V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Food Safety

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
<th>%1862 Extension</th>
<th>%1890 Extension</th>
<th>%1862 Research</th>
<th>%1890 Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>502</td>
<td>New and Improved Food Products</td>
<td></td>
<td></td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>701</td>
<td>Nutrient Composition of Food</td>
<td></td>
<td></td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>711</td>
<td>Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources</td>
<td></td>
<td></td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>712</td>
<td>Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins</td>
<td></td>
<td></td>
<td>63%</td>
<td></td>
</tr>
</tbody>
</table>

Total: 100%

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

<table>
<thead>
<tr>
<th>Year: 2009</th>
<th>Extension</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1862</td>
<td>1890</td>
</tr>
<tr>
<td>Actual</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.0</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Extension</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smith-Lever 3b &amp; 3c</td>
<td>Hatch</td>
</tr>
<tr>
<td>0</td>
<td>60493</td>
</tr>
<tr>
<td>1862 Matching</td>
<td>1862 Matching</td>
</tr>
<tr>
<td>0</td>
<td>194898</td>
</tr>
<tr>
<td>1862 All Other</td>
<td>1862 All Other</td>
</tr>
<tr>
<td>0</td>
<td>31689</td>
</tr>
</tbody>
</table>

V(D). Planned Program (Activity)

1. Brief description of the Activity

MAFES scientists conducted research experiments on new food processing technologies and improved methods for detecting food-borne pathogens. They published peer-reviewed articles and other types of publications and presented their findings at scientific meetings and other venues.

2. Brief description of the target audience

Scientists; extension educators; policy makers; specialty food producers; seafood processors; fruit and vegetable farmers; students; consumers.

V(E). Planned Program (Outputs)
1. Standard output measures

<table>
<thead>
<tr>
<th></th>
<th>Direct Contacts Adults</th>
<th>Indirect Contacts Adults</th>
<th>Direct Contacts Youth</th>
<th>Indirect Contacts Youth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
<td>{NO DATA ENTERED}</td>
<td>{NO DATA ENTERED}</td>
<td>{NO DATA ENTERED}</td>
<td>{NO DATA ENTERED}</td>
</tr>
<tr>
<td>Actual</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

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

**Patent Applications Submitted**

- **Year:** 2009
- **Plan:** 0
- **Actual:** 0

**Patents listed**

3. Publications (Standard General Output Measure)

**Number of Peer Reviewed Publications**

<table>
<thead>
<tr>
<th></th>
<th>Extension</th>
<th>Research</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
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<td></td>
</tr>
<tr>
<td>Actual</td>
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<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

V(F). State Defined Outputs

**Output Target**

**Output #1**

**Output Measure**
- Number of other publications

<table>
<thead>
<tr>
<th>Year</th>
<th>Target</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>{No Data Entered}</td>
<td>11</td>
</tr>
<tr>
<td>O. No.</td>
<td>OUTCOME NAME</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Enhancing the survival rate of Maine lobsters stored in pounds</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Helping Maine’s fledgling elderberry industry</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Methods to minimize patulin contamination on organic apples</td>
<td></td>
</tr>
</tbody>
</table>
Outcome #1

1. Outcome Measures

Enhancing the survival rate of Maine lobsters stored in pounds

2. Associated Institution Types

● 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantitative Target</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>{No Data Entered}</td>
<td>0</td>
</tr>
</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Consumers and producers both care a great deal about the safety and health benefits of food products. There is a need for more efficient, more sensitive and less expensive methods for the analysis of both beneficial and toxic chemicals in our food and water.

What has been done
In a cooperation with a small Maine company and the Maine Aquatic Animal Health Laboratory, MAFES food scientists helped to establish a rapid and inexpensive analytical protocol to test the effectiveness of Florfenicol as an antibiotic in Maine lobster pounds.

Results
The lobster fishery is vitally important to Maine's economy, contributing some $280M per year. Our collaborative work with the Maine Aquatic Animal Health Laboratory and with Beacon Analytical Systems has resulted in the production of a commercially available kit to test lobster hemolymph for residual Florfenicol. In addition to supporting a small company, this research will boost help boost the survival rate of lobsters stored in pounds, enhancing profit margins for lobster fishermen, wholesalers and retailers.

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>701</td>
<td>Nutrient Composition of Food</td>
</tr>
<tr>
<td>711</td>
<td>Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources</td>
</tr>
</tbody>
</table>

Outcome #2

1. Outcome Measures

Helping Maine's fledgling elderberry industry

2. Associated Institution Types

● 1862 Research
3a. Outcome Type:
Change in Action Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantitative Target</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>{No Data Entered}</td>
<td>0</td>
</tr>
</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Consumers and producers both care a great deal about the safety and health benefits of food products. There is a need for more efficient, more sensitive and less expensive methods for the analysis of both beneficial and toxic chemicals in our food and water.

What has been done
MAFES food scientists are working closely with two elderberry grower/processors to help establish the best varieties and the processing methods to retain the highest levels of anthocyanins and phenolic compounds in a number of elderberry products. This analytical work includes assessing and quantifying individual anthocyanins and phenolic acids using sophisticated instrumentation.

Results
These collaborative projects with Maine elderberry entrepreneurs have resulted in significant improvement of antioxidant levels in elderberry food products, enabling the tiny company and fledgling Maine elderberry industry to grow significantly over the past year.

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
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</thead>
<tbody>
<tr>
<td>701</td>
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</tr>
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<td>711</td>
<td>Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources</td>
</tr>
</tbody>
</table>

Outcome #3

1. Outcome Measures

Methods to minimize patulin contamination on organic apples

2. Associated Institution Types

● 1862 Research

3a. Outcome Type:
Change in Action Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantitative Target</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>{No Data Entered}</td>
<td>0</td>
</tr>
</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Patulin is a mycotoxin produced by mold and often found in rotting apples. Although it is not particularly potent, the World Health Organization has set recommendations for levels in apple juice/cider. While there is increasing
demand for organic food products, consumers are concerned about food safety. Organic standards limit certain tools that are available to other food producers.

What has been done
In joint projects with the University of Maine Laboratory for Surface Science and Technology, MAFES food scientists continued work to develop and rapid sensor for the mycotoxin patulin in apple products. The goal of this research will be to make existing procedures more sensitive, reliable and inexpensive. The researchers are working with University of Maine Cooperative Extension researchers towards the development and implementation of processing techniques to minimize patulin contamination of the food supply.

Results
The food scientists recently completed work using vinegar as a natural biological control to reduce patulin concentrations in apple cider. This new method gives organic growers and cider producers a new tool to control the levels of this mycotoxin in their products, resulting in a safer product and expanding options for value-added organic apple products.

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>701</td>
<td>Nutrient Composition of Food</td>
</tr>
<tr>
<td>711</td>
<td>Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources</td>
</tr>
</tbody>
</table>

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
- Competing Programmatic Challenges

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}