V(A). Planned Program (Summary)

Program # 5

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>712</td>
<td>Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

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>1862</td>
<td>1890</td>
<td>1862</td>
</tr>
</tbody>
</table>

| Actual  | 10.0     | 2.0      | 7.0      | 6.7      |

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>317038</td>
<td>803560</td>
</tr>
<tr>
<td>1862 Matching</td>
<td>1862 Matching</td>
</tr>
<tr>
<td>317038</td>
<td>124660</td>
</tr>
<tr>
<td>1862 All Other</td>
<td>1890 All Other</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

V(D). Planned Program (Activity)

1. Brief description of the Activity

1. Food Safety is For Everyone: Initiated FoodSmart Impact Team to lead, develop, implement, and evaluate food safety education programs for UME. Classes and workshops were conducted on integrating relevant food safety info into nutrition and health educational opportunities; Provided Faculty updates and training; Consumer Alerts to Faculty and public; Developed and implemented Online Food Safety Course for Child Care Providers; Conducted hand washing interactive exhibits at Maryland State Fair and county fairs; conducted food preservation workshops; developed collaborative effort with Home & Garden Info Center and Master Gardeners; Farm-To-School Initiative with emphasis on local, healthy veggies for schools; developed exhibits; developed fact sheet.; mass media; news articles; social marketing messages.

2. Molecular Characterization and Predictive Modeling of Salmonella spp.: Collaborations established, students were trained in microbiology and molecular biology, experiments were conducted, and abstracts have been submitted, presented and published.

3. Research was conducted on different aspects of food safety and quality including resistant pathogens, food safety risk analysis, anti-aging and cancer preventive effect of Se.

2. Brief description of the target audience
Consumers: Youth; Adults; Older Adults
Fruit and vegetable producers
Food service workers; childcare workers; community-based organizations
Service agencies related to food production, promotion, consumption, protection, education
Poultry industry, risk assessors, risk managers, and scientific community

V(E). Planned Program (Outputs)

1. Standard output measures

<table>
<thead>
<tr>
<th>2009</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>4059</td>
<td>10000</td>
<td>537</td>
<td>2000</td>
</tr>
</tbody>
</table>

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

Patent Applications Submitted

Year: 2009
Plan: 
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

<table>
<thead>
<tr>
<th>2009</th>
<th>Extension</th>
<th>Research</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Actual</td>
<td>3</td>
<td>15</td>
<td>18</td>
</tr>
</tbody>
</table>

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Food Safety is For Everyone: # presentations; # participants; # fact sheets developed; # educational materials developed; # exhibits developed;

<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>68</td>
</tr>
</tbody>
</table>
### V. State Defined Outcomes Table of Content

<table>
<thead>
<tr>
<th>O. No.</th>
<th>OUTCOME NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Food Safety is For Everyone:  # following key recommendations of food safety-clean, separate, cook, &amp; chill; # planning to thaw frozen foods in refrigerator instead of on kitchen counter; # planning to use food thermomenter to monitor temperature of potentially hazardous foods; # planning to wash fruits and vegetables before eating or preparing them to serve.</td>
</tr>
<tr>
<td>2</td>
<td>Molecular Characterization and Predictive Modeling of Salmonella spp. Recovered from Processed Poultry. Also, Immobilization of bioluminescent Escherichia coli cells using natural and artificial fibers treated with polyethyleneimine</td>
</tr>
</tbody>
</table>
Outcome #1

1. Outcome Measures

Food Safety is For Everyone: # following key recommendations of food safety-clean, separate, cook, & chill; # planning to thaw frozen foods in refrigerator instead of on kitchen counter; # planning to use food thermometer to monitor temperature of potentially hazardous foods; # planning to wash fruits and vegetables before eating or preparing them to serve.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge 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>1206</td>
</tr>
</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
During the past 30 years, there has been an increased incidence of food borne illnesses. Currently, one in four Americans suffers from food borne illness each year. Some foods, such as fruits and vegetables, are often consumed raw or with limited preparation. It is important that producers and consumers practice safe food handling to decrease the burden of food borne illness.

**What has been done**
Food Safety Classes taught; Food Safety integrated into nutrition and food preparation classes; Food Preservation workshops conducted; online food safety course developed and implemented; Mass Media; newsletters; new partnerships developed; new farm to school initiative developed; fact sheet developed; exhibits and brochures developed; health fairs.

Research on the pathogenic prevention, anti-aging, anti colon cancer was conducted with excellent outcomes.

**Results**
After participating in Food Safety education, participants submitted the following evaluation data via surveys:
- 53% plan to follow the key recommendations of food safety-clean, separate, cook, and chill (n=101).
- 58% plan to thaw foods in the refrigerator rather than on the kitchen counter (n=57).
- 55% plan to use a food thermometer more often to monitor the temperature of potentially hazardous foods (n=99).
- 34% plan to wash fruits and vegetables more often before eating and/or preparing food (n=74).

Five food Preservation classes were taught in two Maryland counties for the first time in recent years. More than 50 participants received research-based information on the correct, safe, and most up-to-date food preservation recommendations and guidelines. The hands on workshop was offered due to increased demand and interest in how to correctly and safely preserve the harvest from the garden and locally available produce while also retaining nutritional value.

As a result of these workshops, participants indicated they planned to:
- spice later and adhere strictly to reliable recipes; Follow recipe and not add additional items; can following recommended practices.

Research was published in refereed journals and some of the results of the research was used by our extension faculty to educate public on food safety from pathogens and its nutritional or health values.

4. Associated Knowledge Areas
Outcome #2

1. Outcome Measures


2. Associated Institution Types

● 1862 Research
● 1890 Research

3a. Outcome Type:

Change in Knowledge 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)
Food of animal origin, especially poultry and poultry products, has been implicated in outbreaks of human salmonellosis. Recently, a number of investigators have suggested that processing conditions may play a significant role in promoting/influencing the selection of antimicrobial resistant pathogens during processing. Little information is available about the association between the presence of virulence factors in Salmonella spp. and their potential for causing human illness. The main goal of this project is to characterize Salmonella spp. recovered from processed poultry.

What has been done
A total of 309 (146 pre- and 163 post-chill) isolates recovered from processed poultry were tested for the presence of Salmonella virulence genes invA, pagC, and spvC by PCR. Bioassays were used to evaluate aerobactin and colicin production.

Artificail and natural fibers treated with polyethyleneimine was sucessful in immobilizing the bioluminescent E. Coli, which has a great value in food inspection.

Results
All isolates contained invA and pagC but only 1.3 percent contained spvC. All spvC positive isolates were S. Typhimurium—one of them was recovered from pre-chill and the other three were recovered from post-chill. There was no significant difference (P> 0.05) in the presence of virulence factors between pre- and post-chill isolates. The results suggest that Salmonella isolates recovered from pre- and post-chill whole broiler carcasses can possess virulence factors and thus have the potential to cause salmonellosis. The research also indicates that chilling had no effect on virulence factors of Salmonella.

Two refereed publications resulted from this study of E. Coli immobilization.

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>712</td>
<td>Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins</td>
</tr>
</tbody>
</table>
V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Competing Programmatic Challenges

Brief Explanation

Due to a difficult economy that has resulted in a prolonged hiring freeze, UME has limited faculty to address food safety programmatic needs or consumer requests. The hiring freeze may well continue into the next program year. Limited budget has resulted in limitation in the laboratory equipment and hiring of graduate students to conduct further research in the overall food safety area at UMCP's College of Agriculture and Natural Resources.

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

1. Evaluation Studies Planned

- After Only (post program)
- Before-After (before and after program)

Evaluation Results

Most evaluation data for Food Safety programs were collected via post/pre surveys. Specific program impacts and outcomes for this effort have been reported in the outcomes section. Research outcome of the activities under Food Safety was evaluated both at the proposal stage (pre) and then at the time of publishing data in the refereed journals (post).

Key Items of Evaluation