Prof. Dr Fahim Shaltout

Professor of Meat Hygiene
Food Control Department, Faculty of Veterinary Medicine, Benha University, Egypt.
Email: fahim.shaltout@fvtm.bu.edu.eg

Post-mortem examination

Aim: To ensure that only the meat fit for human consumption is passed for food.

significance

1. Protect consumers against zoonotic diseases.
2. Protect consumers against food-borne infections and intoxications and hazards associated with residues (drugs, pesticides, hormones, etc.). N.B.: 1% of slaughtered animal must be examined for residues.
3. Protect consumers from falsification.
4. Protect livestock against spread of diseases (notifiable).

post_mortem inspection includes:

I- Macroscopic examination "Abattoir inspection"

a) Obligatory inspection "Routine post-mortem".

b) Further inspection for suspected cases.

II- Laboratory examination:

a) Trichinoscopic examination.

b) Bacteriological examination.

c) Additional examination

1. Determination of pH, degree of bleeding.
2. Determination of abnormal odor and color.
3. Determination of early decomposition and
4. Detting.of residues.

General directions before postmortem examination:

1. Post-mortem inspection should be carried out in the slaughter hail and directly after slaughter.
2. Post-mortem inspection carried out by the same inspector who done ante-mortem inspection.
3. The inspector should be supervising the dressing of each carcass to prevent substitution of diseased organ with healthy one.
4. The inspector should have 2 knives to prevent cross contamination and facilitate post-mortem examination.
5. Head and viscera should be hanged to their carcass.
6. Every organ should be examined by inspection, palpation, olfaction and incisions.
7. Avoid carcass contamination with floor and hide.
8. Suspected carcass must be detained in the detention room for further examination.

Post-mortem examination of cattle

A-Obligatory (Routine P.M.): -

I- Carcass inspection: Before proceeding the **P.M.I.,** particular attention should be paid the following

1. The state of nutrition:
   a) Well fleshed.
   b) Poor.
   c) Emaciated.
2. Any evidence of injuries, bruising, hemorrhage, abnormal color, abscess and fractures.
3. Local or general edema.
4. Efficiency of bleeding.
5. Any signs of deformities of bone and joint.
6. Age and sex of the animal.
7. Abnormal odor.
   a) Sexual odor (male sheep, goat, pig).
   b) Uremia.
8. Condition of pleura and peritoneum.
9. Lymphatic system affections:
   a) Leukosis.
   b) Caseous lymphadenitis.

II- Blood: During the process of bleeding, the inspector should observe and examine the evacuated blood, especially in cases of emergency slaughter.

1. Clotting ability (fails to colt in case of septicemia and toxemia).

2. Color:

a) Pale in anemia

b) Reddish white in leukemia.

c) Dark red in fever.

III- Head: Examination of the head includes:

1. ***Teeth*** for aging of the animal.
2. ***Lips and gums*** for presence of ulcers.

a) F.M.D.
b) Stomatitis
c) Actimomycosis.
d) Cattle plague.

3. ***Tongue*** examined for:

a) Actinobacillosis.
b) F.M.D.
c) Cysticerci (making of longitudinal incision along its middle line).

4. Examination of ***external and internal masseter muscles*** for cysticerci by made incision parallel with lower jaw.

5. Incisions of ***lymph node:***

a) Retropharyngeal.
b) Sub maxillary.
c) Parotid.

For tuberculosis, actinobacillosis and abscesses.

6. Mucous membranes of eyes for:

a) Jaundice (yellowish).
b) Fever (congested).

IV- Pluck (lungs, trachea, oesophagus).

1. Esophageal muscle
   - Sarcosporidia “ Buffaloes”.
2. Lung
   a) Inspection:
      - Pneumonia.
      - Melanosis.
   b) Palpation:
      - Hydatid cyst.
      - Abscess.
   c) Incision:
      - Left bronchial lymph node and mediastinal L.n. for
      - 1ung tissue (exposed by deep incision from the base to the apex of each lung, trachea& main branches of the bronchi) for:
        - Parasites.
        - T.B.
        - **C.B.P.P.**
        - Abscess.

V- Heart

1. Pericardium:

a) Traumatic pericarditis.

b) T.B.

c) Hemorrhages.

2. Epicardium:

Petechial hemorrhages.

3. Myocardium:

a) Cysticerci.

b) Hydatid cyst&Linguatulae.

4. Endocardium:

a) Petechial haemorrhages.

b) Endocarditis,Vegetative endocarditis (Chronic swine erysipelas).

VI- Liver

1. Inspection:

a) Focal necrosis.
b) Telangiectesis.
c) Degeneration (Fatty change).

2. Palpation:

a) Abscess.
b) Hydatid cyst.

3. ***Incision*** at the base of the caudate lobe to examine the bile ducts.

- Liver tissue:
  a) Cirrhosis.
  b) Anthrax.
- Hepatic lymph node:
  a)T.B.

VII- Spleen:

1. Inspection:

a) Enlargement:

- Blood parasites.
- Anthrax.
- Leukemia.

b) Palpation:

- Tumor.
- Hydatid cyst.

IX- Kidney

1. ***Inspection:***

a) Renal fat gelatinous in emaciated carcass.

b) Kidney capsule for petechial hemorrhage in

2. PalpaÜpticemia.

a) Inflammation.

b) Tumors.

c) Cysts.

3. Incision:

a) Kidney tissue:

- Emboli.
- Pyelonephritis.

b) Renal lymph node for “T.B.

IX- Udder:

1. ***Inspection*** for mastitis.
2. ***Palpation*** for abscess.
3. ***Incision*** by along and multiple deep incisions in the udder tissue and supra- mammary lymph node for T.B.
4. In Brucellosis reactors the udder is removed intact without incision and without handling.

X- Testes:

1. ***Inspection*** for orchitis.
2. ***Incision*** of superficial inguinal lymph node for T.B. **XI- Stomach, intestine and omentum**

1. Inspection:

a) Parasites.
b) Enteritis.
c) Tumors.

2. ***Incisions*** in mesenteric lymph node for:

a) T.B.
b) Linguatula.

XII- Uterus:

The uterus should be inspected, palpated, if necessary, incised, care being taken to prevent contamination of the carcass. In Brucellosis reactors the uterus must not be incised

XIII- Feet

- F.M.D.
- Foot rot.

B) Additional inspection of cattle or further examination

1. Suspected or evidence of T.B.

2. Presence of cyst cerci

Decisions at post-mortem examination

1-Approved for human consumption (A):

When the post-mortem examination revealed no evidence of any abnormal condition or disease, the carcass including the edible offal's should be approved for human consumption without any restriction.

2-Totally condemned (T):

- The carcass and offal's should be condemned in one or more of the following conditions:

a- If they are hazardous to food handlers, consumers and br livestock,
b- If they contain chemical or radioactive residues which exceed the permissible limits,
c- If the meat has been conditionally approved for human consumption ,but such meat has not treated as stipulated,.
D- There is severing organoleptic deviations from normal meat.

3-Partially approved for human consumption (D):

In case of localized defects resulting from disease or other abnormalities, affecting only part of the carcass or offal's, the affected parts shall be condemned, while the remaining parts shall be approved for human consumption.

4-Conditionally approved for human consumption (K):

Carcass that are hygienically unsatisfactory or that hazardous to human or animal health, but may be treated under official supervision and judged as conditionally approved for. human consumption .The organs should be treated in the same manner as carcass.

K may be classified into:

Kh= means that meat treated with heating.

Kf= means that meat treated with freezing.

5-Inferior quality meat (I):

Meat is safe from the hygienic point of view, but shows minor deviation from the generally accepted quality standard (e.g. slight abnormal odor, taste or color, poor carcass etc...) it may be approved for human consumption on condition that the consumer is aware of its inferior quality, therefore such meat should be sold only in special shops under the supervision of the authority (low price or used for manufacturing purposes).

6-Approved for human consumption, with distribution in restricted to limited area (L):

Meat obtained from animals coming from area kept under quarantine because of an outbreak of a dangerous contagious animal disease may be approved for distribution in restricted area, providing no hazard to human health is involved. Such meat should not be distributed or marketed outside the infected and strictly controlled area, in order to avoid a possible spread of the animal disease concerned.e.g.FMD.

Meat derived from animals coming from restricted area that have been vaccinated and may be carriers of a disease agent should not be marketed and distributed outside this restricted area, especially when such vaccination is not being practiced in neighboring area.

RIGOR MORTIS

- ***Def.:***
  It is the first and most considerable post-mortem change or state of reactions occur in the muscles after slaughter, the changes occur in the meat is as a result of:

  Excessive muscular contraction (stiffenss).
  Accumulation of woste product.s in muscles (Lactic acid)
  Exhaustion of ATP which is the fuel of calcium pump for contraction or extensibility of muscles.
  Exhaustion of glycogen store in muscles

What happen after slaughter

Pre-rigor Muscles are present in arelaxed state due to presence of ATP which serves in the prevention of Actinomyosin formation, ie: the muscles remain extensible (sliding of myosin & actin), in this case, if muscles put under tension, it can also be contracted.

Onset of Rigor mortis:

Time of onset **4** hours in chicken , 24h in beef after slaughter

Onset depends on:

i-Supply of energy " glycogen & ATP" stored in muscle at the time of death, Exactly, when level of ATP falls below the very low level required to maintain relaxation

(Actin + Myosin **Irreversible** Actornyosin

ATP concentration maintained by:

a) break down of glycogen and **ATPbreakdown**

b) level of creatine phosphate ATP ------ADP+P.

2- The atmospheric temperature: high temp accelerate its onset& low temp. retard it.

3- The death of the animal: The animal should be healthy for its occurrence, in febrile animal, R.M. may be abscent or scarcely apparent, some drugs encourage it as sod.salicylate ,alcohol& ether.

Course of Rigor mortis

- Affect first the muscles that have been most active & best nourished
commense at head & neck extending back wards to involve the body & limbs.
- The heart affected very early within one hour of slaughter and great intensity is in the left ventricle which is become free of blood
- As more muscles enter Rigor, the whole carcass become stiff& sets

Resolution of Rigor and tenderization:

Occurs after available times in a progressive manner in which muscles soften and become more tender when cooked, myofibrils become more easly fragmented.

The rate of tenderization or aging depends on

- temperature, when in creased, it accelerate tenderization
- species: 8 hours in birds
  days in beef
- aging not occurs during freezing but continue on thawing

Thank you