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Preslaughter care (from farm to slaughter)

1- THE FARM OR PRODUCTION UNIT

2- TRANSPORTATION (FARM TO MARKET) AND (MARKET TO SLAUGHTER HOUSE)

3- MARKET

4- LAIRAGE

production unit:

- Farmer producing healthy clean and unstressed animals for slaughter
- This require attention to drug use, husbandry and welfare
- Many problems are often seen in the slaughter house due to bad handling of animal on the farm as:
- Faecal communication of cattle hides
- Vaccination abcesses are common in sheep carcass, also appear in cattle —* weight loss & . carcass value.
- Bruising in all food animals especially in lambs due to bad care, bad handling, wool pulling , rough handling during ear tagging.
- Bad use of drugs especially antibiotics or chemotherapeutics

B- Preslaughter care during transportation:

- Animals should be slaughtered as close as possible to the point of production in order to avoid long journeys, injury, stress, loss of weight and disease during journey.

- The more significant points of the transport of animal orders may be summarized as following:

I - Transportation of animal in approved vehicle

2- loading & unloading in such a manner as to prevent injury or unnecessary suffering.

3- Animals loaded by means of ramp, a loading bank

4- **The vehicle-** cleaned & disinfected after each journey
* The floor must be non slip, pigs& calves litter must be provided.
* Separation partitions height not less than 127 cm for cattle, 2m for camel, 75 cm for small animals to prevent over crowding or falling.
* Well ventilated vehicle.
* Not over crowded or so lossely packed.
* Certain classes must be separated
- A female with young - Different species & sizes
- Horned cattle boar over 6m - Bull over 10 months

5-Animals must be fed and watered every 12 h & watered at all possible times except in journey which is completed within 15h they feed on arrival.

6-Unfit animals must not be carried, if transportation will cause unnecessary suffering

7- Carcasses must not be carried with live animals in the same vehicle other than the carcass of animal which has died during the journey

Problems occurring during transport

1-Stress

Stress producing factors (stressors)

a) Miss loading
b) Cold or high temp
c) Starvation
d) Fatigue
e) Rough handling
f) Strange attendant
g) Strange noises, light & wind
h) Strange surroundings
i) Damp weather
j) Emotional excitement&fear

The effect of neurohormonal reaction of stress on meat quality:

Stress ***seriously affect these parametes as following:.***

1- Low level of glycogen and Low ATP supply (important to maintain muscle relaxation setting" & Low level of lactic acid (affect ripening)

2- Higher pH —poor K.Q. of meat .

3- PSE (pale soft exudative meat) in pork

rapid glycolysis & fall in PH immediately after death temperature is still high , reduced ability of muscle protein to hold water

some proteins become insoluble in the acid tissue fluids.short duration

4- DFD (dark firm & dry meat) in beef
Rapid glycolysis & PH is still high
Temperature is still high
Water holding capacity is high
Long duration
5- Ill bled meat (more residual blood) Due to
Increase heart rate & vasoconnstriction leading to increase blood precssurc
Increase muscle contraction leading to increase blood flow to muscles
6- Affect tenderness & flavour of meat due to reduced acidity or lactic acid
7- Initial microbial count of muscle increases
8- Stress liver —irreversible changes in colour & consistency of the liver

2-loss of weight

Factors affecting loss of weight

a) Body condition (Fatty animals lose more)

b) Journey duration(the long journey the more loss)

c) Season (in summer, animals lose more)

d) Sex (females ,lose more)

The loss of weight during transportation is usually due

- glycogen depletion (compensate this from body storage)
- loss of fluid by sweating and respiration
- excretion of urine & faeces

3-Brusing

much of trauma, injuries or even fractures occur during transport as a result of:

- Careless handling
- Mixing of unfamiliar groups & over crowding
- Inadequate loading
- Improper design or maintenance of vehicle
- Excited & bad temperment of animal
- Horned animal

All of these factors create adverse effects appear in dressed carcass

Conditions or affections induced during transport

1- Transit or shipping fever:

2- Transit tetany

3- Transit erythema

4- Death of animals:

5- Salmonelosis

C- Preslaughter care on markets:

- Must be canciled and the animal come from farm to slaughter house directly.

Problems or affections to the animal in market:

Stress and bruising

the abattoir

1-Resting

2) Moving animals within the lairage

3) Avoid noise and social stress:

4) Watering

5) Feeding

6) Fasting

Conditions occurring from poor preslaughter care:

1- Blood splashing:

2-Bruising:

2-Bruising:

Means the release of blood from ruptured vessels into the surrounding tissues.

Causes:

1. Miss-transportation, trauma, injury or even fractures due to carless handling, mixing of unfamiliar groups, over crowding bad vehicles, inadequate loading, horned animals, excited animals.
2. Poor preslaughter care during unloading marketing & lairaging.

***Seat of lesions*:**

cattle *(54%)* involve the hip area (lion damage), in pigs, 66% in the ham area. In sheep, most common in hind legs

Estimation of age of bruising:

1) Visual estimation

Depends on the colour of the bruise:
Red & haemorrhagic —- first few hours
Dark coloured& watery —24-38 hour
Rusty & soapy to touch —- after 3 days

***2) Chemical estimation*:**

Depends on two ways:
a) The quantitative estimation of some breakdown products of haemoglobin from the haemorrhage as
- Haemosiderin test - bilirubin test
b)The quantitative estimation (using kits) of two enzymes
Mainly GOT glutamate-oxaloacetate transrninase
CPK creative phosphokinase

3) Bone taint (deep seated spoilage)

It is the spoilage occurring in deep seated muscle due to anaerobic bacteria which present in the GIT of the animal before slaughter.

Predisposing factors:

* Pre slaughter stress
* Heavy or over fat carcass
* Hot weather
* High PH (neutral or alkaline ***)*** in the carcass

Seat:

* The hip joint in cattle & pig is the area most commonly affected.
* The shoulder area of cattle is also susceptible

- The synovial fluid of the hip joint is a good media for bacterial. Growth with 7-8 PH compared with 6 PH for normal muscle.

Mechanism of occurrence:

After slaughter the carcass temperature falls rapidly, with cool dry ambient conditions, and a free circulation of air around the carcass help in this fall.

In fatty or heavy animal, a high temp may persist for some time in deep seated muscles resulting in bacterial growth in these areas which migrate from GIT to different parts, with the help of high PH in these deep seated parts.

Appearance of the affected area:

Putrefactive smell with the possible discolouration of the surrounding muscle.

Overcoming:

Good preslaughter care especially during hot weather

Well resting of the animal.

Examination:

By inserting a testing probe in the suspected area and smell it.

Judgment:

According to the degree of the condition we can make partial or total condemnation of hind quarter

4) Stress Myopathy

Definition:

It is a group of muscle diseases which are commonly appear among carcasses of stressed or exhausted pigs, cattle or sometimes sheep, as a result of a defect in the energy metabolism of the muscle as well as high stress sensitivity of the animal.

Causes:

The exact or real causes of these diseases not fully known but we can classify causes to predisposing factors and exact causes (the possible known)

Predisposing factors:

a) Preslaughter stress which leads to appearance of exact causes.
b)Hereditary factors which is obvious in some pig breeds as Danish, landrace and pietrain.

Exact or real causes:

These are several factors and assumptions regarding the exact or real causes of these conditions, these causes divided into endocrine factors & myogenic factors

Forms of stress myopathy

PSE (pale soft exudative muscle)

PSS (Porcine stress syndrome)

DFD (dark firm dry meat)

BMN (back muscle necrosis)

1) PSE Pale soft exudative muscles or watery pork.

* In non-stress sensitive pigs or pigs which have been well
rested and not subjected to excitement and stress prior to slaughter, the PH drops from *7* to around *5.5* in 12 hours.
* On the other hand, in stress sensitive pigs which are excited
before slaughter, there is a great production of lactic acid due to glycolysis, which leads to rapid fall of PH to *6-5.5* with *4 5-60* minutes (1 hour) of slaughter, at the same time the temperature of the muscle is still high (above *35C°*) or even very low reduction of carcass temp.

Incidence of PSE meat

a)Pigs ——- *15-30%* especially breeds, Danish, Landrace, Pietrain, Poland, China, Germany , Belgian.

b)Cattle—* 8 % especially young male cattle, but with mild form and the changes are mainly in the psoas major (fillet) and longissinus dorsi muscles.

c) Sheep —rare

d)Poultry ——about 20 % (mostly in white fibers).

It may be physical, chemical or technological properties.

1-Fast rate of PH fall in a very short time after slaughter (may reach *5.5* within *45-60* mm within 1 hour) while carcass temp. is still high (above 35c0).
2-As a result of '{. PH *(5.5)* (isoelectric point).
- Denaturation of sarcoplasmic proteins and contractile protein precipitated on the myofibrils and lowering the extractability of the myofibrillar proteins.
- At isoelectric point the myofibrillar proteins has no electric charge and tend to loss water —* exudation —* waterness —* driploss also meat change to paler appearance due to increased light scattering of denatured proteins. This means . water holding capacity, ionic activity, and solubility of the contractile proteins.

3-PH24 is normal ultimate PH (5.5-5 after 24 h).
4-High amount of drip which causes weight loss (10%) (fresh).
5-Higher losses during chilling and storage due to evaporation process.
6-Higher cooking loss leading to toughness when cooked
7-Taking up more brine solution than normal meat.
8- The bound water percentage is lower than normal by 30%. This negatively affects tenderness and juiceness of meat.
9- Not used for production of sausage without addition of phosphates.
10- Lower glycogen & ATP-ase activity.
11- Low nutritive and technological values.

cutting meat:

It is another form of stress myopathy or another result of preslaughter stress. In which there is a change in the muscle fiber quality of freshly slaughtered animal.
The change in quality appears as dark (dark red) firm in consistency and dry feeling of dryness with sometimes sticky surface of meat.

Cause:

The same as causes of stress myopathy specially climatic stress and aggressive behavior between male animals may cause cattle to deplete their muscle glycogen —*---* decrease amount of lactic acid formed post-mortem —*---* high PH and ultimate PH (PH24) still high (above 6.2) glycogen level and PH don't return to normal level until about 2 day or 3 days in long period of stress.

Incidence:

Cattle —13% especially among young male cattle

Pig —not common but sometimes appears in 5 % of the herd after long duration of preslaughter stress, but shorter duration leads to PSE.

The most affected muscles:

Longissimus dorsi, semitendinousus, semimembranosus adductor, and gluteus medius muscle.

Changes and properties of DFD meat:

1-The high ultimate PH (PH24) of meat increases the extractability of myofibrillar proteins.
2-High PH (above 6.2) far from the isoelectric point *(5-5.5)* causes strong ionization of proteins and increases water holding capacity of meat, so meat becomes firm& dry.
3-Dark appearance is occurring due to: •Increas reflection of light from full & unchanged protein structure.
•Non denatured myoglobin.
•Increase activity of enzymes which utilize oxygen so, only part of myoglobin is converted to oxymyoglobin.

4-Lack of ripening or absence of proteolysis, this may be attributed to high PH which inhibit the autolytic enzymes especially the proteolytic ones —*-—*—* absence of tenderness and the meat becomes firm (tenderness may t at PH 24).
5-Flavour and taste of meat is affected due to decreased levels of ATP, glycogen and lactic acid and increase accumulation of IMP as a result of ATP breakdown.
6-Normal PH1 and PH24.
7-Retardation of oxidative rancidity of fat
8-High PH enhance growth of the meat spoilage and shorten the storage period of the meat. As putrefaction of meat appears after 7 days in the chilling temperature (in normal beef this period may reach 14 days). Therefore, this meat DFD should be oniy used for manfacture of rapid consumed products as fresh sausage.

Examination of DFD meat:

1- R-value test (ratio of ATP to IMP).
2- Measuring of PH24

failure syndrome stress cardiomyopathy:

Def.

Another form of stress myopathy and is the best known example of biological factor (hereditary susceptibility to Stress)
which interact with an environmental factor (preslaughter stress) to alter meat quality.

Causes:

As causes of stress myopathy collected in preslaughter stress and the breed or hereditary factor. According to the amount of stress it may begin as PSE then **PSS** or begin as PSS directly.

Incidence:

This syndrome is common among pigs, particularly, the pietrain and landrace breeds.

P.M.

Diffuse & sever degeneration of skeletal muscles, excess pericardial fluid.

* If the stress is less and the animal survive till reaching the abattoir, the animal is legally slaughtered for its meat it may produce PSE meat when the stress is less and muscles appear wet & pale and the muscle fasciculli may separate very rapidly (lactic acid is high & low PH). Some pigs may produce DFD meat when stress is more and glycogen is depleted (lactic acid very low & high PH).

4) BMN Back muscle necrosis:

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- ***Symptoms:***
  - Appears after 10 hours from exposure to stress (sever).
  - Hyperthermia & troubles in movement.
  - Unilateral or bilateral acute oedematous swelling of muscles of the back
  - Curved back and often drops on its hind limbs (banana. disease).
  - Early death or/and damage of muscles, as a result of sever contraction of muscles or from anoxia.

Admission of animals to abattoir
Decisions of admission

a) The animal shall not be admitted:

b) The animal shall be admitted under special control

c) The animal shall be admitted for animal slaughter:

Thank you