GDM 412 MEAT TECHNOLOGY
LESSON-9

MATERIALS USED IN THE MANUFACTURING OF MEAT PRODUCTS

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Materials Used in The Manufacturing of Meat Products

1- Animal tissues

-Meat (muscle from the carcass)

-Filler meats (trimmings, meats with high connective tissue content, meats with high fat content, edible offals, meat from the head, etc.)

-Fat (Adipose tissue, sheep tail fat, kidney fat, tallow, some vegetable oils)

2- Water

Added to emulsified products, canned products, and wet cured products at different steps.

3- Salt

4- Antimicrobial additives

5- Fillers and binding agents, emulsifiers

6- Other supplementary additives to facilitate production

-Reducing agents (ascorbic acid)
-Other compounds effective in curing (citric acid, phosphates, etc.)

7- Flavor enhancers

-Sugars, protein hydrolysates

8- Seasoning

-Stimulant spices (some peppers)

-Aromatic seasoning (Allspice, cinnamon, clove, ginger)

-Flavoring extracts (e.g. vanilla and lemon extracts)

9- Antioxidants

Some food additives prohibited in some traditional meat products of Turkey

Product	Additive prohibited/category
Sucuk	E 620–625: Glutamic acid—glutamates E 626 – 635: Ribonucleotides E 251–252: Nitrates Coloring agents
Heat-treated Sucuk	E 620–625: Glutamic acid—glutamates E 626 – 635: Ribonucleotides Coloring agents
Pastırma	E 620–625: Glutamic acid—glutamates E 626 – 635: Ribonucleotides E 251–252: Nitrates Coloring agents (with the exception of edible outer coating)
Döner	E 620–625: Glutamic acid—glutamates E 626 – 635: Ribonucleotides E 251–252: Nitrites Coloring agents
Poultry Döner	E 620–625: Glutamic acid—glutamates E 626 – 635: Ribonucleotides E 251–252: Nitrites Coloring agents
Meatballs	E 620–625: Glutamic acid—glutamates E 626 – 635: Ribonucleotides E 251–252: Nitrites Coloring agents

Source: Turkish Food Codex Regulation on Food Additives (2013)

Functions of salt in meat products

- **Salt (NaCl) is added into meat products. Functions;**

  - ✓Antibacterial (bacteriostatic) activity.
  - ✓Important in emulsified meat products: increases ionic strength and solubilizes myofibrillar proteins (salt soluble), thus help form meat emulsion.
  - ✓Affects products typical flavor.
  - ✓It reduces heating period of meat products.
  - ✓Improves tenderness (texture).
  - ✓Increases water binding capacity of proteins, thus, reduces drip loss.
  - ✓When it is added to the cooling water, it lowers freezing point of water.

Salt

- ✓Needs to be food grade.
- ✓When the foreign matter level increases, solubility of salt decreases.
  - ➢The major foreign matter is magnessium which results in discoloration at high concentrations.
  - ➢Iodized salt should not be used. Iodine makes complexes with nitrate and prevents it from being reduced to nitrite.
- ✓In general, salt is added into the meat products by mixing with the curing ingredients.

Nitrate ve nitrite

- ✓Also called curing agents.
- ✓Nitrite is the only toxic compound allowed to be used in foods. Its use is based on strict rules.
- ✓Besides their antimicrobial effect, they exhibit other functions, particularly in cured meat products.

Functions of nitrate and nitrite

- ✓ Antimicrobial effect
- ✓ Responsible for typical color of cured meat products.
  - ➢ Nitrosomyoglobin formation in raw cured products such as sucuk and pastırma
  - ➢ Nitroso-hemochrome formation in heat treated cured products such as franfurters and Bologna
- ✓ Contribute to formation of typical flavor of cured meat products.
- ✓ Antioxidant effect: prevent undesirable off-flavor (warmed-over flavor-WOF).

Emulsifiers

- ✓In emulsified meat products such as frankfurters and Bologna, there is no need to use emulsifiers.
- ✓However, the products such as meat sauces and “gravy” emulsifiers can be used.
- ✓Examples: Lecitin, mono- and diglycerides

“gravy”: a kind of meat sauce

Cure accelerators

- ✓Reducing agents
  - ✓Ascorbic acid and its salts
  - ✓Erithorbic acid and its salts
- ✓Sugars
- ✓Phosphates
- ✓Citric acid and its salts

Phosphates

- ✓ Some phosphates commonly used in meat products alone or as combinations are:
  - Sodium acid pyrophosphate
  - Sodium pyrophosphate
  - Sodium hexametaphosphate
  - Sodium tripolyphosphate
  - Disodium phosphate

Thangavelu et al. 2019

Phosphates

- Alkaline phosphates enhance dispersion properties of proteins by regulating;
  - solubility, gelation, foaming, emulsifying and stabilizing capabilities

Phosphates

✓The effects of phosphates on water holding capacity could be due to:

1. ***pH increasing effect***

2. ***By sequestering the metal ions such as Ca^{2+}, Mg^{2+} present in the actomyosin***

   - ***Dissociation of actomyosin into actin and myosin***

Seasoning

- ✓Stimulant spices- red, black and white pepper
- ✓Aromatic seasoning- allspice, cinnamon, clove, ginger, garlic
- ✓Flavoring extracts- vanilla and lemon extracts (some peppers)