GDM 412 MEAT TECHNOLOGY
LESSON-14

SUCUK PRODUCTION

Prof. Dr. Kezban CANDOĞAN

Sucuk

- ✓ A traditional Turkish dry fermented sausage
- ✓ Typically beef and sheep meat are used for its manufacturing
  - ➢ Occasionally buffalo meat
- ✓ *Sucuk production in Turkey:*
  - ➢ ~15,000 tons fermented + ~ 35,000 tons heat treated
  - ➢ ~ 55% market share within the processed meats

Heat Treated Sucuk

- ✓ Heat treatment can be applied in the production
  - ➢ to shorten the processing time
  - ➢ to ensure safety of the product, to extend shelf-life
  - ➢ to reduce production cost
- ✓ Fermentation period is short
- ✓ The main target in this application is elimination of the foodborne pathogen bacteria

Color formation in sucuk

- ✓"Nitrosomyoglobin" ($NOMb.Fe^{+2}$) is the pigment which gives the typical pink-red color in sucuk.
- ✓Characteristic color of the product is formed as a result of catalase positive bacteria when they reduce nitrate to nitrite.
- ✓With the appropriate pH decline in the product, color reactions gave rise to the typical color.

Flavor generation in sucuk

✓The factors affecting flavor generation in the fermented meat products such as sucuk;

- ➢Salt, seasoning, smoke flavor (if smoking is applied)
- ➢Compounds generated as a result of chemical and enzymatic reactions (i.e., products of lipid oxidation)
- ➢Degradation products of carbohydrates, fats and proteins

Flavor generation in sucuk

- ✓Among all factors affecting flavor generation, the most effective one is products of microbial methabolism.
- ✓Typical sucuk flavor is formed as a consequence of degradation of carbohydrates, lipids and proteins by metabolisms of endogenous enzymes and microbial enzymes.

Microbiology of sucuk ripening

✓There are two bacterial groups which play important roles in sucuk fermentation;

- Lactic acid bacteria- *Lactobacillus*, *Pediococcus*
- *Micrococcaceae- Micrococcus*, *Staphylococcus*

Lactic acid bacteria

- ✓LAB are the fastest-growing microbial group during the production of sausages and are of great importance in ensuring safety of fermented sausages.

- ✓LAB are mainly responsible for acidification. They are able to reduce the pH of the sausages by production of lactic acid from carbohydrates.

- ✓Certain strains on LAB produce antimicrobial compounds, defined as bacteriocins, able to inhibit the growth of pathogenic and spoilage microorganisms.

Lactic acid bacteria

- ✓For fermented sausages the followings are of great importance:
  - ➢*Lactobacillus curvatus*, *Lactobacillus sake*, *Lactobacillus plantarum*
  - ➢*Pediococcus acidilactici*, *Pediococcus pentosaceus*

Coagulase Negative Cocci

✓ Mainly represented by *Staphylococcus* and *Kocuria* spp.

✓They contribute to the final characteristics of the product.

- They produce proteolytic and lipolytic enzymes responsible for the release of low-molecular-weight compounds.

- Examples of these low molecular weight compounds: peptides, amino acids, aldehydes, amines, and free fatty acids, which influence the flavor profile of the final product.

Coagulase Negative Cocci

✓Their roles in fermented sausage production:

- ➢To produce catalase which decomposes H_2O_2.
- ➢To produce nitrate reductase which reduces nitrate to nitrite, and thus play an important role in the formation of typical *nitrosomyoglobin* pigment in the final product.

✓*Staphylococcus carnosus, Staphylococcus xylosus* and *Kocuria varians* are the most important ones.

✓***Staphylococcus carnosus*** and ***Staphylococcus xylosus*** are used in commercial starter culture mixes.

Hurdle Technology

- ✓Production of fermented sausages is well-known example for the hurdle technologies.
- ✓Hurdle technology: Intelligent use of combinations of different preservation factors or techniques.
- ✓Without the use of heat treatments, the growth of pathogenic microorganisms can be inhibited by a series of factors, such as;
  - ➢***pH, aw, organic acids, bacteriocins, sodium chloride, and nitrates/nitrites.***

Hurdle technology in sucuk

Interaction of hurdle parameters in sucuk