Idaho CTE

Agriculture Food Science and Processing (2018)

FOOD INDUSTRY AND HISTORICAL DEVELOPMENT 1.0

1 **Evaluate the Significance and Implications of Changes and Trends in the Food Products and Processing Industry** 1.1

1 Discuss historical changes in the food products and processing industry. 1.1.1

2 Evaluate current trends in the food products and processing industry (e.g., dietary food guides, niche markets, marketing trends). 1.1.2

3 Identify consumer concerns related to food quality and safety (such as allergens, antibiotic use, genetically modified organisms (GMOs), pesticide use, and food borne illnesses). 1.1.3

4 Discuss the economic implications when low-quality and unsafe foods enter the market. 1.1.4

5 Describe the scope and economic importance of agriculture and food processing in the United States and the world, using quantitative data compiled by government agencies and news media. 1.1.5

6 Examine the impact of consumer trends on food products and processing practices (e.g., health and nutrition, organic, information about food products, local food movements, farm-to-fork supply chains, food system transparency). 1.1.6

7 Compare and contrast cultural differences regarding food products and processing practices. 1.1.7

8 Identify and explain environmental and safety concerns about the food supply. 1.1.8

9 Evaluate desirable and undesirable outcomes of emerging technologies used in the food products and processing industry. 1.1.9

2 **Investigate Industry Organizations, Groups, and Regulatory Agencies Affecting the Food Products and Processing Industry** 1.2

1 Explain the purposes of organizations that are part of and/or regulate the food products and processing industry. 1.2.1

2 Determine the relationship between regulatory agencies (i.e., FDA, USDA, CDC, WHO) and the food products and processing industry. 1.2.2

3 Assess the changes in the food products and processing industry brought about by industry organizations or regulatory agencies. 1.2.3

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FOOD SAFETY AND SANITATION 2.0

1 Create Sanitation Standard Operating Procedures and Master Sanitation Schedules 2.1

1. Create Sanitation Standard Operating Procedures (SSOP) for a food processing company. 2.1.1
2. Understand Good Manufacturing Practices (GMP) and how they relate to a food processing company and employee and equipment hygiene. 2.1.2
3. Create Master Sanitation Schedule (MSS) for a food processing company. 2.1.3

2 Create a Food Safety Plan, Understand the Biological, Chemical, and Physical Hazards Associated with Food Processing and Handling 2.2

1. Understand and evaluate the different biological hazards (prions, bacteria, viruses, protozoans, etc.) that could be present in the raw ingredient through processing and distribution of a food product. 2.2.1
2. Understand and evaluate the different chemical hazards (pesticides, herbicides, allergens, paints, heavy metals, dioxins, PCBs, etc.) that could be present in the raw ingredient through processing and distribution of a food product. 2.2.2
3. Understand and evaluate the different physical hazards (metal, plastic, rubber, etc.) that could be present in the raw ingredient through processing and distribution of a food product. 2.2.3
4. Identify potential sources of contamination. 2.2.4
5. Develop strategies to eliminate or reduce contamination to an acceptable level. 2.2.5
6. Discuss current regulatory food safety programs, including HACCP (Hazard Analysis Critical Control Point), FSP (Food Safety Plan), and Food Defense. 2.2.6

3 Apply Sanitation Procedures in the Handling, Processing, and Storing of Food Products 2.3

1. Evaluate food product handling procedures. 2.3.1
2. Explain the importance of microbiological tests (e.g., ATP, equipment swabs, Environmental swab, Pathogen Environmental Monitoring -PEM) in food sanitation verification. 2.3.2
3. Explain the importance of allergen cross-contact and how sanitation affects allergen management. 2.3.3
4. Discuss documentation procedures and their importance in a food processing and distribution system. 2.3.4
5. Understand how Clean in Place (CIP) and Clean Out of Place (COP) affects overall sanitation of a facility. 2.3.5
6. Understand the use of chemical types and applications and how it affects plant sanitation procedures. 2.3.6

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Inderstand Worker Safety Principles in a Manufacturing Facility 3.1

1. Outline guidelines for personnel safety in the food products and processing industry (e.g., lockout-tagout, personal protective equipment, permit required confined space, machine guarding, walking working surfaces, motorized vehicles). 3.1.1
2. Perform a safety risk analysis of a manufacturing facility, including behavior based accident preventions. 3.1.2
3. Create mitigation strategies (engineering, administrative, and PPE) focusing on controls. 3.1.3
4. Demonstrate the ability to follow safety and operational procedures in a lab setting and satisfactorily complete a safety test. 3.1.4

THE SCIENCE OF FOOD PRODUCTS 4.0

1 Apply Principles of Science to Provide a Safe, Wholesome, and Nutritious Food Supply 4.1

1. Design a research project in food science using the scientific method. 4.1.1
2. Examine, interpret, and explain the meaning of required components on a food label. 4.1.2
3. Determine a strategy to prepare and label foods according to the established standards of regulatory agencies (including nutrition facts panel, ingredients, weights, and measures, allergens, etc.). 4.1.3

2 Evaluate, Grade, and Classify Processed Food Products 4.2

1. Perform quality control inspections of raw and finished food products. 4.2.1
2. Explain how the chemical and physical properties of foods influence nutritional value and eating quality. 4.2.2
3. Compare and contrast foods stored under varying conditions for quality, shelf life, and intended use. 4.2.3
4. Design and construct experiments for quality assurance tests on food products. 4.2.4
5. Interpret and evaluate results of quality assurance tests on food products and examine steps to implement corrective procedures. 4.2.5

3 Understand the Constituents of Food (e.g., Lipids, Proteins, Carbohydrates, Water, Vitamins, Minerals) 4.3

1. Differentiate between the common food constituents (i.e., proteins, carbohydrates, fats, vitamins, minerals, and water). 4.3.1
2. Compare and contrast food constituents and their relative value to product taste, appearance, and so forth. 4.3.2
3. Research and report methods of nutritional planning to meet essential needs for the human diet (e.g., MyPlate). 4.3.3

4 Understand and Recognize the Different Additives in Food and Purposes of Use in Processing 4.4

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1 Identify common food additives and identify their properties (e.g., preservatives, antioxidants, buffers, stabilizers, colors, flavors). 4.4.1

2 Describe the purpose of common food additives (CFA). 4.4.2

3 Describe how CFAs influence the chemistry of food. 4.4.3

5 Research and Development 4.5

1 Identify the steps of research and development in the food production and processing industry. 4.5.1

2 Outline the process for designing a new food product from concept to production. 4.5.2

3 Identify the needs and mechanics of a plant scale test. 4.5.3

FOOD PROCESSING OPERATIONS AND TECHNOLOGY 5.0

1 Process Food and Food Products for Sale and Distribution 5.1

1 Understand principles of raw material/ingredient receiving. 5.1.1

2 Create a flow diagram for food production process steps. 5.1.2

3 Identify packaging processes and logistics (e.g., sub packaging, case filling, palletizing). 5.1.3

4 Understand principles of production scheduling, product storage, and distribution. 5.1.4

2 Preserve Food and Food Products for Sale and Distribution 5.2

1 Describe factors related to food preservation. 5.2.1

2 Describe factors that contribute to food deterioration. 5.2.2

3 Preserve foods using various methods and techniques. 5.2.3

4 Identify and summarize purposes of food storage procedures (e.g. temperature regulation, monitoring). 5.2.4

5 Prepare plans that ensure implementation of proper food storage procedures and traceability. 5.2.5

6 Differentiate between methods and materials used for processing food for different markets (e.g., fresh food products, ready to eat food products, organic). 5.2.6

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3 **Food Process Technology and Maintenance** 5.3

1. List and categorize types of equipment used in food products and processing systems including automated systems. 5.3.1
2. List and apply strategies to maintain equipment and facilities for food products and processing systems (Preventative Maintenance). 5.3.2
3. Describe Piping and Instrumentation Diagrams as they relate to food processing. 5.3.3
4. Describe the principles of Operational Technology (OT) and how they relate to larger Information Systems (Big Data Analytics, Statistical Process Control). 5.3.4
5. Identify the role of Robotics in Food Processing and Packaging. 5.3.5

EXPLORE CAREER OPPORTUNITIES 6.0

1 **Understand Employment Fields in the Food Science Technology Industry** 6.1

1. Identify potential careers in the food science and processing industry. 6.1.1
2. Interview current food science/processing professionals. 6.1.2
3. Demonstrate employability skills for a career in the food science and processing industry (e.g., create a resume and cover letter, participate in job interviews). 6.1.3
4. Research additional industry certifications available (i.e., Serve safe, HACCP, OSHA, PCQI). 6.1.4

LEADERSHIP TRAINING THROUGH AGRICULTURAL EDUCATION 7.0

1 **Recognize the Traits of Effective Leaders and Participate in Leadership Training through Involvement in FFA** 7.1

1. Demonstrate effective leadership and participation in leadership training. 7.1.1
2. Expand leadership experience by participating in a chapter activity. 7.1.2
3. Participate in a career development event at the local level or above. 7.1.3
4. Exhibit leadership skills by demonstrating proper parliamentary procedure. 7.1.4
5. Participate in a speech or presentation activity. 7.1.5

2 **Understand the Importance of School and Community Awareness** 7.2

1. Participate in a school improvement or community development project. 7.2.1

SUPERVISED AGRICULTURAL EXPERIENCE (SAE) 8.0

1 **Maintain a Supervised Agricultural Experience** 8.1

1. Accurately maintain SAE record books. 8.1.1
2. Investigate the proficiency award areas related to SAE program area. 8.1.2
3. Actively pursue necessary steps to receive higher degrees in FFA. 8.1.3