Fresh Meat Processing

Objective

To show how carcasses and wholesale meat cuts are processed to provide us with a wide variety of retail meat products
Problem: We have a cooler of beef, what do we do with it?

What is meat processing?

- Any mechanical, chemical or enzymatic treatment of meat that alters the form in which it originally occurs
What is “further processing”?

- An industry term used to describe the processes of comminuting (chop or grind) or enhancing through addition of low quality meats.
- Also referred to as Value Added

The function of further processing

- Preservation or shelf life extension
- Tenderization
  - Mechanical, enzymatic or chemical tenderization
- Increasing food safety and flavor
  - Usually through cooking of product prior to sales
- Manipulation and control of ingredients
- Portion control
- Increasing convenience to customer
  - Ready to eat meals
Carcasses Breaking

• Carcass breaking is first step in processing

More fabrication

• Fabrication of Ox tails
Size Reduction

- Size reduction is the most common form of meat processing

Tenderness and Thickness

- Thinner a piece of meat is sliced, the more tender it will be
- More finely a piece of meat is ground, the more tender it will be
  - However, thinner more ground meat will dry out more quickly
Tenderization Methods

• Mechanical
  – Cutting across the grain, chopping, grinding, beating with a mallet, needling, flaking

• Chemical or enzymatic
  – Papain
    • From the papaya
    • Least effective on collagen
  – Bromelin
    • From pineapple
    • Most effective on collagen
  – Ficin
    • From the fig
    • Affects both muscle fibers and connective tissue

More Tenderization Methods

• Cooler Aging

• High temperature conditioning
  – Usually results in high bacterial counts

• Short term muscle shortening
  – Disrupts the z-line
  – Caution can cause cold shortening
Basic Meat Processing Equipment

Portion Control

- Example of steaks cut for hotel and tourism trade
  - Very trim and similar in size
  - Prevents cooking error
  - Customer always receives the same product
What is Shelf Life?

• The length of time before meat products become unpalatable, unsafe for human consumption or unattractive in the display case

Sell It or Smell It

• Treatment methods that extend shelf life
  – Chilling, Freezing and Freeze drying
  – Heat pasteurization
  – Heat sterilization
  – Curing and smoking
  – Dehydration
  – Irradiation
Shelf Life

- Contaminated hotdogs

Mechanical Refrigeration

- Refrigeration is main form of shelf life extension and preservation

Packaging meat in refrigerated room
Importance of Refrigeration

• Without refrigeration
  – Shelf life is only a few hours

• How do regions of the world where refrigeration is unavailable merchandise meat (Central Mexico)?

Composition Problems with Processing

• Compared to poultry, red meat is highly variable in composition

• Why does the variation exist?

• What do customers want from meat products
  – Consistency
**Most Common Processed Meat**

- Ground meat accounts for 60% of meat consumption
  - Hamburger is most common

Most processing aids are targeted for ground meats

**Meat Grinder**

- Knife and auger rotate
- Grinder plate is stationary
- Many contain bone plate
Grinder with Bone Chip Collector

Making Commercial Patties

• Usually grind the meat twice
  – Coarse grind and determine fat content
  – Add FAT to reach desired content
  – Grind
  – Form patties or chubs
Patty Making Machine

- A form of portion control
- Low value product
  - High cost for consumer

Spiral Freezer for Patties


**Liquid Nitrogen Tunnel**

![Image of a liquid nitrogen tunnel with workers]

**USDA-FSIS Regulations for Ground Beef**

- Ground Beef or Chopped Beef
  - No more than 30% fat
  - Cannot add any more fat than what is in the trim
    - Can’t add stored or extra fat supplies
  - No more than 25% of meat can come from the cheek
Hamburger

- Cannot contain more than 30% fat
- Can have added fat and seasonings
- Cheek meat is limited to 25%
- **Hamburger cannot** contain added water, binders or extenders

Ground Beef and Textured Vegetable Protein (Soy)

- Label for ground beef or Hamburger that contains soy or other extender
- Must contain above statement on ingredients
Imitation Ground Beef or Beef Patties

• Can contain anything
  – Fat
  – Seasonings
  – Water
  – Defatted beef
    • Defatted tissue has been rendered at a temperature that won’t denature the proteins (re-inspected cook products)
    • Very Cheap
    • McD, BK, Wendys

Unique Extender Added to Meat

• Carrageenan
  – Isolated from red seaweed
  – Thickens, gels, stabilizes and suspends proteins
  – Widely used in food industry
How do we do this?

Why do we eat fat?

- Flavor – fatted foods taste better
- Texture – better mouth feel
- Learned preference
  - As adults we tend to repeat what we learn as children
- Low fat diets can be unhealthy
- Recommendation
  - 30% of calories from fat
Processing Continued

- Restructuring Meat Products
  - Method to increase value of cheap meats
  - Muscles are separated and re-shaped into desired shape
  - Use massage or tumbling to extract protein to stick meat pieces together
  - Or use binder such as alginate

Processing Continued

- Aging
  - Wet Aging
    - Meat is aged in vacuum package
    - Safe but slower than other aging mechanisms
  - Dry Aging
    - Meat is hung in low humidity room
    - Increases bacterial contamination
    - Primarily used for restaurant trade
Processing Continued

• Case Ready Meats
  – Most rapidly growing division of meat industry
  – Meat products are shipped to supermarket in sale ready package

Advantages of Case Ready Products

• Less handling of product
• Lower microbial loads (less handling)
• More efficient use of labor
• No need to ship trim or fat for ground beef production
• Increased shelf life
• No need for in-store butcher
Why haven't we seen Case Ready Sooner?

- Consumers expect bright red meat
- Older packaging material was air tight
- Recent packaging developments allow for oxygen exchange
  - Impermeable film is removed prior to placement on shelf

Newest Trend in Meats Processing

- Home Meal Replacements
  - Dinner in a box
- Functional Foods
  - Fruit Smoothies
The End