

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Food and Non-Food Products: Development, Processing, Quality, and Delivery

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
501	New and Improved Food Processing Technologies	0%		23%	
502	New and Improved Food Products	0%		31%	
503	Quality Maintenance in Storing and Marketing Food Products	0%		4%	
504	Home and Commercial Food Service	80%		0%	
511	New and Improved Non-Food Products and Processes	0%		41%	
512	Quality Maintenance in Storing and Marketing Non-Food Products	0%		1%	
703	Nutrition Education and Behavior	10%		0%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	10%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890

Actual Paid Professional	2.6	0.0	25.3	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
139243	0	231807	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
139243	0	296889	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

- Conduct Research on Co-products of Corn and Soybeans
- Research and Improve Biofuel Production Processes
- Develop Methods to Improve Acceptability of Fresh and Processed Meats
- Conduct Barbeque Bootcamp Workshops
- Partner with South Dakota Beef Industry Council
- Partner with South Dakota Pork Producer's Council

2. Brief description of the target audience

- Farmers
- Biofuels Industry
- Beef Science Community
- Beef Producers
- Food Businesses
- Consumers

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	915	139159	682	1130

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

Patent Applications Submitted

Year: 2013

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	1	24	25

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Percentage of all Hatch Research Projects in Food and Non-Food Products: Development, Processing, Quality and Delivery

Year	Actual
2013	11

Output #2

Output Measure

- Developed a Strong Research Program to Enhance the US Dairy and Food Industry

Year	Actual
2013	0

Output #3

Output Measure

- Extracted and Analyzed Oilseeds to Determine Biofuel Production Suitability

Year	Actual
2013	0

Output #4

Output Measure

- Number of BBQ Bootcamp Workshops

Year	Actual
2013	7

Output #5

Output Measure

- Number of Publications Posted on iGrow Website

Year	Actual
2013	220

Output #6

Output Measure

- Number of Articles Posted on iGrow Website

Year	Actual
2013	96

Output #7

Output Measure

- Number of Podcasts Posted on iGrow Website

Year	Actual
2013	55

Output #8

Output Measure

- Number of Radio Programs Posted on iGrow Website

Year	Actual
2013	13

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of Food and Non-Food Products: Development, Processing, Quality, and Delivery Hatch Research Projects
2	Increase Knowledge of Structure-Function Relationships of Milk Proteins
3	Increased Knowledge for Obtaining Maximum Oil Yields
4	Number of BBQ Bootcamp Participants

Outcome #1

1. Outcome Measures

Number of Food and Non-Food Products: Development, Processing, Quality, and Delivery Hatch Research Projects

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The challenge today of producing enough food, fiber and fuel for more than 9.5 billion people by 2050 is almost daunting, especially because it needs to be done using less land, less water and less energy than is used today. Science driven technologies must be developed for this to be accomplished in a sustainable manner.

What has been done

Within the College of Agriculture and Biological Sciences, there are 15 Hatch projects that are categorized in the Planned Program of Food and Non-Food Products: Development, Processing, Quality, and Delivery. The research activities in this program are primarily supported by our Department of Agricultural and Biosystems Engineering, Department of Dairy Science, and our Department of Biology and Microbiology. Projects include but are not limited to research studies in milk and whey protein, methods to augment beef flavor and tenderness, the development of oilseed biofuels, processing co-products of corn and soybeans as valuable chemicals, and the advancement of technologies for improving food safety.

Results

Through research, we continue to build a scientific knowledge base to improve and understand value added protein fractions from milk, the significance of biomass, mechanisms involved in regulating meat aging, increased shelf life for meat products, and milk homogenization. In addition, graduate students gain valuable knowledge and skills while collaborating on research projects.

4. Associated Knowledge Areas

KA Code	Knowledge Area
----------------	-----------------------

501	New and Improved Food Processing Technologies
502	New and Improved Food Products
503	Quality Maintenance in Storing and Marketing Food Products
511	New and Improved Non-Food Products and Processes
512	Quality Maintenance in Storing and Marketing Non-Food Products

Outcome #2

1. Outcome Measures

Increase Knowledge of Structure-Function Relationships of Milk Proteins

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Consumers are increasingly looking for dairy products with improved health and nutrition benefits. The structure and texture of a food product plays a huge role in how it is perceived by the consumer. Increased knowledge of protein structures may make it possible to tailor-make functional and nutritional properties in food products. Designing dairy products with these values will create new opportunities for the dairy industry and increase demand for dairy products.

What has been done

The focus of this first year project has been to develop a strong research program. Significant progress has been made by obtaining the essential requirements for success. At this time, the start of a great team of researchers has been built and key lab equipment has been purchased. Resources have been identified and collaboration has been secured for access to specialized equipment.

Results

Research so far has improved the knowledge of structure-function relationships of milk proteins and also provides a link between food structure and nutrient delivery. Numerous publications, keynote presentations, workshops and conferences have been used to disseminate information. Research collaboration has been established with a major university and a large dairy cooperative in New Zealand, as well as local professors. The project is also providing professional development for many graduate and undergraduate researchers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products

Outcome #3

1. Outcome Measures

Increased Knowledge for Obtaining Maximum Oil Yields

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The global demand for energy threatens the economic stability of nearly every country in the world. The United States needs to develop a sustainable source of bioenergy and bio-based products. Oilseed crops have enormous potential for use in a variety of biofuel markets. The biofuels industry provides opportunities for rural economic growth while reducing our dependence on foreign oil.

What has been done

Oil was extracted from various seeds, including flax, mustard, canola, sunflower and canary. Three methods of extraction ? accelerated solvent extraction, cold press, and solvent assisted extrusion were used at different parameters to produce oils for research. By evaluating and understanding the oil profiles, researchers are able to better determine their suitability for biofuel production. The desired key outcome is to develop an efficient process to extract oils for further conversion into aviation fuels. Partial project results have been presented at various regional, national and international meetings or conferences.

Results

The heating value, viscosity, and oil density produced by accelerated solvent extraction was affected by temperature and extraction time, making the determination of maximum oil yields possible. The range of oil yield from the cold press was also measurable, depending on the oilseed species and conditions. The physical properties of the oilseeds (shape, size, hardness of

seed shell, and oil content) had significant effects on the cold press performance, with lower screw speeds resulting in higher oil yield. Temperature and screw speed also affected the yield of residual oil with the solvent assisted extrusion.

4. Associated Knowledge Areas

KA Code	Knowledge Area
511	New and Improved Non-Food Products and Processes

Outcome #4

1. Outcome Measures

Number of BBQ Bootcamp Participants

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	325

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In recent years, there has been a lot of negative information surrounding meat products. Many times this information is incorrect and misleading, leaving the consumer grasping for answers. Consumers have expressed the need for trusted science-based information to base their decisions upon.

What has been done

SDSU Extension, partnering with the South Dakota Beef Industry Council and South Dakota Pork Producer's Council conducted seven workshops in five cities. The workshops provided intensive, hands-on opportunities for consumers to enhance their understanding of meat cookery, barbecuing, smoking, food safety, meat selection, and nutrition.

Results

Participant evaluations indicate the workshops were very successful in educating consumers. The BBQ Bootcamp program greatly enhanced the understanding of cookery, selection, and safe handling of meat cuts.

4. Associated Knowledge Areas

KA Code	Knowledge Area
504	Home and Commercial Food Service
703	Nutrition Education and Behavior
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Competing Programmatic Challenges

Brief Explanation

SDSU Extension and the SDSU Ag Experiment Station have met or exceeded its goals despite a decrease in state and federal resources. The reduction in funds however, has created challenges across the board with research and outreach. There are fewer faces to greet the customer, there are fewer hands-on projects, and cost recovery has taken the word free out of some programs. But while these challenges may initially seem troublesome, paradoxically they improve service to our stakeholders. Smart classrooms provide video conferencing, web-based learning is available all hours of the day, and new sponsorships create new partnerships. There will be more challenges, but SDSU Extension and the SDSU Ag Experiment Station continue their commitment to excellence and success.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

BBQ Bootcamp

325 participants 133 respondents

Presentation

1 = not valuable; 10 = highly valuable

8.6 - Grilling and Nutrition

8.5 - Smoking, Barbequing, Retail Selection

8.5 - Food Safety & Degrees of Doneness

8.9 - Spices, Rubs, & Marinades

Question

1 = absolutely not, 10 = absolutely; 1 = no knowledge, 10 = expert knowledge

9.1 - Did the speaker effectively explain the information?

5.9 - Knowledge level before program?

8.1 - Knowledge level after program?

9.2 - Was the program beneficial?

9.1 - Was the program beneficial in helping understand food safety, handling, and proper cooking temperatures for meat?

Key Items of Evaluation

Nothing Significant to Report