V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Food Safety - Food Processing, Product Storage, and Food and Product 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
216	Integrated Pest Management Systems	3%		5%	
401	Structures, Facilities, and General Purpose Farm Supplies	16%		5%	
403	Waste Disposal, Recycling, and Reuse	6%		5%	
501	New and Improved Food Processing Technologies	20%		10%	
502	New and Improved Food Products	8%		10%	
503	Quality Maintenance in Storing and Marketing Food Products	9%		10%	
701	Nutrient Composition of Food	4%		10%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	11%		10%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	13%		25%	
723	Hazards to Human Health and Safety	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	1.3	0.0	4.0	0.0
Actual Paid Professional	2.0	0.0	5.0	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**
40276	0	219627	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
40276	0	219627	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
500000	0	1214872	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct research that evaluates food processing technologies with the aim of improving food value, quality, and safety. Provide technical applications, demonstrations and education for food processors.

2. Brief description of the target audience

Food producers; food processors; food handlers; food manufacturers; food safety regulators; and marketers of grain, feed and food.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1916	561680	0	0

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

Patent Applications Submitted

Year: 2012

Actual: 1

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	2	18	20

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer-reviewed journal articles

Year	Actual
2012	18

Output #2

Output Measure

- Number of conferences and other extension outreach presentations

Year	Actual
2012	47

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of processors and/or regulatory agencies implementing new rapid testing methods
2	Number of food processors implementing new technologies or technology improvements
3	New products produced
4	Grain storage, food or pest control entities adopting new process or product
5	Certified Hazard Analysis Critical Control Points (HACCP) training
6	Food process evaluations

Outcome #1

1. Outcome Measures

Number of processors and/or regulatory agencies implementing new rapid testing methods

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Educational programs for food safety with fresh produce farmers were not carried out for Oklahoma in the past. The impact of this is that even small instances of food borne illness can have tragic results and cost the fresh produce industry millions of dollars.

What has been done
Curricula, fact sheets and programs have been updated to provide the educational basis for farmers to manage their crops for food safety. Work is ongoing to harmonize GAP curricula and programs throughout the country.

Results
Prevention is vital for insuring fresh produce food safety. More than 175 producers have received food safety training through the Oklahoma Market Gardening School since 2008 and numerous farmers have been trained at other venues including the Oklahoma Horticulture Industry Show and programs with the Oklahoma Department of Agriculture, Food, and Forestry. Extension programs in food safety have raised awareness and numerous farm operations across the state have initiated food safety programs for their farms based on Good Agricultural Practices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
503	Quality Maintenance in Storing and Marketing Food Products
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety

Outcome #2

1. Outcome Measures

Number of food processors implementing new technologies or technology improvements

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	7

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
BlackJack Beef Jerky (BBJ) is a new company near Chickasha that requested facility design and startup assistance. They manufacture beef jerky according to a recipe that they purchased from another company. The recipe called for a particular type of dehydration operation and they required help identifying and testing potential ovens and suppliers, how the ovens would be installed in their plant, and assistance with the development of a Hazard Analysis Critical Control Points (HACCP) food safety plan.

What has been done
Tim Bowser visited their new plant sight while it was under construction and discussed details of completion, including how the ovens would operate and fit within the shell. Tim drew several alternatives for oven configuration and sent drawings to them. BBJ later visited the Robert M. Kerr Food and Agricultural Products Center (FAPC) to test a spiral oven for use on their product. Jake Nelson and the entire 2nd floor FAPC crew assisted with tests and evaluation of their product. Jason Young provided a HACCP plan template that they could use as a starting point. The FAPC are continuing to support BBJ in their plant startup efforts.

Results
A new facility (>3,000 sq. ft.) has been constructed near Chickasha and is currently under startup. It will be a USDA inspected meat-processing facility. About fifteen new jobs are expected to be created for management, sales, marketing, delivery and production of beef jerky products.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
503	Quality Maintenance in Storing and Marketing Food Products
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety

Outcome #3

1. Outcome Measures

New products produced

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The acreage of blackberries being grown in Oklahoma is increasing. Most blackberries are being grown as a fresh-market crop, but there is continued interest in producing value-added blackberry products from excess crop production. However, knowledge and experience with respect to which cultivars are best suited for production and best processing practices are lacking. With this knowledge in hand, the regional market for value-added blackberry products could be significantly expanded, thus creating new products, increased sales, and expanded employment.

What has been done

A novel partially-fermented blackberry beverage was produced using a process modified from traditional Korean practices that involves a mixed, high-oxygen fermentation of the fruit. Test conditions involved the use of two blackberry cultivars, natural fermentation versus fermentation with inoculated yeast culture, and high and low fermentation temperatures. Qualitative tests such as pH, titratable acidity, and percent soluble solids were conducted on the product at various stages in production as well as on the final product.

Results
The process resulted in a sweet beverage that contained around 2% alcohol and a pleasant blackberry flavor. Further testing is ongoing. However, the blackberry cultivars commonly grown in the Midwest appear to be very suitable for the production of this product. This knowledge furthers the development of this type of value-added blackberry product, which has potential marketability as a beverage and a dietary supplement.

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products
701	Nutrient Composition of Food

Outcome #4

1. Outcome Measures

Grain storage, food or pest control entities adopting new process or product

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Certified Hazard Analysis Critical Control Points (HACCP) training

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Food processors are being asked to comply with a host of new food safety protocols and procedures in order to satisfy government regulations such as the Food Safety Modernization Act

(FSMA) as well as to satisfy customer demands for written food safety plans, third-party food safety audits, and so on. Certified HACCP training gives processors the foundation they need in order to put together a food safety plan that will pass muster with regulators, customers, and the public.

What has been done
A series of two-day HACCP workshops were held in 2012, some on the campus of OSU-Stillwater and some on-site for individual companies. These workshops provided participants with the opportunity to become certified in basic HACCP principles and through hands-on exercises to being the process of crafting their own HACCP plans specific to their processing operations.

Results
More than 80 participants received their Basic HACCP certification by attending HACCP workshops in 2012. This resulted in higher levels of compliance with food safety requirements, safer processing operations, and processors being able to sell their products in markets that require sellers to have written food safety plans in place.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
503	Quality Maintenance in Storing and Marketing Food Products
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety

Outcome #6

1. Outcome Measures

Food process evaluations

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Processors of shelf-stable food products are often required by state or federal regulators to document the adequacy of the heat, drying, or other processes they use to render their foods commercially sterile. Larger processors may be able to accomplish this using their own in-house resources, but smaller companies must rely on outside expertise and testing facilities. These may be difficult to find and expensive to use.

What has been done

Laboratory testing facilities and personnel at the Robert M. Kerr Food and Agricultural Products Center (FAPC) are available to food processors as part of the Preserved Food Process Evaluation program. This program allows food processor to have their products tested at reasonable fee rates. From those test results, Process Authority letters are drafted. These letters provide processors with processing recommendations related to cook times and temperatures, maximum allowable pH values, and other critical safety limits related to product formulation and processing. The letters serve as reference for processors and food safety regulators in order to assure the safe production of the food products in question.

Results

More than 100 food products manufactured by 15 food processers were evaluated by the FAPC in 2012. A total of 98 Process Authority letters were issued; these letters provided companies with the information needed to produce safe products and the documentation needed to begin production in compliance with applicable state and federal food safety regulations.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
503	Quality Maintenance in Storing and Marketing Food Products
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes

Brief Explanation

Limited formula funding has hindered our ability to conduct applied research and technical assistance projects. In addition, financial and in-kind support from industry partners has been flat or in some cases has dropped as a result of the extended economic downturn.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Extension and outreach programs were evaluated based on before and after assessment of student knowledge.

Key Items of Evaluation