

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

**Program # 5**

**1. Name of the Planned Program**

Childhood Obesity, Human Nutrition and Health

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			15%	
502	New and Improved Food Products			15%	
702	Requirements and Function of Nutrients and Other Food Components			20%	
703	Nutrition Education and Behavior			30%	
724	Healthy Lifestyle			20%	
	<b>Total</b>			100%	

**V(C). Planned Program (Inputs)**

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	3.5	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	351534	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	569425	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	301069	0

## **V(D). Planned Program (Activity)**

### **1. Brief description of the Activity**

West Virginia citizens have the second highest level of obesity in the Nation (33.8%, Center for Disease Control, 2012). West Virginia is also above the national averages for incidence of diabetes, high blood pressure, and cardiovascular disease, as well as for osteopenia and osteoporosis. Station research in human nutrition and health is focused on determining the current and potential impacts of diet, nutritional education and dietary intervention on obesity and obesity related conditions (diabetes, elevated cholesterol and plasma lipids, heart attack, stroke and some cancers). The program also is testing the efficacy and safety of bioactive compounds in foods, including krill protein, and is developing omega-3 DHA enhanced diets and educational programs to support their adoption.

A number of projects continued to look at the effects of omega-3 DHA enhanced diets on various aspects of human health, either directly or through animal models. The general population is encouraged to increase omega-3 polyunsaturated fatty acid (n-3 PUFA) intake in order to optimize health for preventative health care. Consumers are typically unaware that different amounts, types, and structural forms of n-3 PUFA have different efficacy. Therefore, the objectives of one research project were to characterize different sources of n-3 PUFAs and to determine whether consumption of these oils influences renal fatty acid composition and renal health. Lipid classes and fatty acid profile of corn (CO), flaxseed (FO), menhaden (MO), salmon (SO), tuna (TO) or krill (KO) oils were determined by thin-layer and gas chromatography. The study results indicated that consumption of n-3 PUFAs influences renal health and the effects varied depending on the n-3 PUFA source consumed. The research so far has led to receipt of a Soybean Health Program Incentive Grant and the preparation and submission of a NIH R01 grant. The next phase of the study will look at the effects of diet on polycystic kidney disease progression.

Twenty-first century consumers are fully aware of health benefits associated with omega-3 FA. Similarly to organic foods, the sales of nutraceutical food products have steadily increased over the past decade and it is expected that this trend will continue. The main goal of another research project is to develop nutritional foods that are high in omega-3 FA and would appeal to consumers. Development of foods containing higher concentrations of omega-3 FA are of interest because of their role in decreasing the risk of diseases such as cardiovascular disease, type 2 diabetes and obesity. The impact of this research could have positive effects on overall nutrition and health of consumers. Isoelectric solubilization and precipitation (ISP) processing is a protein recovery process where high or low pH conditions cause protein separation from insoluble fractions of the fish (i.e. bones, skin, scales, etc.) by solubilization. Using pH shifts, protein is recovered by precipitation and centrifugation. This process has been shown to provide efficient and favorable recovery rates when compared to other commercial processing techniques such as mechanical filleting or conventional methods involving separators and decanters (Taskaya et al., 2009). Traditionally, strong acids such as HCl are used in the process but organic acids have been shown to be more effective at reducing bacterial pathogens. The results of these studies showed that organic acids have the potential to recover protein and lipid from otherwise hard to process fish by ISP processing. The gels made from recovered carp protein show similar or improved functional, texture and color properties compared to Alaska Pollock surimi depending on the treatment and might be used for the development of restructured fish products and value-added for human consumption.

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

The target audience for this program area includes dietitians, nutritionists, policy makers, researchers, extension specialists, 4-H and other youth program developers, community leaders and State citizens.

### **3. How was eXtension used?**

eXtension was not used in this program

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2013	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: 2013

Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2013	Extension	Research	Total
Actual	0	9	0

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

**Output Target**

**Output #1**

**Output Measure**

- Presentations on research at scientific meetings

Year	Actual
2013	10

**Output #2**

**Output Measure**

- Popular press articles on research

Year	Actual
2013	2

**Output #3**

**Output Measure**

- Completed graduate degree programs

<b>Year</b>	<b>Actual</b>
2013	3

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

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

O. No.	OUTCOME NAME
1	Annual reduction in state incidence of obesity -% reduction
2	Participants in nutrition workshops will increase their knowledge of the relation between nutrition and health (% of participants reporting a gain in knowledge).
3	Participants in nutrition workshops will gain an understanding of how to make healthy food choices (% reporting a gain in understanding).
4	Development of inexpensive food sources of protein and omega 3 fatty acids.

## **Outcome #1**

### **1. Outcome Measures**

Annual reduction in state incidence of obesity -% reduction

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

- 1862 Research

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

Change in Condition Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2013	0

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

#### **Issue (Who cares and Why)**

West Virginia citizens have the second highest level of obesity in the Nation (33.2%, Center for Disease Control, 2012, an increase over last year's 32.4 %). West Virginia is also above the national averages for incidence of diabetes, high blood pressure, and cardiovascular disease, as well as for osteopenia and osteoporosis.

#### **What has been done**

Station research in human nutrition and health is focused on determining the current and potential impacts of diet, nutritional education and dietary intervention on obesity and obesity related conditions (diabetes, elevated cholesterol and plasma lipids, heart attack, stroke and some cancers).

#### **Results**

While the overall rate of obesity increased somewhat, preliminary data indicate a decline in the rate of childhood obesity. Since the target groups of our work have been children and adolescents, this finding, if proven to be statistically significant, is promising.

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

<b>KA Code</b>	<b>Knowledge Area</b>
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior

## **Outcome #2**

### **1. Outcome Measures**

Participants in nutrition workshops will increase their knowledge of the relation between nutrition and health (% of participants reporting a gain in knowledge).

Not Reporting on this Outcome Measure

## **Outcome #3**

### **1. Outcome Measures**

Participants in nutrition workshops will gain an understanding of how to make healthy food choices (% reporting a gain in understanding).

Not Reporting on this Outcome Measure

## **Outcome #4**

### **1. Outcome Measures**

Development of inexpensive food sources of protein and omega 3 fatty acids.

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

- 1862 Research

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2013	0

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

#### **Issue (Who cares and Why)**

Omega-3 PUFA's are claimed to have positive effects on humans by reducing triglycerides and cholesterol. Research is needed on the relationship between different sources of omega-3 PUFA's and health and applied research is needed to develop consumer acceptable products that contain omega-3 PUFA's.

#### **What has been done**

Development of foods containing higher concentrations of omega-3 FA are of interest because of their role in decreasing the risk of diseases such as cardiovascular

disease, type 2 diabetes and obesity. The impact of this research could have positive effects on overall nutrition and health of consumers. Isoelectric solubilization and precipitation (ISP) processing is a protein recovery process where high or low pH conditions cause protein separation from insoluble fractions of the fish (i.e. bones, skin, scales, etc.) by solubilization. Using pH shifts, protein is recovered by precipitation and centrifugation.

### **Results**

The process has been shown to provide efficient and favorable recovery rates when compared to other commercial processing techniques such as mechanical filleting or conventional methods involving separators and decanters. The gels made from recovered carp protein show similar or improved functional, texture and color properties compared to Alaska Pollock surimi depending on the treatment and might be used for the development of restructured fish products and value-added for human consumption.

## **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

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

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

- Economy
- Appropriations changes
- Competing Public priorities

#### **Brief Explanation**

The sequestration in 2013 limited the funding we were able to use to conduct our research program in this area.

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

#### **Evaluation Results**

Experiment Station research program evaluation will take place at two levels and on two different time cycles. All programs will use these general criteria plus additional criteria tailored to each program as detailed in the Plan of Work under Outputs and State Defined Outputs and Outcomes.

Annual evaluation will continue as before, looking at productivity in terms of immediate impact:

- Referee journal articles and books
- Professional presentations
- General audience papers and news reports
- M.S. and PhD graduates
- Trends in terms of competitive funding

And in terms of longer-term impact:

- Citations in scientific journals
- Patents
- Successful technology transfer or start-ups based on research programs
- Awards based on continuing impact and research excellence

In addition, every five years we will have a full portfolio review of our research programs in terms of:

- Long term productivity
- Relevance to our constituent groups and the State and Region
- The allocation of research inputs among the programs
- Consideration of eliminating some research programs that are not productive or have diminished relevance given NIFA and State priorities
- Consideration of adding additional program areas given NIFA and State priorities

We are still working to complete the results of the reviews we conducted in 2012. We are continuing to increase the amount of funded research we do jointly with Extension and are still working to improve our level of joint planning. In 2014 we will do our first consolidated Plan of Work with WVU Extension and WV State Research and Extension.

### **Key Items of Evaluation**