

# GDM 412 MEAT TECHNOLOGY

## LESSON-12

### ***MEAT EMULSIONS and EMULSIFIED MEAT PRODUCTS***

**Prof. Dr. Kezban CANDOĞAN**

# Emulsified meat products



- ✓ European origin
- ✓ Small caliber products- frankfurter, wiener
- ✓ Large caliber products- in Turkey, salam, in the world, bologna, mortadella

Processes applied in the production;

- Homogenization in a bowl-cutter (Kuterleme)
- Smoking
- Heat treatment

✓ The operation of converting two immiscible phases into an emulsion, or reducing oil globule average size in a previously formed emulsion is called "**homogenization**".

- considerable amount of energy is necessary for emulsion formation.

# Emulsified meat products

- ✓ Meat with high water holding capacity- fine chopping
- ✓ Fat
- ✓ Water/Ice
- ✓ Additives for product color, flavor and texture
  - Salt
  - Nitrite
  - Phosphates
  - Starch
  - Ascorbic acid
  - Seasoning

Product quality depends on several technological characteristics of proteins;

- ✓ Emulsification
- ✓ Gel formation
- ✓ Water holding
- ✓ Foam formation

# Emulsified meat products

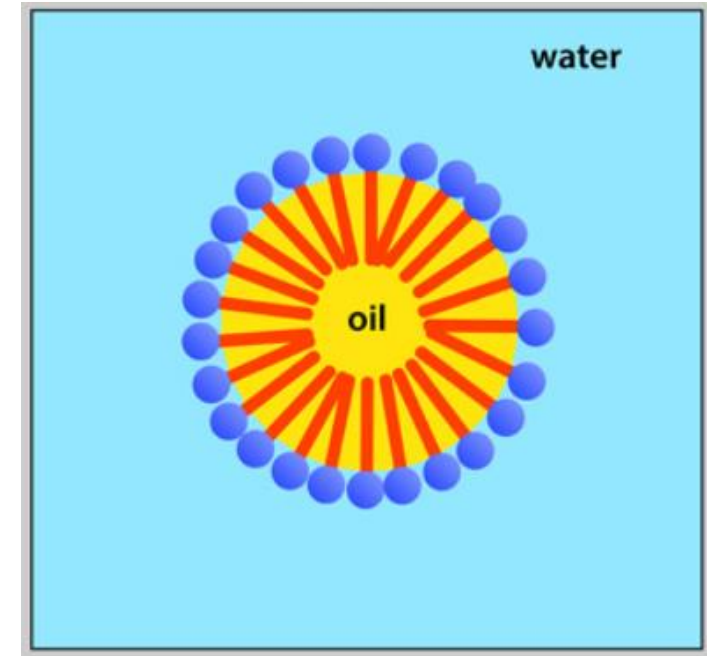
- ✓ Also called meat batters
- ✓ Complex systems in which fat is emulsified into a viscous fluid
- ✓ This is mainly composed of solubilized myofibrillar proteins previously extracted from meat from different animal species.

# Classification of emulsified meat products in the world

- ✓ **Sliceable Products** (wieners, frankfurters, mortadella, and bologna)
  - Emulsified cooked meat products of finely comminuted meats mixed with fat, water and ice, and additives (salt, nitrate, phosphate seasonings, flavorings, etc.).
  
- ✓ **Spreadable Products** (pâté, terrine, galantine, and roulade)
  - Wide variety of products produced in many parts of the world.

# Emulsified meat products

- ✓ Emulsions are a dispersion of one immiscible liquid in another immiscible liquid.
- ✓ The liquid phase that is dispersed is the “internal phase or dispersed phase”
- ✓ The other liquid phase is the “external phase or continuous phase”.
- ✓ Meat emulsions are oil/water emulsions.



# Meat proteins in emulsion formation

- ✓ Myofibrillar proteins have the best emulsifying properties.
- ✓ Protein's high solubility and their interactions with other compounds positively affect;
  - the oil-binding ability
  - water-holding capacity
  - emulsion stability
  - emulsion viscosity and density

# Meat emulsions- Related definitions in Turkish Food Codex

- ✓ ***Emulsifying***: The process whereby water and animal fat are kept together homogenously by means of meat proteins and emulgators
- ✓ ***Emulsified meat product***: Heat treated meat product prepared from the batter obtained from meats from domestic ungulates or poultry meats using emulsion process followed by stuffing into natural or artificial casings, and then heat treatment



# Meat emulsions

- ✓ A meat emulsion is a biphasic system:
  - fat globules (***dispersed phase***) suspended in a matrix made of proteins solubilized in a salt solution (***continuous phase***).
- ✓ Fat globules are suspended in the liquid bulk due to the formation of a protein film.
  - *The protein hydrophilic groups are oriented toward the aqueous phase.*
  - *The hydrophobic groups are oriented toward the fat (or lipid) phase,*
    - *They stabilize the suspension.*

# Factors affecting the characteristics of emulsions

- ✓ Emulsion capacity (the ability of the protein solution or suspension to emulsify oil)
- ✓ Emulsion stability
- ✓ Type and level of the soluble proteins
- ✓ Emulsion temperature
- ✓ pH value
- ✓ Diameter of fat globules
- ✓ Emulsion viscosity

# Emulsified-type sausages

## ❖ Main processes in the production:

- Chopping in cutter (fine chopping)
- Smoking
- Cooking

## ❖ Formulation:

- Meat with high water holding capacity
- Fat
- Cold water/ice
- Additives: Salt, Nitrite, Phosphate, Starch, Ascorbic acid, Seasoning

# Emulsified sausage production flow



Stuffing

Smoking

Cooking

Cooling

Refrigerating

Packaging



# Defects in emulsified meat products

## Texture defects

- ✓ Emulsion breakdown
- ✓ Hard and dry texture
- ✓ Soft texture
- ✓ Spongy texture
- ✓ Nonuniform distribution of ingredients

## Color defects:

- ✓ Dark colors
- ✓ Pale colors
- ✓ Internal color defects
- ✓ Blue, green and gray colors in the cross section

## Flavor defects:

- ✓ Sour taste
- ✓ Musty taste and odor
- ✓ Absence of meat flavor