, residual pesticides in foods, symbiotic associations between antibiotic producing bacteria, and several other areas.

2. Brief description of the target audience

Integrated activity for our Capacity Grant programs targets a broad group of stakeholder audiences in agricultural, natural resources, and the public. Examples can be seen in our stakeholder section information provided elsewhere in this report.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2014
 Actual: 2

Patents listed

Title: Preparing Flexible Carbon Nanotube Thin-Film Using a Diazo Dye as a Dispersant and Template
 Investigator: Sundaram Gunasekaran
 Patent Application: 61/986973 (filed 4/14/2014)

Title: Remediating Effluents Containing Heavy Metals Complexed with Organic and Inorganic Species
 Investigator: Sundaram Gunasekaran
 Patent Application: 6/035130 (filed 6/20/2014)

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	0	30	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Output measures for this project include patents, graduate students trained, and publications. This estimated output will be refined as we gain experience with this measure for Formula Grant supported work. Graduate Students Trained: 21

Year	Actual
2014	18

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	<p>Outcome measures for this work are both qualitative and quantitative. We will rely on feedback from stakeholder groups, advisory boards, and individual constituents, as well as from UW Extension teams on the relevance, importance and impact of our research program. The output measures listed earlier will also serve as outcome measures in that patents graduate degrees and publications all include an element of critical review and assessment of uniqueness, originality, contribution to the science and knowledge base, or other performance criteria. Finally, we will use the Thomson ISI Essential Science for agricultural science as one of our measures of impact of our research program. Our target for these outcome measures is to be ranked in the top 5 institutions in the United States. We will continue to develop impact statements for individual projects which have shown exemplary and significant impact. Publications:39</p>

Outcome #1

1. Outcome Measures

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2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	30

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Title: Improvement of Thermal and Alternative Processes for Foods

The U.S. ice cream industry generates more than \$10 billion in sales each year, making it one of our nation's most popular treats. It is, however, a treat that can be high in fat. In the interest of public health, it is of great societal and economic benefit to develop lower-fat ice cream that consumers can turn to as a genuinely acceptable option rather than a less palatable "diet" food. There is a growing market for such alternatives, as the rise of such lower-fat options as frozen yogurt demonstrates. Research enabling manufacturers to control ice crystal formation and other key structural factors determining texture and flavor will allow them to develop and serve that market.

What has been done

A key factor in determining ice cream quality and shelf life is the size of ice crystals, with small ice crystals being optimal for both. Better understanding of ice crystal formation during ice cream production is helping manufacturers' better control crystal size, to the benefit of ice cream consumers. Researchers used a scraped surface freezer to study the formation of ice crystals

during the ice cream production. They evaluated ice crystal size distribution under carefully controlled operating conditions, studying the effects of those conditions on ice formation and the ripening of crystals in both full-fat and reduced-fat ice creams. They were able to develop a novel mechanism that explains ice crystal formation in ice cream, as well as a working model to predict ice crystal size under various operating conditions. They also studied methods to produce small ice crystals within the freezer. The team's mechanism and research findings led to specific recommendations for ice cream manufacturers regarding freezer operation, offering manufacturers of both ice cream and ice cream equipment information they need to produce better products.

Results

Results of this project were shared at the Institute of Food Technologies (IFT) Annual Meeting and at an industry-sponsored advanced symposium on ice cream. Based on the industry's keen interest in this work, it is likely that some ice cream companies have incorporated these recommendations into their ice cream-making protocols (we cannot know for sure as this information is proprietary). The project also served as the basis of a number of publications with widespread influence among researchers, the ice cream industry and beyond.

Funding: WIS01512

More Information: Richard Hartel, rwhartel@wisc.edu

Knowledge area(s): 502

4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Diseases and Nematodes Affecting Plants
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V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities

Brief Explanation

A variety of factors could affect the outcomes of this project including those listed above. However, the breadth of the program makes it unlikely that the outputs would be completely disrupted unless there was some major natural, economic, or public policy disruption. A major change in federal policy or appropriation affecting the Capacity Grant program could affect our ability to produce our outcomes. Since these funds do not allow tuition remission, we continue to discuss alternatives to meeting our capacity grant mission, while continuing to train graduate students for the next generation of agricultural science.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

N/A

Key Items of Evaluation

N/A