



Factors affecting quality of poultry meat

MODULE NO. 20: Factors affecting quality of poultry meat

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- ❖ **Rearing conditions**
- ❖ **Pre slaughtering conditions:**
 - Bird catching:
 - Stress and fatigue:
- ❖ **Ante-mortem Factors:**
 - Fasting:
 - Stunning:
- ❖ **Handling and slaughtering conditions**



1. Rearing

- Rearing effects quality of meat.
- Unfavourable rearing conditions decrease productivity.
- Temperature, airflow greatly effects bird conditions.
- Temperature, ventilation rate have significant effects on quality as well as biological efficiency.



2. Pre slaughtering conditions

Bird catching:

- Pre-slaughter management affects meat quality.
- Catching may result in injury.
- Maximum bruises result due to transportation and unloading at processing plant.
- Damage prone areas include mainly carcass : breast (11%), thighs(33%) and wings (38%).
- The way producer cage the birds is an important factor that determine meat quality



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Stress and fatigue:

- Stress and fatigue lower the quality of meat when exposed to adverse conditions before slaughter.
- Dark cutting meat or dark, firm and dry (DFD) meat may be produced due to low acid
- Keeping quality of meat reduced and looks dark.



3. *Ante-mortem* factors

- Period of stress and anxiety.
- Most likely takes place at farm and 12h prior to slaughter.
- Birds need proper care during this particular time period.
- Stress may accelerate rigor mortis development, reduce water holding ability, and paleness in meat.
- Transportation stress reduce tenderness and increase lightness.



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- Reduce plasma levels of corticosterone.
- Lower incidence of carcass bruising, when birds transported before slaughter.



Fasting:

- Fasting prior to slaughter results in meat with higher pH and dark color.
- Fasting improves quality of meat.
- Accelerate rigor mortis and final product quality.
- Feed withdrawal from broilers reduced muscle energy stores.



Stunning:

- An ante-mortem factor that can have profound effect on meat quality.
- Stunning may immobilize the bird for automatic killing .
- commonly done by passing electric current from saline bath to bird's head through its body.
- Marked effect on muscle characteristics that induce hemorrhages and broken bones.
- Other factor affecting is stunning duration.



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- Alternative form of stunning is gas stunning.
- Birds exposed to anesthetic gas carbon dioxide or a mixture of carbon dioxide and argon to deprive the bird of oxygen.
- Influence the development of rigor mortis and the need for aging.



4. *Handling and slaughtering conditions*

- To remove stress birds should be relaxed
- Birds to be slaughtered be disease free.
- Birds should keep fast six to eight hours prior to slaughter.
- Birds to be slaughtered should be kept away from rest of the birds.
- Birds should be unaware of the stunning process while stunning.



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- Slaughtering has a major influence on the quality of meat.
- Slaughtering area should be free from contamination.
- Proper drainage facilities for water, blood.
- Slaughtering equipments should be clean, sterile, free from microbial load.
- After slaughtering, defeathering should be done followed by evisceration. Eviscerated bird should be thoroughly washed.



Quality maintenance after slaughtering

- Temperature should be controlled as well as packaging and handling systems.
- Temperature around 0°C for frozen poultry temperature of -18°C or lower are useful.
- Controlled atmosphere packaging using gas flushing and modern laminated films for unfrozen.



Factors affecting meat quality

Biochemical changes:

- Greatly affects meat quality
- Rigor mortis development is crucial in process of muscle death.
- Anaerobic conditions develop.
- Muscles stiffen and contract- process known as rigor mortis.



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➤ Rigor mortis develops as:

- Depletion of glycogen and accumulation of lactic acid in the muscle.

- Inhibits glycolysis and ATP production.

- Actin –myosin dissociation occurs.

➤ Glycolysis and rigor mortis occur significantly faster in poultry in comparison to that of red meat.



Temperature:

- Influences rigor mortis and overall meat quality.
- Increase of 10°C resulted in 20 fold increase in protein denaturation.
- Elevated temperature leads to degradation.
- Rigor mortis in meat-type chickens is complete within 2 to 3 hours of postmortem.



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- Temperatures between 37° and 41° C exhibit rapid rates of glycolysis and onset of rigor mortis especially in broiler.
- Rigor increases carcass temperature .



Chilling:

- Done below 4°C within 1.5 h of death with water immersion or 2.5 h of death with air chilling.
- Rapid chilling reduce microbial growth, but also
- Serves to increase the firmness of the muscle and stiffness of skeleton.



Ageing:

- Ageing, or maturation, is done at refrigerated temperature before deboning.
- Tough meat when harvested before development of rigor mortis.
- Reducing the need of aging would expedite boneless meat production.

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