BEEF PROCESSING AND THE ROLE OF MATURATION IN ENSURING A SAFE PRODUCT

PRESENTATION OUTLINE

- BACKGROUND
- MATURATION PROCESS
- CONCLUSIONS
- REFERENCES

BACKGROUND

- Commodity-based trade (CBT) has opened up of opportunities for animal products from Foot and Mouth Disease (FMD) infected countries and zones to be traded internationally.
- According to Article 8.8.22 of the OIE Terrestrial Animal Health Code deboned beef (DB) can be traded internationally.
- This trade is conditioned on application of risk mitigation measures at all stages.
- Extensive research on Foot and Mouth Disease Virus (FMDV) survival in meat and other tissues has been carried out, dating as far back as 1927.

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BACKGROUND

- This presentation will focus on Point 2 of Article 8.8.22 which recommends that for the importation of fresh meat from FMD infected countries or zones then it must come from:
- 2) comes from deboned carcasses:
- a) from which the major lymphatic nodes have been removed;
- b) which, prior to deboning, have been submitted to maturation at a temperature greater than + 2°C for a minimum period of 24 hours following slaughter and in which the pH value was less than 6.0 when tested in the middle of both the longissimus dorsi muscle.

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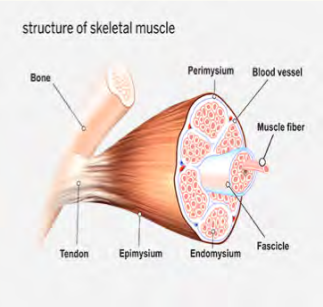
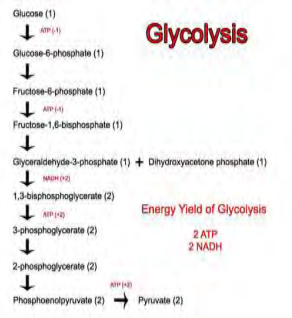
MATURATION PROCESS





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MATURATION PROCESS

- The role of maturation process is for the inactivation of the FMDV through pH drop.
- Muscle
- Before slaughter muscle pH is around 7.2
- After slaughter temperature is between 37°C and 39°C
- Glycogen is stored in muscle cells when animal is living and broken down to produce energy (aerobic glycolysis)
- Glycogen levels affected by pre-slaughter stress conditions/animal welfare practices and intrinsic factors such as species, type of muscle.
- Presence of virus in muscle due to viraemia or direct infection into muscle tissue.

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MATURATION PROCESS

- Glycolysis
- Death leads to no supply of oxygen, free fatty acid and glucose to muscles.
- Anaerobic process of glycolysis then converts glycogen to lactic acid.
- Lactic acid accumulation results in fall in pH between 5.6 and 5.7
- Failure of acidification will improve survival conditions for FMDV.
- Longissimus dorsi muscle is used to measure the pH drop because of its good correlation with many other muscles.

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MATURATION PROCESS

- Rate of glycolysis is affected by:
- Temperature and pH both affect enzyme activity.
- Increased temperature increases the rate of pH decline and vise versa.
- Rate decreases with decrease in pH.
- At pH of about 5.4-5.5 enzymes become inactivated.
- Glycogen pre-slaughter is directly proportional to pH drop.

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MATURATION PROCESS

- Deboned beef
- Has been removed of all bones, major blood vessels, all visually identified lymphnodes, blots and specified amounts of fat.
- pH in removed materials does not reach required levels for FMDV inactivation.
- Ultimate pH is 5.8 and below

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CONCLUSIONS

- FMDV inactivated by pH <6.0 or >9.0
- Ultimate pH of deboned beef achieved by maturation is 5.8
- FMDV survival in bone marrow, lymphnodes and haemal nodes.
- Maturation alone cannot guarantee safe trade of deboned beef.
- A combination of pre-slaughter and slaughter measures results in deboned beef being a commodity with negligible risk of transmitting the FMDV.
- Above all measures need not only to be applied but to be also monitored, verified and certified.

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THANK YOU

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