Needs and Opportunities for ARS in Food Quality and Processing Research

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National Program 306
Quality and Utilization of Agricultural Products

- Maintaining quality of harvested produce
- Developing efficient processing concepts
- Developing value-added food/nonfood processes

http://www.ars.usda.gov/research/programs/programs.htm?NP_CODE=306
Quality and Utilization of Agricultural Products

Core Mission Objectives

- Determining/enhancing food quality
- Maintaining quality of commodities
- Identifying/characterizing functional compounds/components
- Developing dual-use or intermediate processes
- Developing/improving technologies

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Core Mission Objectives

• Developing value-added food/nonfood co-products and processes

• Developing knowledge and technology for postharvest quality measurement

• Developing new specialty products from crops and animals commodity products

• Increasing commodity volume and quality

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NP 306 Research 2003 – 2008 - Impacts

Texturized Whey Proteins  Healthy Fruit Bars  Trim Technologies  Sytrinol & Flavoxine

NP 306 Research Needs and Opportunities for ARS in food quality and processing research
Provide an analysis of the relevant trends, markets, economics, and science and technology needs of NP 306 Program

Provide guidance to the executive management team in establishing appropriate program directions for the next 5 years

NPS Assignment March – May 2008

http://www.ars.usda.gov/research/programs/programs.htm?NP_CODE=306
• Background issues
• Current markets for commodities and products
• Summary of current ARS activities
• Activities outside ARS
• ARS stakeholders’ Issues
• Focus for NP 306 Food Research

Research Questions
  • Global, Agency, Mission Issues
  • NP 306 Stakeholders
    • ARS Scientists
Bio-Economy & Food Scarcity

Bio-economy: integration of energy and agricultural into one market

Energy prices affected agricultural prices mostly on the input,. resulting in lower output. Now, higher energy is affecting output prices as well. Wallace E. Tyner, 2007, Purdue University

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Global Food Crisis

A Catastrophe Playing Out Around the World

Food shortages and sharply rising prices have sparked riots in underdeveloped countries. Global grain stocks are at their lowest levels in decades, and the price of rice has risen 70 percent in the past year. Here is a look at some of the causes and further consequences.

1. United States: Wholesale retailers Sam's Club and Costco recently imposed restrictions on bulk rice purchases. Reports of empty shelves and shortages followed.

2. Mexico: Tens of thousands of people took to the streets of Mexico City in January 2008 to protest the rising cost of tortillas.

3. Haiti: Food riots resulted in multiple deaths and led to the firing of the nation's prime minister, Jacques Alain, in April. Prices of rice, beans, and fruit have climbed by at least 50 percent since 2007.

4. Argentina: Farmers suspect the lack of international demand for soybeans if conditions don't improve by the end of the month.

5. Egypt: With basic food costs up more than 50 percent in the past year, protests are spreading.

6. Somalia: Two people were killed when police opened fire on protesters in the nation's capital on May 5. High food prices and shortages were cited as instigative causes.

7. Afghanistan: 400 protesters blockaded a main road to the nation's capital on April 22. Much of their anger was directed at Pakistan, which has stopped exporting wheat.

8. India: The country has imposed export bans on almost all varieties of rice. Fearing shortages, it has also removed import tariffs on edible oils and maize.

9. Myanmar: When a deadly 130-mph cyclone struck this month, it may also have seriously damaged the country's food supply.

10. Thailand: The world's biggest rice exporter saw rice prices more than triple from January to April.

11. Mongolia: A crowd of 20,000 protested soaring food prices in the nation's capital in April. Some staples have recently tripled in price.

12. China: The country's middle class is expected to expand by 500 million people by 2020. Growing demands here and in India have been blamed in part for rising food prices.

13. Vietnam: Suffering from double-digit inflation in food prices, the country has banned rice shipments until June.

14. Australia: A severe six-year drought has reduced the rice crop by 98 percent. The country's largest rice mill was shut down in December.

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FAO projects at least 10 years of rising food costs


April 2008 • Journal of the AMERICAN DIETETIC ASSOCIATION 616-617

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Current Market Economics

Organic Foods

Where are U.S. sales going?

U.S. Organic Food and Beverage Retail Sales
(2006 = Approx. $17 billion)

Outlook Conference 2008, Nigel Willerton, CEO Wholesome Sweetners,
Source: Organic Trade Association’s 2007 Manufacturer Survey

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Summary of Issues

- Biofuels & Bio-economy
- Food Security (availability & Access)
- Health-full Quality Foods
- Obesity/Starvation
- Food/Feed Scarcity
- Rising Costs of foods.

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Research Outside ARS - USDA

- Globalization
- Supply Complexity
- Healthy products
- Environment
- Bio-economy

- Specialty crops -- High quality produce
- Animal Agriculture: addressing high feed costs, poultry and swine
- Goods for human health -- wellness foods
- Capture value from basic nutritional research

USDA’s Congressional Research Report, Prepared for Members and Committees of US Congress, Previewing a 2007 Farm Bill (a multi-year legislation or authorization for agriculture and food), Updated January 3, 2007
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• Human nutrition, development of new products, understanding the relationship between diet and food

• Health and wellness concerns, nutrition and obesity

• Developing new and sustainable feedstock, utilization of bioconversion products

• Mitigating the effect of bio-economy on food quality and availability using new technologies, innovative and cutting edge technologies

• Developing and using genomic data and biotechnology tools to expand food and fiber production,
• explore linkages between food and health – obesity, metabolic syndrome

• develop new crops—Organic

• create better food and processing techniques, leading to higher values

• develop improved food qualities, (new/improved technologies)

• develop novel processing methods

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The Institute of Food technologist (IFT) is an international organization focused on food science and technology.

- Wholesome, minimally processed, organic fresh-from-the-farm products
- Safe sustainable, innovative and healthful manner
- Fundamental science and new processing, packaging & preservation technologies

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Research Outside ARS - Canada

Canada’s Science and Technology Framework

Canada will support leading edge of developments that research

The challenges include how to fund agricultural research in ways that will increase innovation

- Productivity gap,
- Sustainable growth
- Strengthening knowledge
- Health, environmental
- Supporting basic research

Public agricultural research funding to close critical gaps which the public sector must fill and the need to maintain public trust in support of policy and regulations.

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• Bio-economy
• Climate shock
• Energy crisis
• Food crisis/ food security
• Cooperation with nature
• Social problems of health

Researcheable outcomes
• Sustainability
• Security
• Knowledge
• Competitiveness

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• **Intensification of competition** from growing markets, Brazil, China, and India

• **Increasing per capita food consumption** from rising incomes and growing trade

• Health paradigm
• Food Availability
• Organic Food Supply
• Food Access
• Food Quality & Nutrition
• **Hidden hunger:** inadequate nutrient intake—supplements

**World Bank Launches $1.2 Billion Fast-Track Facility for Food Crisis**

AgriCultural Support to Increase to $6 Billion, New Risk Management Tools for Crops

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Stakeholders Research Needs

• Develop new technologies for fractionation, isolation, extraction, reduction (low salt), concentration

• Health-promoting wholesome foods

• New processing technologies for intelligent delivery

• Stability of ingredients in foods

NP 306 Research Needs and Opportunities for ARS in food quality and processing research

1Appendix: List of Stakeholders
National Watermelon Promotion Board;
USA Rice Federation;
SoyNewHorizons;
Pickle packers International;
Georgia Peanut Commission;
California League of Food Processors; Florida Citrus Processors Association; National Barley Foods Council (NBIC); American Sugar Cane League; Sugar Processing Research institute;
Washington Tree Fruit Research Commission; Dairy Management Inc.;
National Association of Wheat Growers (NWIC); American Bakers Association.
Stakeholders Research Needs

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• Improve processing value and end-product quality

• Develop new rapid, objective methods to evaluate grain quality and functionality

• Develop rapid measures of functionality

• Products with health portfolios

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Stakeholders Research Needs

• Nutrition, safe foods, food defense
• Food quality; Acrylamide, Allergen, Folic Acid
• Food Security
• Health & Obesity
• Low Carbs/ Net Carbs
• Omega-3 Nutrient Content Claims

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ARS Scientists Suggested Research Needs

- Identification/isolation of health components
- New technologies to deliver nutrients
- Biochemical & molecular markers
- New technologies & processes
- New sources of dietary fibers

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Enhancing shelf-life

Co-products from bio-fermentation

High-speed sensors

Develop new products

Sources of phytochemicals

Techniques to measure volatiles
Suggested Research-ARS Scientists

- Internationally competitive processes
- Discover GRAS chemical/biological
- Organic food processing
- Food matrix, health/disease interface
- Healthy foods, and food allergens

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The budgets of institutions that delivered the world from famine in the 1970s disappeared when ‘People felt that the world food crisis was solved,’ Robert S. Zeigler, the director general of the rice institute.

U.S. food price rise to be largest in 18 years: USDA

WASHINGTON (Reuters) - U.S. food prices will rise by 5 percent this year, the largest increase since 1990, Glauber, USDA chief economist.

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Recommended Areas of Focus for ARS 2009:

**Food Security, Quality and Nutrition Research:**

- Nutrient Discovery
- Process Discovery
- Characterization & Preservation
- Technology to prevent quality deterioration; eliminate contamination
- Improve nutritional quality
- New uses, processes & products
- Waste recovery, feed & fiber
Food Security, Quality and Nutrition Research:

- Prevention of food quality losses
- Value-added qualities/properties
- Maintaining nutrients
- Nutrient availability, etc.
Final Words

Specifically, NP 306 Projects needs to Consider the Following Questions

- Robust objectives, adapted to changing circumstances?
- Do they generate economic value?
- Core competency of the CRIS constitute a reservoir for innovations?
- Networking across disciplines - connectiveness (food/feed/fiber/fuel, processing and health)?
- Do the outcomes impact food resources (food, feed, fiber, fuel)?
- Does the outcome result in public good?

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Final Words

**NP 306 Food Research Outcomes**

1. Availability of sufficient foods, feeds and fiber
2. New processing and preservation methods
3. Utilization of uncommon commodities
4. Improvement in food quality and quantity
5. Better nutrients
6. Wholesomeness across the food chain
7. Specialty foods, e.g. food for aging population
Thank you