

UNIT II - FOOD PROCESSING

Lesson 7: Processing Meat Animals

Objective

The student will be able to describe the processing of meat animals.

I. Study Questions

- A. What are the steps involved in processing meat animals?
- B. What techniques are used to process fresh meat products?
- C. What factors affect meat quality?
- D. How is the meat processing industry organized?

II. Reference

- A. Martin, Phillip R. *Food Science and Technology* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1994. Unit II.

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TEACHING PROCEDURES

A. Review

Review the major meat animal sources.

B. Motivation

1. Rigor mortis can be observed using the sterno-mandibularis muscle from a pork or beef carcass. Obtain muscle from a local slaughter house. Cut muscle into two pieces with the grain. Nail the ends of one piece to a small board. Freeze both muscles within 20 minutes of slaughtering in its stretched position. Allow muscle to thaw. Measure the rigor mortis activity as it shortens.
2. Explain the Kosher processing method to students by explaining its history. Show students a package of meat with the Kosher meat stamp. Kosher Inspection is performed by authorized persons following the standards set forth by the Mosaic and Talmudic laws. The word Kosher means "properly prepared" in the Hebrew language. Kosher meat must come from an animal that has split hooves and chews its cud.

The slaughter involves draining the blood and then soaking and salting each side of the meat. Salting draws out the remaining blood as it is required by biblical law. (Leviticus 7:14) "You shall not eat the blood of any creature for the life of every creature is its blood."

C. Assignment

D. Supervised Study

E. Discussion

1. Discuss the steps of processing meat animals.

What are the steps involved in processing meat animals?

- a. Cattle
 1. Immobilization
 2. Rodding the weasand

3. Heading
4. Shankling
5. Siding
6. Evisceration
7. Splitting
8. Refrigerating
9. Inspecting
10. Grading
- b. Hogs
 1. Immobilization, stunning and sticking
 2. Scalding/skinning
 3. Hair and scurf removal
 4. Skinning
 5. Head removal
 6. Evisceration
 7. Splitting
 8. Inspection
 9. Refrigeration
 10. Grading
- c. Lambs
 1. Immobilization, stunning, and exsanguination
 2. Pelting
 3. Head removal
 4. Separate esophagus and trachea
 5. Evisceration
 6. Refrigeration
 7. Inspection
 8. Grading
- d. Poultry
 1. Immobilization and sticking
 2. Defeathering - scalding and defeathering or dry-picking
 3. Chilling
 4. Evisceration
 5. Grading
- e. Fish
 1. Remove head behind gills
 2. Descale
 3. Remove tail
 4. Remove entrails
 5. Rinse and chill

2. Discuss what techniques are used to process fresh meat products. The majority of processed meat is shipped in a box as either quarters, primal cuts, or subprimal cuts. Lamb carcasses are normally shipped whole.

What techniques are used to process fresh meat products?

- a. Carcass size reduction
 1. Beef - quartering: cut between 12th & 13th ribs: 52 percent weight in forequarters, 48 percent weight in rearquarters
 2. Lamb - whole
 3. Veal - fore and rear saddles
 4. Pork - complete subprimal processing
 - b. Primal (wholesale) cuts fabrication
 - c. Subprimal (retail) cut fabrication
 1. Roast
 2. Steak/chop
 3. Ground meat
 - d. Deboning
 - e. Pattie production
 - f. Shelf-life extension - refrigeration is the most popular
 - g. Tenderization - mechanical, enzymatic
 - h. Control of composition by restructuring
 - i. Portion control
3. Discuss what factors affect meat quality.

What factors affect meat quality?

- a. Production-related factors
 1. Age of animal
 2. Health of live animal
 3. Nutrition of live animal
 4. Sorting and hauling of live animal
 5. Heredity
 - b. Processing related factors
 1. Sanitation of processing plant
 2. Efficient immobilization and proper exsanguination
 3. Postmortem temperature
 4. Postmortem handling
 5. Processing sanitation
 6. Water holding capacity
 7. Color control
4. Discuss how the meat processing industry is organized.

How is the meat processing industry organized?

1. Poultry - vertical integration
2. Pork - some vertical, some independent
3. Lamb & beef - mostly independent
4. National Live Stock and Meat Board, National Broiler Council and National Turkey Federation represent producers, processors, and retailers in product research, education, and promotion.

F. Other activities

1. Show a video on slaughtering.
2. Taste test tenderized flank steak versus non-tenderized.

G. Conclusion

The process of transforming a meat animal into retail steaks, roasts, burgers, etc., is complex. Beef, veal, pork, lamb, mutton, and poultry products all undergo inspection and grading before they reach the retail meat case. Fish, on the other hand, are not required to be inspected. Meat quality is a concern of all and is determined by production techniques, genetics and processing factors.

H. Competency

Describe the processing of meat animals.

Related Missouri Core Competencies and Key Skills: None

I. Answers to Evaluation

1. 6 Grading
1 Stunning
4 Eviscerating
5 Refrigerating
2 Sticking
3 Skinning
2. d
3. e
4. b
5. c
6. a

7. Compare: both are scalded to denature proteins. Contrast: pork scalding loosens hairs, poultry scalding loosens feathers.
8. Its thickness - steak $\frac{3}{4}$ - 1", roast 2" or more.
9. The younger the animal, the more tender its muscle.
10. Stress causes higher temperatures, reduced pH and early rigor mortis onset. It can result in PSE meat.
11. National Live Stock and Meat Board
National Broiler Council
National Turkey Federation

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Name_____

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Date_____

EVALUATION

1. Place the following beef processing steps in the correct order by placing numbers in the blanks to indicate which step comes 1st, 2nd, 3rd, etc.

___Grading
___Stunning
___Eviscerating
___Refrigerating
___Sticking
___Skinning

Match the carcass size reduction technique with the type of meat animal.

- | | |
|---------------|----------------------------------|
| ___2. Veal | a. Whole or pre-cut |
| ___3. Beef | b. Whole |
| ___4. Lamb | c. Complete subprimal processing |
| ___5. Pork | d. Fore and rear saddles |
| ___6. Poultry | e. Quartering |

Complete the following short answer questions.

7. Compare and contrast the scalding of hogs versus poultry.
8. What is the basic difference between a steak and a roast?
9. How can an animal's age affect its meat quality?

Food Science and Technology-Unit II

10. How can stress on an animal affect its muscle character?

11. What national organizations represent the meat industry?