

**V(A). Planned Program (Summary)**

**Program # 2**

**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
501	New and Improved Food Processing Technologies		25%		25%
502	New and Improved Food Products		25%		25%
503	Quality Maintenance in Storing and Marketing Food Products		25%		25%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins		25%		25%
	<b>Total</b>		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	0.0	0.3	0.0	0.7
Actual Paid Professional	0.0	0.4	0.0	0.8
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	74608	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	45263
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**

Studies focused on effects of edible coatings including chitosan or hydroxypropyl methylcellulose and sanitizers including sodium hypochlorite or peroxyacetic/octanoic acid mixture on microbiological quality of fresh-cut sweet potatoes at refrigeration storage under modified atmosphere packaging.

**2. Brief description of the target audience**

Local farmers and limited resource farmers

**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
<b>Actual</b>	20	10	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
<b>Actual</b>	0	0	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Three abstracts and three presentations at the scientific annual meetings. Three peer reviewed publications. Three presentations and/or workshops to farmers.

<b>Year</b>	<b>Actual</b>
2012	2

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Increase number of small farmers and producers who adopt UAPB's Fresh-Cut Processing Technology and utilize it for market development of their fresh-cut produce.

## **Outcome #1**

### **1. Outcome Measures**

Increase number of small farmers and producers who adopt UAPB's Fresh-Cut Processing Technology and utilize it for market development of their fresh-cut produce.

### **2. Associated Institution Types**

- 1890 Extension
- 1890 Research

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2012	0

### **3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
503	Quality Maintenance in Storing and Marketing Food Products
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

### **V(H). Planned Program (External Factors)**

#### **External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)

#### **Brief Explanation**

Weather conditions may affect production of sweet potatoes needed for the research.

## **V(I). Planned Program (Evaluation Studies)**

### **Evaluation Results**

Sweet potatoes (*Ipomoea batatas*) were obtained from the University of Arkansas at Pine Bluff Research Demonstration Farm (Lonoke, AR). Sweet potatoes were washed, peeled, and sliced. Fresh-cut sweet potatoes were coated with edible coating or treated with sanitizers to evaluate shelf life extension and preservation quality. Edible coating solutions include 1% of hydroxypropyl methylcellulose (HPMC) solution and 1% of chitosan (CTS) solution. Sanitizer solutions include 100 ppm of sodium hypochlorite (SHC) solution and 40 ppm of peroxyacetic/octanoic acid mixture (POA). Fresh-cut sweet potatoes were dipped into edible coating solutions or sanitizer solutions. Treated samples were packaged under modified atmosphere packaging (MAP) in low O<sub>2</sub> permeability bags and flushed with gas composed of 2% O<sub>2</sub> and 5% CO<sub>2</sub> or under air packaging in high O<sub>2</sub> permeability bags. Packaged samples were stored for 14 days at 4°C. Samples were taken from the refrigerator at 0, 4, 7, 11, and 14 day of storage. The headspace of O<sub>2</sub> and CO<sub>2</sub> were measured. Aerobic plate counts and yeast and mold counts were determined.

The average of initial aerobic plate counts of control (uncoated), HPMC, CTS, SHC, POA in both air packaging and MAP were 2.8 log CFU/g on day 0. The average of aerobic plate counts of control (uncoated), HPMC, CTS, SHC, POA in both air packaging and MAP were 7.1 log CFU/g on day 14. Aerobic plate counts of CTS coated and SHC treated samples were 0.5 log lower than control samples after 14 days of storage regardless of packaging method. The average of initial yeast and mold counts of control (uncoated), HPMC, CTS, SHC, POA in both air packaging and MAP were 1.5 log CFU/g on day 0. The average of yeast and mold counts of control (uncoated), HPMC, CTS, SHC, POA in both air packaging and MAP were 4.5 log CFU/g on day 14. Yeast and mold counts of CTS coated and SHC treated samples in MAP and air and POA treated sample in MAP were 0.5 - 1.0 log lower than control samples after 14 days of storage. From the study results, either chitosan coating or sodium hypochlorite sanitizer showed inhibitory effect on both aerobic plate counts and yeast and mold counts regardless of packaging method. Peroxyacetic/octanoic acid mixture showed inhibitory effect against yeast and mold counts under modified atmosphere packaging.

Hunter color L\*, a\*, b\* values did not show any significant difference throughout storage.

Initial O<sub>2</sub> concentrations in MAP and in air packaging were 2 and 20%, respectively. After 14 days of storage, O<sub>2</sub> concentrations in MAP increased to 8-10%, whereas those in air packaging decreased to 12-14%. Initial CO<sub>2</sub> concentrations in MAP and in air packaging were 4.5 and 0.5%, respectively. After 14 days of storage, CO<sub>2</sub> concentrations in MAP increased to 8-10%, whereas those in air packaging decreased to 12-14%.

Sweet potatoes treated with chitosan coating or sanitizer, sodium hypochlorite, had slightly lower bacterial counts compared to those with other treatments during storage. Microbiological quality of fresh cut sweet potatoes could be maintained up to 11

days at 4°C regardless of gas composition in packaging bags. Overall, no significant beneficial effect of modified atmosphere packaging was observed on microbiological quality characteristics of fresh-cut sweet potatoes.

#### **Key Items of Evaluation**

Sweet potatoes treated with chitosan coating or sodium hypochlorite treatment had slightly lower aerobic plate counts compared to those with other treatments during storage. Modified atmosphere packaging of 2% O<sub>2</sub> and 5% CO<sub>2</sub> showed no significant effect on shelf life extension.