

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 secondary 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 CO₂**.
 - ✓ 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



✓ Stages in the production of fermented sausages;

- Formulation
- Fermentation
- 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 quality product, characteristics 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. artificial casings