

Objectives

- Review technology for making emulsified meat products
- Answer Questions



Emulsified Meats

- Finely comminuted sausage batters are often referred to as meat emulsions.

However, they are not true emulsions such as mayonnaise or milk.



They are a dispersion of fat particles in a complex phase composed of water, solubilized meat protein, cellular components and other ingredients.

The fat is actually entrapped!

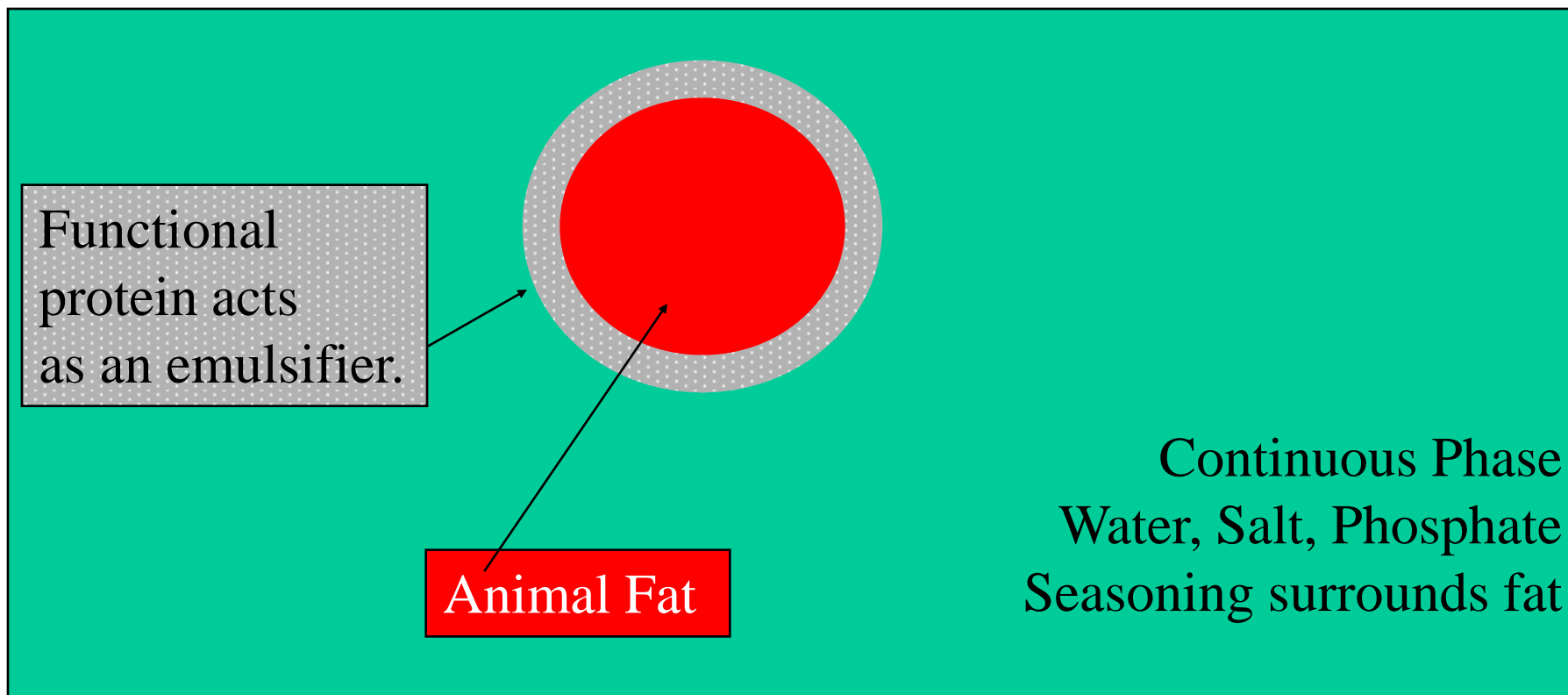


Meat Emulsions Definitions

- In a meat emulsion, fine fat droplets are dispersed in an aqueous medium containing soluble proteins, other soluble muscle constituents, segments of muscle fibers and connective tissue fibers.
- In a stable emulsion, each fat droplet is coated with a thin layer of soluble protein which has been released into the aqueous medium from the muscle fibers.

Key Goal : Fat and Moisture Stabilization

Soluble proteins act as emulsifiers to stabilize fat and moisture. When fat is not stabilized, fat separation occurs. Formulation and processing impact stabilization.



Emulsified Meat Manufacturing Steps

- Voice of customer
- Raw Material Selection
- Particle Size Reduction - Grinding
- Mixing
- Ingredient Addition
- Emulsifying
- Filling
- Thermal Processing
- Packaging



Voice of customer

- I want flavorful, juicy, and meaty texture.
- I want the best value for my money.
- I want good nutrition for my family
- I want convenience



Who is the customer? You must consider this when formulating.



Frankfurter Compositions

Protein	9 – 14%
Fat	10 – 35%
Salt	1.5 – 3.0%
Phosphate	0 – 0.5%
Sodium Nitrite	0.01 – 0.03%
Sodium Ascorbate	0.03 - 0.05%
Starch	0 – 10%
Sugars	0 – 4%
Seasonings	Variable
Water	By difference



Emulsified Meat Manufacture

- There are two primary methods of manufacture. Both have advantages and disadvantages
 - Mixer Emulsifier (continuous system)
 - Bowl Chopper (batch system)
- A bowl chopper is more efficient for extracting lean meat proteins.
- A mixer emulsifier system is capable of higher through put.

Grinding - Meat Preparation



- Plates and blades
 - sharp and matched
- Continuous
- Bone elimination systems



Mixing



Emulsified Meat Manufacture



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Emulsified Meat Manufacture



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Mixer Emulsifier System





Filling/Stuffing



- Stuffing horn
 - Closest to casing size as possible
 - Burrs and nicks
- Vacuum
- Longer the distance to stuff - more work - increased product instability

Filling/Stuffing



Filling/Stuffing



Chopper Systems

- Batch Systems
- Operator sensitive
- Sharp blades
- Vacuum



Bowl Chopper



Order of Addition

- Lean, 1/2 of water, salt, phosphate
 - Cure, spices
 - Sweeteners
 - Fat meat, remaining water
 - Other ingredients
 - Rework
- Lean, SUPRO, hydration water
 - Salt, phosphate
 - Cure, spices
 - Sweeteners
 - Fat meat, remaining water
 - Other ingredients
 - Rework

Chopping Temperature

- Poultry
 - 10-13°C
- Pork
 - 13-16°C
- Beef
 - 18-21°C

