GDM 412 MEAT TECHNOLOGY LESSON-13

MEAT FERMENTATION and FERMENTED MEAT PRODUCTS

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Lactic acid fermentation

- ✓ Generation of primarily lactic acid. Also production of acetic, formic acid and ethanol as seconder products from glucose
- ✓ Homolactic fermentation:
 - ✓ One molecule of glucose is converted to **two molecules of lactic acid**.
 - ✓ Most of the lactic acid bacteria produced lactic acid (higher than 90%).
 - ✓ Typical examples are most *Streptococcus* spp., *Lactobacillus casei*, etc.
- ✓ Heterolactic fermentation:
 - ✓ Glucose is converted to *lactate, acetate, ethanol and* CO_2 .
 - ✓ Typical microorganisms involved: *Leuconostoc* and some *Lactobacillus* species

Meat fermentation

- ✓ One of the oldest methods of meat preservation.
- ✓ A process where microorganisms, meat and technology meet.

Meat fermentation

✓ Main processes used in the production of fermented meat products:

- ✓ Curing
- ✓ Lactic acid fermentation
- ✓ Drying

"ripening"

*Ripening: a general expression used for fermentation+drying processes

Fermented meat products in the World

✓ They are produced in most of the countries in the World, mainly in European countries.



- ✓ Raw materials used: beef and pork, lamb, buffalo and poultry meats
- ✓ In the production of whole-meat products, only one type of meat is used while for the products such as sausages, different types of meats can be used.

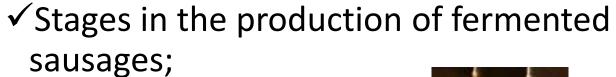
Fermented meat products in the World-Classification

Three types of fermented meat products based on the meats used in the production :

- 1. Fermented sausages
 - a) High moisture content (50-60% moisture)- e.g., Lebanon bologna, mortadella
 - b) Semi-dry (35-50% moisture)- e.g., summer sausage, U.S.A., figatelli France
 - c) Dry (20-35% moisture)- e.g., pepperoni, salami
- 2. Products manufactured with fermentation of large and whole cuts (e.g., Biltong, Jerky)
- 3. Locally produced products from other parts of animals (e.g., *Miriss* from lamb stomach; *twini digla* from intestines; *kaidu-digla* from chopped bones)



Fermented sausages







➤ Drying











Fermented sausages

- ✓ Product type and diversity differ depending on the climate and region.
- ✓ In Germany, around 350, in Spain, around 50 fermented sausage types.
- ✓ Traditional meat product of Turkey, "SUCUK" falls into the fermented sausage category.





Important factors in fermented sausage production

- ✓ Raw materials: meat and fat
- ✓ Meat preparation
- ✓ Refrigeration
- ✓ Grinding
- ✓ Flavoring mixture

Factors affecting ripening

- ✓ Extrinsic factors
 - ➤ Relative humidity
 - **≻**Temperature
 - ➤ Air circulation
- ✓ Intrinsic factors
 - ➤ pH value
 - ➤ Water activity
 - ➤ Level of salt, nitrite and sugar
 - > Fat content
 - ➤ Degree of fat grinding
 - ➤ Casing type

Product quality control during ripening

- √ To obtain good qulity product, characProperties that need to be controlled periodically to follow the course of ripening and are;
 - ➤pH value
 - ≽a_w value
 - **≻**Texture
 - ➤ Weight loss

Starter Cultures

- ✓ Starter cultures are preparations that contain actively growing or resting forms of microorganisms that with their metabolic activity impart desired effects during fermentation.
- ✓ Starter cultures are essential in order to shorten the ripening period, ensure color development, enhance the flavor and improve product safety.
- ✓ Starter cultures used in fermented sausage production:
 - > Lactic acid bacteria
 - **≻**Micrococcaceae
 - > Yeast and molds



Casings

- ✓ Properties required for good quality casings:
 - ✓ good porosity which will allow a good exchange of water from the inside to the outside of the sausage
 - ✓ soft and elastic to assure the adherence of the meat batter to the casing during all the process simple removal
- ✓ Natural vs. artifical casings