

V(A). Planned Program (Summary)

Program # 5

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
311	Animal Diseases			10%	
315	Animal Welfare/Well-Being and Protection			10%	
501	New and Improved Food Processing Technologies			8%	
603	Market Economics			4%	
607	Consumer Economics			4%	
701	Nutrient Composition of Food			10%	
703	Nutrition Education and Behavior			4%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources			10%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins			40%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	2.6	0.0
Actual Paid Professional	0.0	0.0	2.7	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	230114	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	400569	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 scientific research. Publish peer-reviewed journal articles and other publications. Present findings at professional and public meetings and at other venues, and provide training sessions for food producers and processors. Educate undergraduate and graduate students.

2. Brief description of the target audience

Maine food producers and processors, Cooperative Extension staff, other scientists, state policymakers, regulators, and legislators, classroom teachers, consumers, and general public.

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	0	0	0	0

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

Patent Applications Submitted

Year: 2012
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	1	10

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of other publications

Year	Actual
2012	17

Output #2

Output Measure

- Completed research projects

Year	Actual
2012	3

Output #3

Output Measure

- Number of presentations at scientific meetings/conferences

Year	Actual
2012	11

Output #4

Output Measure

- A prototheca workshop was given at the National Mastitis Council annual meeting during 2012

Year	Actual
2012	1

Output #5

Output Measure

- Amount researchers in this program area received in extramural grants and contracts: \$245,000

Year	Actual
2012	245000

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Federal food safety agencies may alter the way they calculate the benefits of food safety programs and may change their food safety program priorities
2	Percentage of Maine food industry and food producers adopting new effective methods to eliminate microbial contaminations
3	Percentage of Maine food industry and food producers using ingredients with natural antimicrobial properties in food products to control foodborne pathogens
4	Safer food supply and protection against foodborne illness and bacterial infection for the people of Maine
5	Increased number of regional dairy farmers using an alternative teat dip
6	Reduction in use of disinfectant teat dips will increase level of human health
7	Increase number of viable technologies to improve food safety
8	Improve mastitis prevention/control efforts for Maine dairy farms

Outcome #1

1. Outcome Measures

Federal food safety agencies may alter the way they calculate the benefits of food safety programs and may change their food safety program priorities

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The function of product information approaches (e.g., labeling and social marketing) is to improve the flow of information to consumers who, in turn, alter their information search and or product purchase behaviors. These changes in consumer behaviors then may lead to changes in the behaviors of food safety agencies. For example, agencies may develop new marketing strategies or target different consumers.

What has been done

University of Maine economists have examined the effectiveness of Maine CDC's fish consumption advisory. The researchers administered a mail survey that collected data from pregnant women about their fish consumption. They used the resulting data to measure the effectiveness of Maine CDC's education strategy to convince pregnant and nursing women switch away from eating fish with high levels of mercury contamination to fish with low levels of contamination.

Results

The results of the survey study led CDC to redesign the advisory and for the researchers to re-examine the effectiveness of the advisory. The readers of the new advisory were more aware and knowledgeable of safe fish consumption, increased their consumption of low-mercury, high omega-3 pre-packaged salmon, decreased their consumption of high-mercury white tuna, and significantly, increased their consumption of low-mercury fish.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies

- 603 Market Economics
- 607 Consumer Economics
- 703 Nutrition Education and Behavior

Outcome #2

1. Outcome Measures

Percentage of Maine food industry and food producers adopting new effective methods to eliminate microbial contaminations

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Percentage of Maine food industry and food producers using ingredients with natural antimicrobial properties in food products to control foodborne pathogens

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Safer food supply and protection against foodborne illness and bacterial infection for the people of Maine

2. Associated Institution Types

- 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)

Consumption of fresh fruits and vegetables has increased in recent years. With an increase in consumption has come an increased frequency of foodborne outbreaks associated with raw or minimally processed fruits and vegetables. Bacterial foodborne outbreaks have been associated with fresh fruit and vegetable products including a recent Escherichia coli O157:H7 outbreak

associated with spinach. Therefore, research is needed to better understand not only the mechanisms through which pathogens can contaminate fresh fruits and vegetables, but also the procedures for eliminating pathogens once they are present, either on the surface or in internal tissues, and the analytical methods for pathogen detection.

What has been done

MAFES food scientists have established a simple predictive model based on the correlation of catalase activity and viable microbial counts for celery, bell pepper and ready-to-eat salad (lettuce) and have verified the model by random samples.

Results

The scientists found that the catalase activity in the sample is positively correlated to the log concentration of bacteria and fungi. The model based on the correlation between catalase activity and microbial loads was established and tested, with results that show accuracy of prediction at higher levels of contamination. The catalase assay is a simple, reliable, and rapid way of detecting concentration of total microorganisms in vegetables tested. It may have potential utility in a school cafeteria setting, or any other place with ready-to-eat foods.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #5

1. Outcome Measures

Increased number of regional dairy farmers using an alternative teat dip

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Reduction in use of disinfectant teat dips will increase level of human health

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Increase number of viable technologies to improve food safety

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

There is a strong need for more efficient, more sensitive, and less expensive methods for analyzing both beneficial and toxic chemicals in our food and water.

What has been done

University of Maine researchers have used advanced analytical (chromatography) resources to support Maine agricultural, food processing, and biotech industries. Their continued long-term collaboration with Beacon Analytical Systems, a small Maine biotech company, has produced a number rapid analytical kits for the analysis of melamine (toxic adulterant) in various food matrices; Florfenicol (antibiotic) in lobster tissue; and capsaicinoids (natural pungent compounds) in hot pepper food products. Several years of work with Maine Medicinals, testing bioactive compounds in various elderberry cultivars and elderberry food products has helped establish a small elderberry agriculture presence in Maine, which should grow in importance over the next few years. The researchers have worked with the Maine Board of Pesticide Control to develop a better understanding of the fate and transport of pyrethroid and organophosphate pesticides in the environment.

Results

Their work with Beacon Analytical Systems in the area of melamine/cyanuric acid analysis, has helped the firm to continue to refine its rapid assay kit and has led to the creation of several well-paid scientific research jobs in Maine. The researchers' work with the elderberry growers has led to the production of several new foodstuffs that now enjoy a nationwide distribution. Knowledge gained from the fate of pesticide residues on blueberry fruit will lead to more effective insecticide application, while reducing potentially harmful residues.

4. Associated Knowledge Areas

KA Code	Knowledge Area
701	Nutrient Composition of Food
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

Outcome #8

1. Outcome Measures

Improve mastitis prevention/control efforts for Maine dairy farms

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Mastitis continues to be a major economic risk, capable of devastating the small or large dairy operation. Prevention and control have relied on hygiene during and between milkings, antibiotic treatment or teat sealants during the dry period, antibiotic treatment of clinically detectable mastitis, and culling of seriously affected cattle. Due to human health concerns, dairy farmers follow strict regulations, and are encouraged to avoid exogenous chemicals or drugs.

What has been done

University of Maine animal scientists have developed a nested PCR to screen bulk tank filters for prototheca, a colorless algae capable of causing bovine mastitis. This test was developed in their lab, and a statewide prototheca prevalence survey was completed using bulk tank filters from collaborating dairies. The PCR test has been used to screen dairies on a research and clinical basis in the mastitis lab. The scientists have also tested pasteurization resistance of Maine prototheca isolates, and evaluated bedding types for prevention of prototheca on farms.

Results

Implementation of a nested PCR for detection and speciation of prototheca from dairy farm samples has contributed to a change in knowledge by allowing sensitive and specific detection of prototheca in a herd of dairy cattle. The research has also shown that the use of cedar shavings as a bedding source minimizes prototheca transmission on the farm. The new screening ability has led one dairy farmer to change methods of water delivery, cleaning/sanitizing methods, and engage in repeated testing/culling to keep the disease under control. Rapid detection and prompt action should reduce the incidence of prototheca mastitis, improve milk quality, and decrease the cost of milk production for Maine dairy farms. As more information about the state and regional prevalence of protothecal mastitis is developed, the disease should decrease in incidence due to improved hygiene and culling of infected cattle.

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases
315	Animal Welfare/Well-Being and Protection
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
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Evaluations are currently conducted at the project and program levels. At the project level, all projects are reviewed by an internal research council and external peer reviewers when initiated and again at completion by the research council. During the research council final evaluation, the focus is on determining if terminating projects met their stated objectives, secured extramural funding, and produced peer-reviewed publications. For FY12, two projects went through the review process in this program area. As for other measures of successful research programs, faculty in this program area published 10 peer-reviewed articles.

Researchers use a variety of methods to evaluate their own research projects including evaluations retrospectively, before-after, and during the life of the project; case studies; and comparisons between treatment/intervention and nontreatment/nonintervention.

At the program level, external NIFA review teams are asked to review the research programs of schools/departments. These teams provide input on the impact and productivity of research programs supported through the station. The station is working to develop a standard program-level evaluation process, which will be used to evaluate each station program area. Our current plans include an approach based on use of expert panels as recommended by the federal Government Accounting Office with individual program evaluations occurring every four to five years on a staggered time table.

Key Items of Evaluation