Teaching Experimental Foods

Pei Liu, PhD
Nutrition and Dietetics
Louisiana Tech University

Class Overview

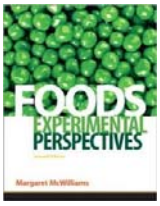
- The primary purposes of this class will be to:
  - Review basic food science content.
  - Practice experimental food science techniques.
  - Complete three food science projects in *assigned* groups.
  - Work through the research process: proposal, data collection, data analysis, and presentation of results in a variety of formats.

Course Objectives

- To describe the physical and chemical properties of food and how they relate to food preparation.
- To outline basic food science principles associated with preparation of foods with significant carbohydrate, protein, and/or lipid components.
- To describe the impact of food safety concerns and controls, food preservation techniques and food additives on the food supply.
- To apply food science knowledge to determine functions of ingredients in foods.
- Apply basic research skills to develop and modify recipes.
- To plan and execute food science experiments that utilize objective and subjective, as well as nutritional and cost analysis evaluation methods.
- To develop a proposal, conduct research, analyze data, and summarize results using professional communication strategies (oral, technological, written formats).

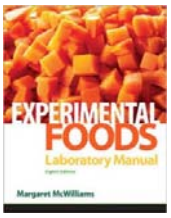
Textbook

- McWilliams, M. (2012). *Foods: Experimental perspectives.* (7th ed.). Upper Saddle River, New Jersey: Pearson-Prentice Hall.



Textbook

- McWilliams, M. (2012). *Experimental foods laboratory manual.* (8th ed.). Upper Saddle River, New Jersey: Pearson-Prentice Hall.



Class Format

- Lectures
- Food Labs
- Grading
  - Two exams
  - Annotated bibliography (six research articles)
  - Lab notebook
  - Projects
  - In-class and homework assignments

Food Labs

Lectures

- Three hours
- PowerPoint
- YouTube videos

Food Labs

- Projects
  - Lab Report 1 (Measurements)
  - Lab Report 2 (Healthy Party Labs)
  - Lab Report 3 (Thrifty One-dish Meal Lab)
  - Lab Report 4 (Major Project)

Lab Project 1

- Measurements
  - Weighing ingredients
  - Using balances
  - Reading and recording results

Lab Project 2

- Demonstration Garden

Lab Project 2

- Demonstration Garden

DEMONSTRATION GARDEN #1					
Cauliflower	Broccoli	Green Cabbage	Green Cabbage	Chinese Cabbage	Swiss Chard
		Kale	Red Cabbage	Kholrabi	

DEMONSTRATION GARDEN #2					
Collards	Mustard Greens	Collards	Onions	Brussel Sprouts	Elephant Garlic
			Potatoes	Green Onions	Italian Garlic

Lab Project 2

- Healthy Party Labs
  - To develop healthy party recipe
  - Ingredients: at least two vegetables from demonstration gardens (each group needs to develop different recipe)
  - Original recipe and three modifications
  - Report
    - Nutritional Content of standard and modified recipe
    - Cost analysis (using supermarket or web search)
    - Sensory Analysis
    - Conclusions

Thrifty One-dish Meal Lab

- Using a list of non-perishable food items as the basis for recipe development.
- Developing the recipe for a family of 2 adults and 2 children
- Meeting MyPyramid/MyPlate and Dietary Guidelines, yet as low cost as possible for this family.
- Report including:
  - Nutritional analysis
  - Cost assessment
  - Sensory analysis
  - Overall conclusions

Final Project

- To develop a snack product
- Focus on nutritional quality, cost effectiveness, and consumer acceptability
- Procedure
  - Development – 3 labs
  - Replication and testing (panelists) – 3 labs

Methods - Development (1st option)

- Each development lab
  - Purpose (e.g.) (1 purpose for each lab)
    - Reduce sodium or
    - Reduce sugar or
    - Increase fiber …
  - Standard product (recipe)
  - Original + 3 modifications (for each purpose)
    - Totally cooking 4 products
  - Day 1 results determine Day 2
  - Day 2 results determine Day 3
  - Day 3 results determine replication

Examples:

Goal: Modify sugar, fat/cholesterol, and fiber in a chocolate chip muffin

Lab 1: Modify sugar only (with 3 levels)

Lab 2: Start with best of day 1 and modify fat/cholesterol (with 3 levels)

Lab 3: Start with best of day 2 and modify fiber (with 3 levels)

OR Development (2nd option)

- Day 1: Create original and 3 different recipes that are all high in fiber, low in sugar and low in fat/cholesterol
- Day 2: Based on comments from Day 1, modify each of the 3 different recipes to make them more acceptable to consumers
- Day 3: Based on comments from Day 2, modify each of the 3 different recipes to make them more acceptable to consumers

Methods - Replication and Testing

- Replication labs
  - Each of 3 labs, you will prepare the "standard" recipe and 3 modifications--- (repeating development labs)
  - Each modification will have been previously tested and proven to be nutritional, cost effective, and acceptable to consumers
  - Purpose of replication phase is to determine
    - Standardization of recipe
    - Standardization of product
    - Differences in quality
    - Differences in consumer acceptability

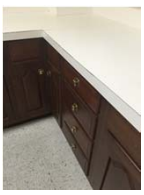
Statistical Analysis

- Statistical analysis
  - Descriptive analysis (frequencies and mean +/- standard deviations)
  - T-test or ANOVA

Final Project

- Report including
  - Cover page
  - Table of contents
  - Introduction
  - Literature review
  - Methods
  - Results
  - Discussion and Conclusion
  - References
  - Appendices
    - Evaluation Instrument
    - Tables of Comparison (cost, nutrient, acceptability)
    - Copy of cited articles

Handicapped Accessible Kitchen (Before)



Handicapped Accessible Kitchen (After)

Challenges

- Resources
  - Classrooms
  - Food labs
  - Lab fees
  - Class time
- Students
  - Research skills


Any
Questions