

V(A). Planned Program (Summary)

Program # 15

1. Name of the Planned Program

Food Safety--Research

- 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
211	Insects, Mites, and Other Arthropods Affecting Plants	0%	0%	11%	
212	Diseases and Nematodes Affecting Plants	0%	0%	41%	
213	Weeds Affecting Plants	0%	0%	5%	
215	Biological Control of Pests Affecting Plants	0%	0%	4%	
216	Integrated Pest Management Systems	0%	0%	11%	
311	Animal Diseases	0%	0%	6%	
312	External Parasites and Pests of Animals	0%	0%	1%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	0%	0%	2%	
315	Animal Welfare/Well-Being and Protection	0%	0%	2%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	0%	0%	4%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	0%	0%	7%	
721	Insects and Other Pests Affecting Humans	0%	0%	3%	
723	Hazards to Human Health and Safety	0%	0%	3%	
	Total	0%	0%	100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	1.0	0.0
Actual Paid	0.0	0.0	115.0	0.0

Actual Volunteer	0.0	0.0	0.0	0.0
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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	1043983	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1043983	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

Projects may be in many areas but many will relate to improving fresh produce safety/ Small farm food safety and/or identifying BMPs to improve home food preservation and food safety issues related to food handlers.

2. Brief description of the target audience

Residents of Florida
 Those in restaurant related careers
 growers and producers
 home canners

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2014	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: 2014
Actual: 4

Patents listed

1. Use of Bacteriophage Outer Membrane Breaching Proteins Expressed in Plants for the Control of Gram-negative Bacteria (CIP of 11238 and 12626)
2. Method for Increasing the Speed and Resolution of Gas Permeation Instruments
3. The Use of Hypotaurine and Related Compounds to Inhibit Enzymatic Browning in Food (CIP)
4. Sustained Release Devices for Repellents of Insects to Protect Horses and Other Animals

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	0	206	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Identify BMPS that would decrease foodborne illness

Outcome #1

1. Outcome Measures

Identify BMPS that would decrease foodborne illness

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The CDC estimates Shiga toxin-producing E. coli (STEC) causes approximately 175,000 illnesses, 2,400 hospitalizations and 20 deaths annually in US alone. While O157 serogroup is most well-known, non-O157 serogroups, particularly those belonging to six O groups, O26, O111, O103, O121, O45, and O145, have been recognized as a growing public health concern. Since STEC infections can lead to serious complications such as hemorrhagic colitis, hemolytic uremic syndrome and even death, it is highly crucial to detect STEC infection to properly treat the patients and control the outbreaks in timely manner.

What has been done

In this study, we propose to develop a microbead-based suspension array for STEC detection and identification of its serogroup, which can be applied to various food and environmental samples. Currently there are no selective media that are able to identify non-O157 STEC. A sensitive non-culture method to detect all STEC strains with minimal cross-reactivity would be valuable to control STEC contamination in foods and STEC-associated infections in public. Moreover, when detection techniques are applied for pre-harvest food safety to control STEC contamination in cattle or fresh produce, a detection assay that could provide results within 24 hrs (compared to 3-4 days for culture methods) would be highly desirable in that it would allow producers time to implement corrective actions and control further transmission.

Results

In the study of developing DNA microarray, all the designed primers were able to specifically detect target STEC serotype without failure. When samples are tested for the presence of STEC by using PCR only, it requires multiple steps to confirm the presence of STEC and identify the serotype of the detected STEC, mostly due to the limit of primer numbers that can be incorporated in a single reaction (5-6 primer sets per reaction). When the PCR products are

tested with DNA microarray proposed in this study, it will be able to test the presence of target based on the fluorescent signal, not on the size of band on agarose gel, and therefore it will be able to accommodate more number of primers in a single reaction (12-15 primer sets per reaction), and will significantly increase the detection efficiency. This will ultimately lead to more effective monitoring system for STEC in foods and improve food safety and public health.

4. Associated Knowledge Areas

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
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
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

Many parts of the state are still struggling due to the economy. This leads to greater numbers of people in need of help. Controversial issues such as climate change and GMOs take additional time and care when building relationships and trust with clientele, partners, and other stakeholders. Cuts to the university budget in year's past continue to have some impact. We are in the process of evaluating our Extension staffing needs statewide to ensure we are using our human resources most efficiently.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

In 2014, UF/IFAS Research did not conducted a formal or comprehensive evaluation of the summation of all research conducted on areas related to this program area. Surrogate measures such as expenditures, patents and peer-reviewed publications are included in this report for each planned program. The competitive funding process and administrative oversight, as well as the peer review process and stakeholder input process described in this report, are evaluative methods for insuring our research projects are valid and useful.

Key Items of Evaluation

No additional information to provide.