

UNIT II - FOOD PROCESSING

Lesson 2: Food Product Development

Objective

The student will be able to describe the complexity of the development of food products.

I. Study Questions

- A. How are new food products developed and introduced into the marketplace?
- B. How was margarine formulated?

II. References

- A. Martin, Phillip R. *Food Science and Technology* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1994. Unit II.
- B. Activity Sheet
 - AS 2.1: Soy Milk

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TEACHING PROCEDURES

A. Review

Review why food is processed and relate that processing procedures are determined by consumer demand. What if a consumer survey demands a product that is not yet available? What are the steps in product development?

B. Motivation

1. The students, collectively, make up a taste panel. Each student receives four chocolate chip cookies labelled A,B,C, and D: Cookie A has 2 times the salt, cookie B has 50 percent of the flour, cookie C is made like the recipe, and cookie D has 50 percent of the sugar called for in the recipe. Students evaluate each sample based on its appearance, flavor, aroma, and texture. Students should write down their comments and report outcomes. Discuss what students liked or didn't like about the cookies.
2. Also works to compare three brands of saltine crackers or vanilla wafers. Tang®, Koolaid®, and orange juice is also an interesting comparison.

C. Assignment

D. Supervised study

E. Discussion

1. Discuss how new food products are developed. Research in food science has been increasing as consumers become more mobile. Early research centered on practical problems in food preparation encountered in the home. Modern research is focusing on commercially important food products. While all product development begins with an idea, the complex series of steps that follow occur in no particular order. Have students complete AS 2.1.

How are new food products developed and introduced into the marketplace?

- a. Idea - Food scientists (product developers) come up with ideas that may be generated by consumer complaints or suggestions, new regulations, new findings about nutrition, etc.

- b. Bench-top development - production of prototypes
 - c. Objective testing - shelf-life and safety testing
 - d. Sensory evaluation - do consumers like the taste, color, etc.
 - e. Basic and applied research - to solve problems
 - f. Pilot plant production - evaluates production process
 - g. Engineering services - modify processing facilities
 - h. Marketing surveys - to determine if product meets the desires of consumers
 - i. Economic analysis - to determine costs of the product
 - j. Test marketing - to determine if consumers will buy product
 - k. National roll-outs - company commits to sell product
 - l. Advertising campaigns - to advertise the new product
 - m. Brand maintenance - monitor the performance of the product
2. Discuss how margarine differs from butter.

How was margarine formulated?

- a. The need for a new product was created by the shortage of butter during World War I.
- b. The product developer's goal was to simulate butter using ingredients that were readily available.
 - 1. The emulsifier is obtained from soybeans.
 - 2. Hydrogenation is used to add hydrogen atoms to the fatty acids in soybeans.
 - 3. Hydrogenated oil, water, and lecithin are blended together to get the desired emulsion.
 - 4. Colors, flavors, and vitamins were added to make margarine a reasonable substitute for butter.

F. Other activities

Butter churning lab. Place appropriate quantity of cream in butter churn and let students churn until butter is complete, then lightly salt and form into desired shape. Rinse off and serve.

G. Conclusion

Food products are the product of lengthy efforts and only a few reach the product stage. All products begin as an idea that could be beneficial in terms of convenience, nutrition or economic reasons. The research and development process is a detailed process that precedes new product launch. Various foods eaten today are formulated foods resulting from food product development efforts.

H. Competency

1. Describe the complexity of the development of food products.
2. Related Missouri Core Competencies and Key Skills: None

I. Answers to Evaluation

1. a
2. b
3. d
4. a
5. c
6. b

J. Answers to Activity Sheet

AS 2.1

1. for lactose intolerant diets; value added product of soybeans, low fat product, etc.
2. instructor's discretion
3. instructor's discretion
4. instructor's discretion

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EVALUATION

Circle the letter that corresponds to the best answer.

1. How are engineering services used in new product development?
 - a. To modify processing facilities
 - b. To evaluate production process
 - c. To determine if consumers will buy the product
 - d. To monitor the performance of the product
2. How is pilot plant production used in new product development?
 - a. To modify processing facilities
 - b. To evaluate production process
 - c. To determine if consumers will buy the product
 - d. To monitor the performance of the product
3. Which technique is used to determine if consumers like the taste, color, etc., of the product being developed?
 - a. Advertising campaigns
 - b. Economic analysis
 - c. National roll-outs
 - d. Sensory evaluation
4. Which phase of new product development uses the production of prototypes?
 - a. Bench-top development
 - b. Economic analysis
 - c. Marketing surveys
 - d. Test marketing

5. Why was margarine formulated?
 - a. Consumers were tired of eating butter at every meal.
 - b. Dairy cattle were needed to pull two-wheel carts.
 - c. Butter wasn't available because it was being fed to the soldiers.
 - d. Butter doesn't keep so a substitute needed to be developed.

6. What was the product developer's goal when formulating margarine?
 - a. To eliminate butter from the market place
 - b. To simulate butter using ingredients that were readily available
 - c. To make a butter substitute at any cost
 - d. To replace butter as the spread for breads

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AS 2.1

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Soy Milk

Objective: Students will process soybeans to produce soy milk and design a food label for soy milk.

Activity Length: 2 periods

Background Information:

Commercial soy milk is often fortified with vitamins and minerals to approximate the composition of cow's milk. Soy milk may be used in place of cow's milk in most recipes. Due to the flavor difference between soy and cow's milk, you may prefer to use half soy milk and half cow's milk.

Soy milk is available commercially in dry, concentrated, and ready-to-use forms. Instructions for preparing, serving, and storing are on the package. Soy milk may also be prepared at home.

Materials and Equipment:

1 lb. (2½ c.) dry soybeans
Water
Blender
Cheesecloth
Cooking pot
2 T. Sugar
1 t. Salt

Procedure:

1. To prepare about 2 quarts of soy milk, use 1 pound (2 1/2 cups) dry soybeans. Sort and wash beans thoroughly.
2. Using 2 quarts of water, soak beans overnight or use the 2-minute-boil method.
3. Drain soaked beans, remove skins, and discard the soaking water. You only need to remove the skins from the beans if you wish to use the bean mash or pulp after the milk is made.

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4. Using 3 quarts of water, grind the soaked beans in a blender. Place part of the beans and enough water to cover the beans in blender container; grind until very fine (about 2 minutes). Repeat until all beans have been ground and the 3 quarts of water have been used.
5. Strain ground beans through two layers of cheesecloth into a large kettle. Squeeze as much liquid from the mash as possible.
6. Boil the soy milk for 30 minutes, stirring occasionally to prevent scorching. It is necessary to cook the milk thoroughly to destroy a substance which interferes with trypsin, one of the digestive enzymes.
7. While the milk is still warm, add 2 tablespoons sugar and 1 teaspoon salt. Stir until dissolved.
8. Cover milk tightly and store in the refrigerator.
9. Strain milk before using because a skin often forms on the surface.
10. Following refrigeration, compare soy milk's flavor and texture to cow's milk and answer the following questions then design a label for a jar of soy milk to enhance its share of the market.

Key Questions:

1. Why is soy milk produced?
2. What are soy milk's positive attributes?
3. How does its flavor and texture compare to cow's milk?
4. What size market share do you expect soy milk to gain in the future?

Credit:Missouri Soybean Association and the Missouri Soybean Merchandising Council, P.O. Box 104778, Jefferson City, MO 65110-4778.