

**Ministry of Agriculture**  
**Export Abattoirs Inspection and Certification**  
**Directorate**



**Meat Inspection Guidelines for Export**  
**Abattoirs**

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**Addis Ababa Ethiopia**

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## **Acronyms**

°C	Degree Celsius
EC	European council
ECTAD	Emergency Centre for Transboundary Animal Diseases
FAO	Food and Agriculture Organization of the United Nations
Fig	Figure
MM	Millimeter
MoARD	Ministry of Agriculture and Rural Development
S/he	She or he
SRM	Specified risk material

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## **Foreword**

This technical document entitled “Meat Inspection Guidelines for Export Abattoirs” is one of the documents in a series of guidelines and Standard Operating Procedures that were developed from 2008 to 2010 by the then Ministry of Agriculture and Rural Development in collaboration with the Ethiopian Sanitary and Phytosanitary and Livestock and Meat Marketing Program.

This Guidelines document is at present reviewed and updated by the Ministry of Agriculture in collaboration with the FAO-ECTAD Ethiopia, Improving Sanitary Capacity and Facilitating Export of Livestock and Livestock Products from Ethiopia Project. The main goal of the project is to increase exports of meat and livestock to benefit Ethiopian livestock producers and exporters and to promote national economic development.

This guidelines document is intended to be used as a reference guide by the meat inspectors and inspector veterinarians assigned by the regulatory authority in export abattoirs. The document describes, among other things, the aims of meat inspection, scientific principles, methodologies and procedures to follow while conducting meat inspection activities in export abattoirs in order to certify that the meat and meat products produced there are safe for human consumption.

Apart from the regulatory inspectors, this guidelines document is also highlighting the role and responsibilities of abattoir operators in order to comply with the regulatory requirements while carrying their day to day operations.

At this point, the Export Abattoirs Inspection and Certification Directorate of the Ministry of Agriculture would like to thank the FAO-ECTAD Ethiopia, Improving Sanitary Capacity and Facilitating Export of Livestock and Livestock Products from Ethiopia Project, for providing the necessary technical and financial support required for reviewing, updating and publishing this guideline.

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## **Part I: General**

### **1. Introduction**

Meat is a very perishable commodity capable of spreading a number of disease-causing pathogens if not handled and regulated properly. Regardless of existence of geographical, cultural, religious or other differences, meat consumers in general require to pay for the meat and meat products that they have trust on satisfying the required safety, quality and wholesomeness standards.

Though operators of slaughter abattoirs have a legal responsibilities for ensuring the safety, quality and wholesomeness of the meat and meat products that they produce and supply to consumers, it is ultimately the sole responsibility of the regulatory authority to supervise and certify that the meat and meat products are produced and handled in conditions that make them safe and wholesome to be marketed for human consumption.

In this regard, meat inspection is one of the major functions that the regulatory authority should perform in any one of the registered abattoirs based on the relevant national legal provisions taking into account both the international and importing countries requirements.

#### **1.1 Objective**

This guidelines document is prepared to serve as a reference guide for meat inspectors in ensuring the meat and meat products produced in export abattoirs are safe for human consumption and satisfy importing countries' requirements.

### **2. Scope**

This guidelines document applies to meat inspection activities to be carried out in export abattoirs slaughtering cattle, sheep, goat and camel for export purposes.

### **3. Definitions**

**Abattoir:** means any premises that is approved and registered by the regulatory authority in which animals are slaughtered and dressed for human consumption.

**Approved as fit for human consumption:** means the meat has been inspected and passed without any restrictions, and branded accordingly.

**Approved as fit for human consumption with distribution restricted to limited areas:** means the meat has been inspected and approved for human consumption with the requirement that the distribution be limited to restricted areas.

**Abattoir operator:** includes any person for the time being responsible for the management of the abattoir or establishment.

**Ante-mortem inspection:** Any procedure or test conducted by a competent person on live animals for the purpose of judgement of safety and suitability for slaughter.

**Brand:** means any mark or stamp approved by the regulatory authority and also includes any tag or label bearing such mark or stamp.

**Cleaning:** refers to the ongoing process of sanitary measures which takes place throughout the day and reaches its peak after the slaughtering process has ended. This process includes the mechanical and chemical methods by which macroscopic, visible dirt is removed.

**Carcass:** means the body of any slaughtered animal after bleeding and dressing.

**Condemned:** means inspected and judged as unfit for human consumption and requiring destruction.

**Conditionally approved as fit for human consumption:** means meat that has been inspected and approved for human consumption subject to it being treated under official supervision in order to make it safe for human consumption prior to it being branded and distributed.

**Contamination:** means objectionable matter, and includes substances and/or microorganisms that make fresh meat unsafe and/or unwholesome.

**Disinfection:** refers to the process of sterilization by which micro-organisms and their spores are killed or inactivated.

**Disease or defect:** means a pathological change or other abnormality.

**Dressing:** means the progressive separation on the dressing floor of a slaughter animal into a carcass (or sides of a carcass), offals and inedible by-products and may include the removal of the head.

**Export abattoir:** means any premises that is approved and registered by the regulatory authority in which animals are slaughtered and dressed for human consumption after exported abroad.

**Fit for human consumption:** means meat that has been passed by an inspector as safe and wholesome, unless found unwholesome in subsequent examinations.

**Fresh meat:** means meat that has not yet been treated in any way other than by modified atmosphere packaging or vacuum packaging to ensure its preservation, except that if it has been subjected only to refrigeration.



**Hygienic:** refers to a condition that includes the concepts of “clean” and “safe” (the absence of harmful organisms or substances).

**Inedible:** means inspected and judged to be, or otherwise officially determined to be, unfit for human consumption but not requiring destruction.

**Inspector Veterinarian:** means an inspector who is professionally qualified as a veterinarian.

**Meat:** means all edible parts of any slaughter animal slaughtered in an abattoir and includes edible offal.

**Meat hygiene:** All conditions and measures necessary to ensure the safety and suitability of meat at all stages of the food chain.

**Meat inspector:** means a properly trained officer appointed by the regulatory authority for the purpose of meat inspection and control of hygiene, and includes a veterinary inspector. The supervision of meat hygiene, including the inspection of meat, should be under the responsibility of a veterinary inspector.

**Offal:** in relation to slaughtered animals means any edible or non-edible part of the animal other than the carcass.

**Organoleptic inspection:** Using the senses of sight, touch, taste and smell for identification of diseases and defects.

**Parts:** means any meat products or meat by-products originating from a carcass. This would include, without being limited to, organs, blood, tail, head, feet, muscles, hide, etc.

**Potable water:** means water that is pure and wholesome at the point of usage in accordance with requirements contained in the national and international guidelines for drinking-water quality.

**Protective clothing:** means special garments intended to prevent the contamination of meat and used as outer wear by persons in an abattoir or establishment, and includes head coverings and footwear.

**Post-mortem inspection:** Any procedure or test conducted by a competent person on all relevant parts of slaughtered animals for the purpose of judgement of safety and suitability and disposition.

**Regulatory authority:** The official authority charged by the government with the control of meat hygiene

**Residues:** means residues of veterinary drugs, pesticide residues and contaminants.

**Retained:** means held under the control and security of the inspector veterinarian or regulatory authority pending final judgement.

**Risk analysis:** includes risk assessment, risk management and risk communication, all of which are essential to the decision-making process that determines acceptable levels of risk, and the implementation of those decisions.

**Sanitation:** refers to all the processes and principles which are applied to ensure that the microorganism count is kept at a safe low level in accordance with official regulations.

**Slaughter:** means the killing of a slaughter animal for the purpose of human consumption and includes bleeding.

**Viscera:** means the organs of the thoracic and abdominal cavity and includes the kidneys.

#### **4. Meat inspection overview**

In satisfying the sanitary requirements of meat importing countries and supplying the export markets with meat and meat products that are reliably safe and wholesome for human consumption, the veterinary science and the science of meat hygiene should be properly applied throughout the food chain, starting at the farm of origin. Ante-mortem and post-mortem inspection of slaughtered animals and the maintenance of hygienic practice is carried out to ensure that fresh meat produced for human consumption is safe and wholesome. The objectives of meat inspection program are twofold:

- To ensure that only apparently healthy, physiologically normal animals are slaughtered for human consumption and that abnormal animals are separated and dealt with accordingly.
- To ensure that meat from animals is free from disease, wholesome and of no risk to human health.

These objectives are achieved by antemortem and postmortem inspection procedures and by hygienic dressing with minimum contamination. The inspection procedures should be appropriate to the spectrum and prevalence of diseases and defects present in the particular class of livestock being inspected using the principles of risk assessment. Meat inspection is part of the wider process of screening animals and meat for fitness for human consumption. It can follow traditional or risk-based approaches. In areas where diseases such as tuberculosis, *Cysticercus*

bovis, fascioliasis, etc are prevalent, the traditional approach of meat inspection involving incision and palpation are the best means of revealing these diseases.

However, there is a widespread recognition that the traditional approaches may introduce or spread contamination as they involve detailed inspection of tissues, particularly lymph nodes, through multiple incision and palpation. In situations where zoonotic diseases that produce gross pathological lesions have been eradicated or are controlled, the major hazard in meat is microbiological such as Escherichia coli, Salmonella in beef, etc. In this situation, the traditional inspection methods may not detect these hazards. Rather, a risk-based approach to meat inspection may be deemed more appropriate. Therefore, the type of inspection system to be applied must reflect local disease risk situations.

## **5. Major responsible bodies**

The Federal Export Abattoirs Inspection and Certification Directorate is the legal authority mandated to ensure the safety, quality and wholesomeness of meat and meat products coming out of export abattoirs. However, the meat industry should also hold responsibility for ensuring the production, handling and sell of meat and meat products that are safe and wholesome for the consumers.

The following are the major actors responsible for ensuring the production and sell of safe and quality meat and meat products:

### **5.1 Export Abattoirs Inspection and Certification Directorate**

The Export Abattoirs Inspection and Certification Directorate has the following, but not limited to, major duties and responsibilities:

- ❖ Inspect and certify that the export abattoirs are operating in accordance with the stated and agreed national construction and operational requirements
- ❖ Train, certify and assign competent inspector veterinarians and meat inspectors that will regulate the overall slaughter operations of the export abattoirs.
- ❖ Monitor, supervise and evaluate the performance of the assigned inspector veterinarians doing the inspection activities on a regular basis
- ❖ Provide the required materials, logistics and finance required for meat inspectors accomplish their duties

- ❖ Provide regular training programs for the assigned meat inspectors and inspector veterinarians on scientific and research developments made in the areas of veterinary public health, food safety and quality and related professional disciplines.

## **5.2 Meat inspection personnel**

The regulatory authority should be responsible for all decisions made related to human and animal health at admission of slaughter animals to the abattoir and at ante-mortem and post-mortem inspections. The meat inspection team assigned by the directorate and stationed at the export abattoir has the following, but not limited to, major duties and responsibilities:

- ❖ Verify that the export abattoir has met the regulatory requirements set for maintaining the facilities where meat inspection is to be conducted.
- ❖ Ensure that animals are rested sufficiently before slaughter so that signs important to inspection disposition are not masked.
- ❖ Conduct ante-mortem inspection for all animals while animals are being unloaded and being moved to holding pens, while animals are kept in holding pens and 12 hours before slaughter while animals are kept in lairages
- ❖ Supervise and guide abattoir operators on humane handling of livestock including provision of water, rest and feed as may be required.
- ❖ Closely monitor abattoir personnel to assure that they use humane animal handling practices at all times.
- ❖ Follow good safety practices while inspecting animals, since large animals can be very dangerous.
- ❖ Ensure that animals whose meat may be fit for human consumption but that require special handling during slaughter and dressing, and animals that will require special attention during post-mortem inspection, are segregated and so handled or inspected.
- ❖ Ensure the remains of dead animals, and of those that have been condemned at ante-mortem inspection and killed, should be removed immediately to the rendering station or other place of destruction, and there should be adequate precautions to prevent misuse, and to avoid danger to human health and animal health.
- ❖ Take the necessary and immediate action(s) to correct the errors made if the abattoir fails to meet one or more of its obligations. The action that may be taken may vary from withholding inspection of a single pen of animals until the pen is properly identified, or to withholding

inspection of all animal pens because the abattoir has failed to provide adequate documentations and employees to move and restrain the animals.

- ❖ Inspect and approve the sanitary status and readiness of slaughter and dressing rooms; equipment and personnel before the daily slaughter operation begins
- ❖ Monitor conduct of stunning, bleeding and dressing operations.
- ❖ Conduct post-mortem inspection as soon as the orderly dressing of a carcass allows and should not be delayed.
- ❖ The inspector should correlate information available from ante-mortem inspection with what can be discerned by examining the head, carcass and viscera.
- ❖ Ensure the head, organs, viscera and any other part of a carcass required for post-mortem inspection remain identifiable with the carcass from which they were removed until inspection has been completed.
- ❖ Where a lymph node, organ or any carcass tissue is being incised for inspection, the cut surface should be cleanly sliced to present a view that is not distorted and needs to be made as far as possible in a way that overcomes any risk of contamination.
- ❖ Should ensure that no person removes from the inspection area of an abattoir any part of any carcass, organ, or any viscera until the inspector has completed the inspection and a decision has been made.
- ❖ Ensure marking of carcasses passed as fit for human consumption follow immediately after the completion of inspection and carcass washing and before cooling.
- ❖ Make sure the inspection mark as fit for human consumption remain clearly visible and unambiguous and unfit carcasses should not be marked in this way.
- ❖ Prior to inspection of any carcass being completed and the inspector gives decision, no person should remove any serous membrane or any other part from the carcass; remove, modify, or obliterate any evidence of disease or defect in the carcass or organ; or remove any mark or identification from the hide, carcass, head or viscera;
- ❖ When a decision cannot be taken at that stage as to suitability or otherwise for human consumption, the carcass and all its relevant parts should be suitably identified and retained, separate from other meat, under the control of an inspector.
- ❖ When the carcass is that of an animal identified as a suspect on ante-mortem inspection, a more detailed inspection is to be made on organs and the carcass including body lymph nodes.

- ❖ Ensure those condemned and in edible meat products are handled properly and not removed from their respective rooms without denaturation and knowledge of the inspector
- ❖ Ensure the meat that is approved as fit for human consumption is properly stored and loaded for export
- ❖ Understand the final responsibility for inspection decisions on fitness for slaughter and fitness for human consumption rests with the inspector and inspector veterinarian in charge of conducting meat inspection activities.
- ❖ A meat inspector should acquaint him or her-self with the contents of all relevant guidelines issued by the regulatory authority regarding meat inspections.

### **5.3 Export abattoirs' operators**

While inspector veterinarians are responsible for verifying that the establishment has met the regulatory requirements, the export abattoirs' operators have also the responsibility of performing the following activities on a regular basis:

- Maintain the pens, driveways, and ramps in good repair and free from sharp objects that may cause injury or pain to animals.
- Ensure the floors of pens, driveways, and ramps be well constructed and maintained to provide good footing for animals
- Keep livestock pens clean, well-drained and satisfactory for conducting ante-mortem inspection.
- Provide suitable and sufficient drinking water and feed for animals while kept at holding pens on their arrival and at all times.
- Provide a 72 hours rest period for all species of animals transported from distant areas and a 24 hours rest period for those coming within 100 kms radius of the abattoir in holding pens before they are moved to lairages.
- Avoid keeping animals awaiting slaughter for a period of more than 72 hours in holding pens unless extension of these periods is authorized in special circumstances by the inspector veterinarian.
- Should not remove any animal which has entered the lairage/pen from there, whether for slaughter or otherwise, unless permission has been granted by the inspecting officer.
- Ensure availability of sufficient lighting for inspection.

- Ensure availability of adequate areas for holding animals that are identified by the inspector veterinarian as suspect or condemned. These should be typically designated as the “Suspect” and “Condemned” pens.
- Provide a restraining device such as a chute or squeeze gate for restraining animals and taking temperatures during the examination of animals.
- Prepare pen card for recording date and time of reception of animals, pen number, species and total number of animals in the pen. The card should be signed by the attendant of the animals and checked by the inspector.
- Present all required travel documents accompanying the slaughter lot (e.g. animal health/movement certificates if there is any, transport etc) and provide any other relevant information to the inspector veterinarian before ante- mortem inspection is performed. The purpose of these documents is to account for all animals in the pen prior to ante-mortem inspection and to ensure that every animal that comes to slaughter has the required health and welfare documentations for conducting ante-mortem inspection.
- Properly identify slaughter animals to relate the identity of animals with the carcasses and their parts after slaughter
- Ensure abattoir employees involved in the handling, segregation, restraining, identification of animals got awareness creation training on basic animal welfare issues
- Should not slaughter any animal in the abattoir unless the animal(s) has /have been subjected to final ante-mortem inspection within 12 hours before the time of slaughter and certified as fit for slaughter.
- Ensure conduct of the slaughter, dressing, storage and meat transport operations based on the operational guidelines presented by the regulatory authority and direction of the inspector.
- Identify the carcass and its parts to correlate during post-mortem inspection.
- Present carcasses and its parts in convenient ways to conduct meat inspection by inspectors.
- Ensure the removal and disposal of waste mater, condemned and inedible carcasses and its parts based on the instructions of the inspector and provisions of relevant guidelines.
- Take immediate corrective actions when operational deviations from normal are observed or when instructed by the inspector.

## **Part II: Ante-mortem inspection**

### **1. General**

Ante-mortem inspection is the inspection of the health and physical status of live animals by authorized meat inspector within the facility of the export abattoir before they are slaughtered. In any export abattoir, all livestock presented for slaughter should be subjected to veterinary inspection and certified as fit within a specified time period before allowed to move to the stunning and /or slaughter chambers.

Ante-mortem inspection is a screening process to remove obviously diseased, unclean and exhausted animals from the food supply chain prior to slaughter and to identify animals that may require a more extensive postmortem examination. It is the first line of defense in protecting the public from potentially harmful meat products. Those animals that exhibit abnormal signs should be withheld from normal slaughter and segregated for closer examination and treatment.

Ante-mortem inspection assessments of the meat inspector are based on:

- The absence or presence and extent of any clinical signs of disease.
- The presence and extent of any conditions that may result in the rejection of the carcass or its parts as a source of human food.
- The presence of excitement or disturbed activity.
- The presence of any disability.
- The treatment or exposure of animals to drugs, chemicals or biological substances.
- The extent of soilage and contamination

### **2. Objectives of ante-mortem inspection**

Ante-mortem inspection consists of examining the live animals, separating those which appear abnormal or diseased and, passing the rest for slaughter. The overall *objectives* of ante-mortem inspection are:

- Ensure that animals are properly rested in slaughter house and that proper clinical information, which will assist in the disease diagnosis and judgement, is obtained.
- Reduce contamination of the abattoir killing floor by separating the dirty and diseased animals.



- Ensure that injured animals or those with pain and suffering receive emergency slaughter and that animals are treated humanely.
- Identify reportable animal diseases affecting the slaughter animals.
- Identify sick animals and those treated with antibiotics, chemotherapeutic agents, insecticides and pesticides.
- Identify animals which are suspected of showing deviation from normal behavior or appearance that could render the carcass unfit for human consumption. Some conditions including neurological abnormalities may be present that are not detectable on post mortem examination/inspection.
- Identify animals which could pose a threat to the health of personnel handling them.

### **3. Required materials and supplies**

Ante-mortem inspection of livestock should take place in pens and each animal should be observed and its status recorded. The records should be part of the procedures used to identify animals as having received ante-mortem inspection. All inspection items and documentations should be kept together under lock and key in the inspector veterinarian 's office. The materials and supplies that are recommended to be available for performing ante-mortem inspection should include, but not limited to, the following items:

- ❖ Ante-mortem inspection format
- ❖ Thermometer, stethoscope, bull rings,
- ❖ Pen, pencil, pad of paper and clipboard
- ❖ Suspected and condemned tags to be attached to the animal's ear
- ❖ Tagging pliers (these are used to attach the suspect and condemn tags to the animal's ear)
- ❖ Reject/retain tag (to be attached to areas of livestock pens to show that they are rejected because they didn't meet requirements and therefore did not pass inspection)

### **4. Ante-mortem inspection procedures**

The health status of the farm of origin and the husbandry of slaughter animals has a significant effect on the safety and wholesomeness of meat. In this respect, all efforts should be made to collect and evaluate information that might have influence on ante-mortem.

Ante-mortem inspection should be carried out in a systematic manner in accordance with routine procedures established by the controlling authority, and should ensure that animals found to be affected by a disease or defect that would render their meat unfit for human consumption are removed from the human food chain and so identified.

Ante-mortem inspection should ensure that animals whose meat may be fit for human consumption but that require special handling during slaughter and dressing, and animals that will require special attention during post-mortem inspection, are segregated and so handled or inspected. Ante-mortem inspection should be carried out with a full knowledge of all relevant information gained on the animals prior to their arrival at the abattoir including information recorded on different documents accompanying the livestock transport.

Animals should be inspected in a way that allows the inspector to detect deviations from normality, whether of demeanour, behaviour, appearance or other clinical signs, that might indicate a disease or defect requiring special handling or closer examination. The inspector should also consider the cleanliness of animals when determining fitness for slaughter. One of the most important functions of ante-mortem inspection is to ensure that animals are rested sufficiently so that signs important to inspection disposition are not masked. It also ensures that signs that are important to inspection disposition but that may be less readily observed (or not evident) at post-mortem inspection can be taken into account in reaching a decision as to the safety and wholesomeness of meat.

When it is found on ante-mortem inspection that an animal is not fit to be slaughtered for human consumption, a judgement should be based on that finding and not delayed until after slaughter and post-mortem inspection. Ante-mortem inspection enables animals that require special handling on the slaughter and dressing floor (whether because of uncleanness, disease or defect) to be identified and given that special handling, as well as permitting the identification of animals requiring special post-mortem inspection.

## **5. Ante-mortem inspection methodology**

Ante-mortem inspection should take place as soon as practicable on arrival of animals at the slaughterhouse. Ante-mortem inspection should commence by observing animals while they are unloaded and being transported to the holding pen. Ante-mortem inspection may be divided in two phases namely: initial antemortem inspection and final antemortem inspection.

### **5.1 Initial antemortem inspection (screening)**

Initial antemortem inspection (screening) begins as soon as the animals arrive at the abattoir premises and continues while animals are rested in holding pens until they move to lairages. The following guidelines should be followed:

- ❖ The abattoir should assign competent person(s) to receive animals

- ❖ Any animal health movement and related travel documents accompanying the lot should be checked and relevant information recorded
- ❖ The abattoir employee should prepare pen card for recording date and time of reception of animals, pen number, species and total number of animals in the pen. The card should be signed by the attendant of the animals and checked by the inspector.
- ❖ The abattoir employee should properly identify the slaughter animals to relate the identity of animals with the carcasses and their parts after slaughter
- ❖ Animals should be inspected by the ante-mortem inspector while on truck and during unloading for signs of disease; evidence of welfare problems and presence of excessive dirt
- ❖ Those animals that are healthy, as far as the inspector veterinarian can judge, and are in a satisfactory state as regards to welfare should move to holding pens for three-day rest for those animals directly transported from distant areas. However, the resting period for animals coming from recognized feedlot facilities and farms found within about 100 kms radius from the slaughter abattoirs, may be shortened to 24 hours depending on their physical conditions.
- ❖ Animals that are to be found suffering from pain, terminal disease/injuries or are unable to leave the transport vehicle of their own accord on arrival at the abattoir are to be approved for emergency slaughter.
- ❖ Animals in holding pens should be inspected daily by a meat inspector
- ❖ Animals showing signs of disease should be isolated and be kept separately for further investigation and treatment
- ❖ Dead and condemned animals to be destroyed during ante-mortem inspection should not be allowed to go to the clean area of the abattoir.
- ❖ If there is a suspicion of trade limiting diseases on ante-mortem inspection, the animals should be held in isolation, laboratory samples are collected for confirmation and an appropriate and disease specific disposal and decontamination measures are applied.
- ❖ Feed and water should be supplied while animals are being kept in holding pens.
- ❖ Inspection includes confirmation that the animals are properly identified, so that any special conditions pertaining to their sources are considered in the post-mortem inspection.

- ❖ Animals presented for initial ante-mortem inspection should have passed the required drug withdrawal period if they were treated for any sort of systemic illness before they were sent to the holding pens and lairage.

## **5.2 Final antemortem inspection**

Final antemortem inspection should be conducted within 12 hours before slaughter while animals are moved from holding pens to lairages. The following guidelines should be followed:

- ❖ Move those animals rested and have no visible signs of illness to lairage to stay there for additional 12 hours before slaughter and conduct final antemortem inspection
- ❖ The abattoir employee should present all required travel documents accompanying the slaughter lot (e.g. animal health/movement certificates if there is any, transport etc) and provide any other relevant information to the inspector veterinarian before ante-mortem inspection is performed. The purpose of these documents is to account for all animals in the pen prior to ante-mortem inspection and to ensure that every animal that comes to slaughter has the required health and welfare documentations for conducting ante-mortem inspection.
- ❖ Water should be supplied while animals are kept in lairages, however, if animals are to be slaughtered using halal slaughter methods, feed may also be supplied to animals kept in lairages.
- ❖ Ante-mortem inspection should be conducted while animals are both at rest and in motion because certain abnormal signs such as labored breathing are easier to detect while the animals are at rest; whilst other abnormalities, such as lameness, may not be detected until the inspector veterinarian observes the animals in motion.
- ❖ While inspecting at rest:
  - the inspector veterinarian should position her/himself at various locations outside the pen.
  - The inspector veterinarian should observe all animals and note their general behavior while they are at rest.
  - She/he should determine if any of the animals show abnormal behavioral patterns such as excessive excitability or severe depression.
  - She/he should look at the heads, necks, sides, rumps, and legs of as many animals as possible and she/he should make a note of any abnormalities.
- ❖ While inspecting in motion:

- The inspector veterinarian should position her/himself outside the pen next to the open gate to easily view the animals as they are driven.
  - She/he should direct the establishment employee to move all animals slowly and individually out of the pen and then back and forth, while she/he observes each animal for abnormalities by viewing the head, neck, shoulder, flank, legs, and rump.
  - If the pen size permits, she/he should position her/himself inside the pen and direct the establishment employee to move the animals past her/him both ways in the pen. She/he should do this only if it is safe. In general, it is only safe to position oneself inside the pen when inspecting small livestock such as sheep, goats and calves. Cattle can be surprisingly fast and agile, particularly when agitated or startled.
  - The inspector veterinarian should never go into a pen of large livestock. This is especially true of a pen with a bull.
  - The inspector veterinarian should not make the mistake of performing in-motion inspection immediately behind a loose, swinging gate. As the animals are driven out of the pen, they could push against the swinging gate and force it against her/him.
  - The inspector veterinarian should not position her/himself in a corner or in a place that allows no escape to safety should an animal turns aggressive.
  - The inspector veterinarian should not climb on high, unstable fences to view the animals during ante-mortem inspection.
  - When required, the inspector veterinarian should use safety helmet while conducting ante-mortem inspection.
- ❖ Animals showing clinical signs of disease should be held for veterinary examination and judgement. They are treated as “suspects” and should be segregated from the healthy animals.
  - ❖ For those condemned animals, the reasons for condemnation should be recorded.
  - ❖ The disease and management history should be recorded and reported on an Ante -mortem inspection form. The information to be recorded should include:
    - Name of export abattoir

- History of the affected lot or animals: Description on the source and purchase areas, location of collection facility, presence and/ or absence of current livestock movement bans imposed by federal authority on livestock originating from specified areas and/or trade routes, presence and /or absence of mixing of different groups of animals on resting points during travel etc
- Livestock supplier or owner's name
- Origin or source area of the slaughter animals
- Method of travel (trekking/vehicle transport)
- The number of animals in the lot and arrival time
- Species and sex of the animal affected
- The time and date of ante-mortem inspection
- Clinical signs and body temperature if relevant
- Judgement passed (isolate, condemn, etc)
- Reason why the animal was held
- Name, date and signature of inspector

## **6. General signs of diseases and conditions**

The general signs that indicate an animal may have a condition or disease which makes it unwholesome or unfit for human food include *abnormal behavior, body movement, body condition and signs on the body's surface*. Some of the major abnormalities which are checked on ante-mortem examination include:

- Abnormalities in respiration
- Abnormalities in behavior
- Abnormalities in gait
- Abnormalities in posture
- Abnormalities in structure and conformation
- Abnormal discharges or protrusions from body openings
- Abnormal colour
- Abnormal odour
- Abnormal body movement
- Abnormal body condition

***Abnormalities in respiration*** commonly refer to frequency of respiration. If the breathing pattern is different from normal, the animal should be segregated as a suspect.

***Abnormalities in behavior*** are manifested by one or more of the following signs:

- walking in circles or show an abnormal gait or posture
- pushing its head against a wall
- charging at various objects and acting aggressively
- showing a dull and anxious expression in the eyes

***An abnormal gait*** in an animal is associated with pain in the legs, chest or abdomen or is an indication of nervous disease.

***Abnormal posture*** in an animal is observed as tucked up abdomen or the animal may stand with an extended head and stretched out feet. The animal may also be laying and have its head turned along its side. When it is unable to rise, it is often called a “downer.” Downer animals should be handled with caution in order to prevent further suffering.

***Abnormalities in structure (conformation)*** are manifested by swellings (abscesses), enlarged joints, umbilical swelling (hernia), enlarged sensitive udder indicative of mastitis, enlarged jaw (“lumpy jaw”), bloated abdomen and etc.

***Abnormal discharges or protrusions*** from the body are discharges from the nose; excessive saliva from the mouth; afterbirth protruding from the vulva; intestine protruding from the rectum (prolapsed rectum) or uterus protruding from the vagina (prolapsed uterus) and bloody diarrhea.

***Abnormal colour*** such as red areas on light coloured skin (inflammation), dark blue areas on the skin or udder (gangrene).

***An abnormal odour:*** the inspector veterinarian ’s sense of smell is a very important aspect of performing ante-mortem inspection. The odour of an abscess or an acetone odour of ketosis may be observed. At times when looking at a large pen of animals, the Inspector veterinarian may not at first see a wound or prolapse, but she/he may detect the characteristic odor that will alert her/him to look more closely at the animals.

***Abnormal body movement:*** An animal may have a condition or disease which may be associated with body movement such as:

- Lameness or limping: sometimes the cause of lameness is rather obvious; sometimes not. Lameness may be caused by arthritis in one or more joints.
- Central nervous system diseases: certain diseases such as rabies and listeriosis can affect the brain and central nervous system. The animal may appear extremely nervous or restless, excessively anxious or upset, or stagger or circle.
- Certain poisons and toxic residues that the animal was exposed to may cause staggering or circling or movement.
- Depression or disinterest may be a sign that the animal is in a dying or moribund state. A moribund animal may not respond to noises or other stimuli. Animals in a moribund condition are not eligible for slaughter.
- Animals may scratch excessively or rub their hide against objects. Scratching and rubbing associated with hair loss may indicate that the animal has lice or mange infestation.
- Animals may have muscle tremors or shivering, hold their head to one side, or have any number of abnormal gaits.
- An animal may be disoriented and run into things or butt its head against objects.
- Animals may strain and assume abnormal body positions. For example, urinary or respiratory or intestinal disorders may cause straining and abnormal positions such as arching of the back, tucking in of the abdomen (stomach), and extending the neck and tail.
- An animal may have difficulty in rising or be unable to get up at all. These "downers" may be down for a variety of reasons ranging from an injury to severe illness or depression. All "downers" should be examined by the inspector veterinarian.

***Abnormal body conditions:*** animals may be seen as thin and weak due to chronic disease problems such as pericarditis, pneumonia, nephritis, etc. Animals that are in very poor condition and exhibit other signs such as depression, lethargy, respiratory difficulty, etc., should be placed in the suspect pen. Thinness alone may not be an abnormal sign. For example, some under-fed animals may be very thin, but they may be bright and alert, have a good appetite, and show no other abnormal signs. These animals should not be placed in the suspect pen. However, some animals may be weak, thin, and dehydrated. They may be uncoordinated or barely able to stand. These animals should be placed in the suspect pen.



***Abnormal body functions:*** Abnormal signs associated with body functions include respiratory distress such as labored or rapid breathing. These signs are commonly seen in animals with lung disorders such as pneumonia. Coughing and sneezing are other signs associated with pneumonia and other respiratory disorders. Animals may exhibit pain. Pain may be manifested by signs such as groaning, grunting, or grinding of teeth.

The inspector veterinarian may also see animals that have difficulty drinking and swallowing or appear to be blind. All of these signs are abnormal and may be associated with a great variety of diseases.

***Abnormal signs on the body's surface:*** There are a great number of abnormal signs associated with body surfaces. Injuries and fractures are included in this group. When observing animals, the inspector veterinarian should be on the alert for abnormal growths, swellings and enlargements such as lymphadenitis. Abnormalities of the skin and mucus membranes will be observed while performing ante-mortem inspection. Animals may exhibit a variety of skin lesions including papillomas (warts). They may have a roughened, dry, or dehydrated hair coat or large patches of hair missing.

The inspector veterinarian should also be on the lookout for superficial ulcers, sores, blisters or vesicles, particularly around the feet or around the mouth. There are several diseases that may cause these signs, including the dreaded foot-and-mouth disease, which is a reportable disease. The color of mucous membranes of the body, such as the gums or the eyes, may be an indication of a disease condition. The membranes may appear reddened, or very pale, or may have a yellowish color.

While observing body surfaces, the inspector veterinarian should be on the lookout for injection sites. Abnormal swelling, especially in the round or neck areas, could be an indication that animal was recently given an injection. Approved drugs have a very specific withdrawal period prior to slaughter that, if not followed, can result in potentially harmful residues in the muscle tissue. If the inspector veterinarian observes an injection site on an animal, she/he should make it a suspect and request additional information on the date and type of drug injected and determine its withdrawal time. Animals presented for ante-mortem inspection should have passed the required drug withdrawal period if they were treated for any sort of systemic illness before they were sent to the lairage.

## **7. Ante-mortem dispositions**

Animals should be inspected in a way that allows the inspector to detect deviations from normality, whether of demeanour, behaviour, appearance or other clinical signs, that might indicate a disease or defect requiring special handling or closer examination. The inspector should also consider the cleanliness of animals when determining fitness for slaughter. After completing ante-mortem inspection and properly recording the inspection findings, there are four possible outcomes, or dispositions, that follow ante-mortem inspection: “*Passed for Slaughter*”, “*Passed for Slaughter Conditionally*”, “*Suspected*” and “*Condemned*”.

### **7.1 Passed for slaughter**

- ❖ After inspecting animals, the inspector veterinarian should complete recording of all required information and sign the inspection format.
- ❖ An animal should be released for slaughter without any restriction when an ante-mortem inspection has revealed that *it is adequately rested, that there are no diseases or defects that would render it unfit for slaughter for human consumption or require special attention during dressing or post-mortem inspection, and that it is not unacceptably dirty.*
- ❖ The ante-mortem inspection format should be delivered to the postmortem inspector veterinarian prior to or at the time the animals are driven in to the stunning and slaughter hall.
- ❖ The postmortem inspector veterinarian should collect all the ante-mortem inspection formats and compare the number of animals recorded on the formats with the number of animals being slaughtered. This is done to determine if all animals being slaughtered have received ante-mortem inspection.

### **7.2 Conditionally passed for slaughter**

If during the ante-mortem inspection any disease or defect has been noted that does not prevent the animal from being slaughtered for human consumption but may influence the post-mortem inspection or judgement, the animal should be identified and released by the inspector veterinarian for slaughter and post-mortem inspection.

### **7.3 Suspected**

When the inspector veterinarian finds an animal(s) that exhibit signs of disease or condition that may create doubt in certifying its (their) fitness for slaughter, the inspector veterinarian in charge should do the following:

- ❖ Where signs of disease are equivocal, the animal should be withdrawn from normal slaughter, identified with a *Suspect tag* and placed in an isolation pen set aside for:
  - detailed further examination, observation or treatment; or
  - slaughter under special conditions so as to preclude contamination of the premises, equipment and personnel.
- ❖ Animals exhibiting normal behavior but known to be carrying residues should be withheld from slaughter until the residues are excreted or metabolized to levels such that they do not exceed established safety levels
- ❖ When animals are placed in the suspect pen, they should be accompanied by ante-mortem inspection format.
- ❖ After further examination of an animal in the suspect pen, the inspector veterinarian can pass either of the following decisions:
  - If the suspect animal is found normal or that the abnormal signs observed are not severe enough to condemn the animal that the animal be released for slaughter or
  - If there are still some issues to determine its fitness that the animal be released for slaughter under conditions requiring detail investigation during postmortem inspection or
  - The suspect animals remain in isolation for further treatment
  - If the animal is not fit for slaughter and human consumption that it be condemned
- ❖ Once the suspect animal is certified as fit for slaughter and the abattoir employee is instructed to move this animal out of the suspect pen, the inspector veterinarian should make sure that the necessary changes are made on the ante-mortem inspection format records.
- ❖ The inspector veterinarian can also have the suspect animal slaughtered separately and conduct a thorough postmortem examination by the Senior Inspector veterinarian.
- ❖ When inspector veterinarian grants permission to hold the animal for further treatment in an effort to improve the animal's condition to the point that it may become eligible for slaughter, the following activities should be conducted:
  - Identification of the animal should be maintained throughout the treatment period.
  - The animal should be placed in a separate pen and the ante-mortem inspection format be changed.

- The inspector veterinarian should write in the phrase "Held for Treatment" in the appropriate space provided in the inspection format.
- Conduct re-inspection of the animal by the inspector veterinarian and pass final decision.

#### **7.4 Condemned**

An animal that is condemned during ante-mortem inspection or found dead is not eligible for slaughter in the abattoir for human consumption. The inspector veterinarian should ensure implementation of the following activities:

- ❖ Ensure identification of the condemned animal and remains of animals that have died by placing a Condemned tag in the animal's ear.
- ❖ Ensure that the condemned animal is not slaughtered in the abattoir for the purpose of using for human consumption.
- ❖ Ensure the humane killing of the condemned animal and disposal of the carcass in appropriate disposal facility of the abattoir.
- ❖ Ensure completion of the ante-mortem inspection form by recording the identification number of the animal (condemned tag number).
- ❖ If the inspector veterinarian encounters a dead animal, she/he should make sure that there is an adequate control to prevent the animal from entering the slaughter process. She/he should take the following steps:
  - Identify the animal as condemned with *condemned tag*
  - Fill out an ante-mortem inspection format and write the words "Dead in Pens" or "Dead on Arrival" in the space provided in the format.
- ❖ If an animal is in severe pain or distress and the inspector veterinarian is not present, the animal can be slaughtered immediately. Meat from animals that undergo this emergency slaughter may be used for human consumption provided that it passes post-mortem inspection performed personally by the senior inspector veterinarian and no serious lesions other than those due to the reason for slaughter are found.

### **Part III: Post -mortem meat inspection**

#### **1. Overview**

Post -mortem meat inspection covers the inspection of the carcasses and parts of meat used for human consumption. It takes place after ante-mortem inspection. It covers the whole slaughter process that begins at stunning and ends at the step where the carcass is placed in the cooler. As

soon as possible after the completion of dressing, all organs and carcass portions should be kept together and correlated for inspection in order to detect any abnormalities before they are removed from the slaughter floor.

During postmortem inspection, professional and technical knowledge must be fully utilized by:

- ❖ viewing, incision, palpation and olfaction techniques.
- ❖ classifying the lesions into one of two major categories - acute or chronic.
- ❖ establishing whether the condition is localized or generalized, and the extent of systemic changes in other organs or tissues.
- ❖ determining the significance of primary and systemic pathological lesions and their relevance to major organs and systems, particularly the liver, kidneys, heart, spleen and lymphatic system.
- ❖ coordinating all the components of antemortem and postmortem findings to make a final diagnosis.
- ❖ submitting the samples to the laboratory for diagnostic support.

The decision as to whether meat is fit for human consumption or not will utilize many skills of observation and evaluation, and should take into consideration the results of ante-mortem inspection, as well as any available information on the disease history of the herd or region of origin of the animals. Following post-mortem meat inspection, regulatory decisions and enforcement of actions should follow available regulations, directives, and guidelines of the Ministry of Agriculture.

## **2. General guidelines for post-mortem inspection**

- ❖ Post-mortem inspection should be carried out in a systematic manner and should ensure that meat passed for human consumption is safe and wholesome and the inspection procedures should be appropriate to the spectrum and prevalence of diseases and defects present in the country, region or particular species of slaughter livestock being inspected.
- ❖ The responsibility for production of safe and wholesome meat should be shared by the meat industry and the regulatory authority.
- ❖ Post-mortem inspection should be efficient and effective by tailoring procedures to the particular circumstances that may need to be supported by formal risk analysis.

- ❖ Post-mortem inspection should be undertaken as soon as the orderly dressing of a carcass allows and should not be delayed. Particular attention should be paid to the detection of notifiable and zoonotic diseases.
- ❖ Routine post-mortem inspection of red meat carcasses is based on the examination of heads and their lymph nodes, thoracic and abdominal viscera and their lymph nodes, and the exposed parts of the carcass.
- ❖ Inspection procedures should ensure the absence of all contamination identifiable at post-mortem inspection and should limit the potential for unseen contamination to as low as practicable level as possible.
- ❖ During post-mortem inspection, the inspector veterinarian should correlate information available from the field and from ante-mortem inspection with what can be discerned by examining the head, carcass and viscera.
- ❖ Conduct of stunning, bleeding and dressing operations should be monitored to ensure adequate animal welfare and hygienic practices.
- ❖ The head, organs, viscera and any other part of a carcass required for post-mortem inspection should be identifiable with the carcass from which they were removed until inspection has been completed.
- ❖ Where a lymph node, organ or any carcass tissue is being incised for inspection, the cut surface should be cleanly sliced to present a view that is not distorted and needs to be made as far as possible in a way that overcomes any risk of contamination, whether to meat, premises, equipment or personnel.
- ❖ Blood of slaughtered animals, when intended for human consumption should, until inspection of the carcass from which it was recovered has been completed, be so kept as to permit its condemnation should this be necessary.
- ❖ Prior to the inspection of any carcass being completed and the inspector gives decision, no person should remove any serous membrane or any other part from the carcass; remove, modify, or obliterate any evidence of disease or defect in the carcass or organ; or remove any mark or identification from the hide, carcass, head or viscera;
- ❖ Marking of carcasses passed as fit for human consumption must follow immediately after the completion of inspection. The mark must be clearly visible and unambiguous; unfit carcasses should not be marked in this way.
- ❖ Heads that are to be inspected should be skinned to the extent necessary to facilitate inspection, and be clean. The base of the tongue should be detached or dropped where this is

necessary to give access to the masticatory muscles and lymph nodes. Where head loops are used to hold heads for inspection and incision of lymph nodes is required, the lymph nodes may be incised and examined before the tongue is dropped.

- ❖ When a decision cannot be taken at that stage as to suitability or otherwise for human consumption, the carcass and all its relevant parts should be suitably identified and retained, separate from other meat, under the control of an inspector. The relevant parts of that animal should be assembled for further inspection.
- ❖ When the carcass is that of an animal identified as a suspect on ante-mortem inspection, a more detailed inspection is to be made on organs and the carcass including body lymph nodes.
- ❖ During the inspection, precautions must be taken to ensure that contamination of the meat by actions such as palpation, cutting or incision is kept to a minimum.
- ❖ When it is obvious that a portion will be condemned, it is still necessary to conduct the full routine inspection
- ❖ It is the responsibility of the inspection staff to take immediate action if management does not adhere to its responsibilities. Such action could be to demand that the rate of slaughter be slowed down, to temporarily suspend inspection services until management has corrected the situation, etc.
- ❖ Veterinary inspection includes assessing the degree of involvement in the case of many diseases and conditions. In order to determine if a disease or condition is localized or generalized, the appropriate lymph nodes shall be examined.
- ❖ The final responsibility for inspection decisions on fitness for human consumption rests with the inspector veterinarian in charge.
- ❖ A meat inspector must acquaint him or her-self of all further guidelines issued by the regulatory authority regarding meat inspections.

### **3. Presentation of carcasses and parts for post-mortem inspection**

Every operator shall ensure that carcasses and their parts are presented for post-mortem inspection in such a way as to permit proper examination by the veterinary inspectors. The operator is responsible for removing all dressing defects as well as certain specific pathologies from the slaughter floor and placing them in specifically designated rooms under the direction of the inspector.

The operator should develop, implement and maintain a control program to ensure proper and consistent presentation of carcasses and parts that requires a post-mortem inspection. This control program shall include monitoring procedures, corrective actions and preventive measures to be taken when deviations to proper presentation occur. Where the dressing of the carcass includes its splitting, the carcass shall be split prior to conduct of inspection.

The operator should ensure that all parts presented are within reach of the inspector when it is necessary to handle them for inspection; no part is hidden by contamination to an extent that it hinders the inspection; and 50% or more of each carcass part is readily visible without manipulation by the inspector.

#### **4. Post-mortem inspection requirements**

##### **4.1 Cattle**

##### **4.1.1 Carcasses**

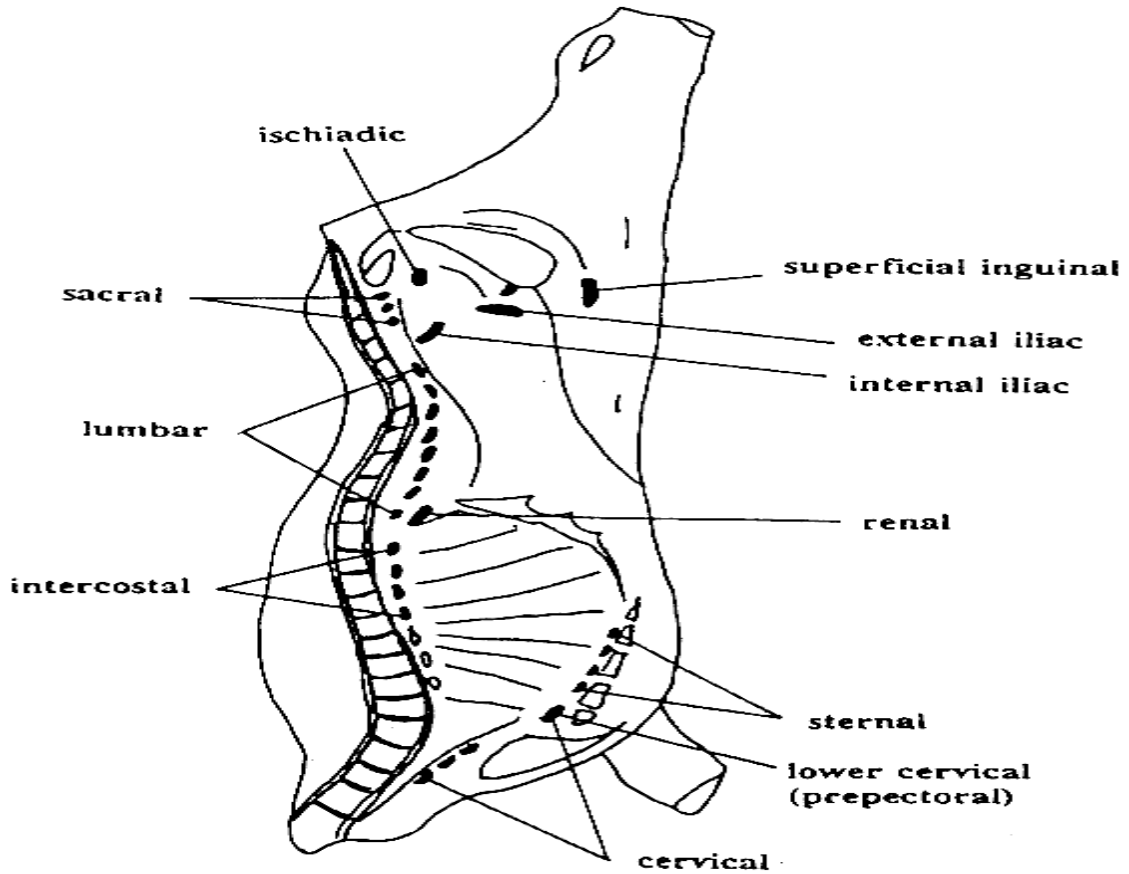
The inspection of the cattle carcass should be performed after the viscera have been removed, but before carcass washing. The inspection consists of a careful examination of the external surfaces of the carcass, the internal cavity, including a visual observation, palpation, smell and, where necessary, incision. The inspector must take the following into consideration:

- ❖ the state of nutrition, color, odor and symmetry;
- ❖ the efficiency of its bleeding and any contamination;
- ❖ presence of pathological conditions and any parasitic infestation;
- ❖ presence of injection marks and any bruising and injuries;
- ❖ presence of any abnormalities of muscles, bones, tendons, joints or other tissues;





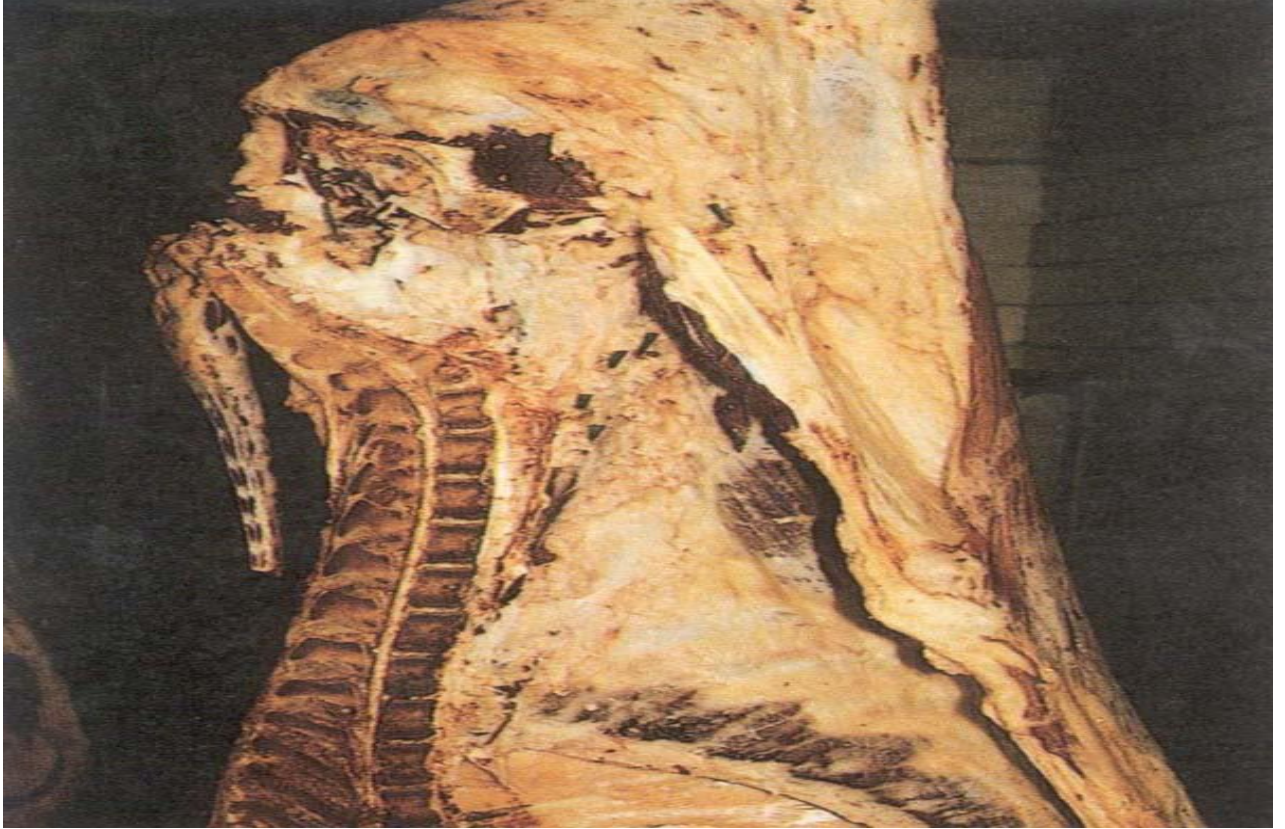
**Fig. 1:** Lateral view a carcass. Precrural and prescapular lymph nodes are incised in systemic or generalized disease.



**Fig. 2:** Medial view of carcass with relevant lymph nodes

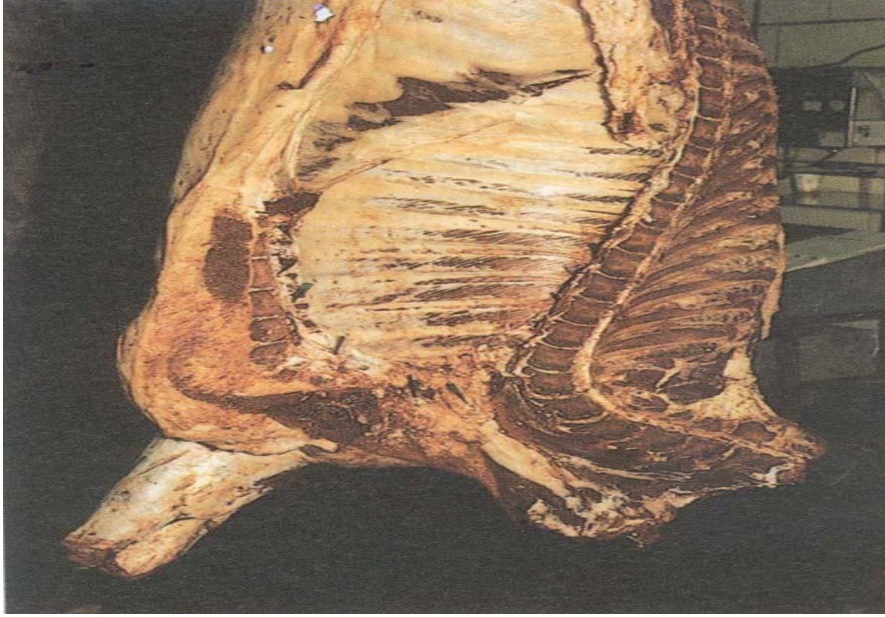
When inspecting the hindquarter, a meat inspector must inspect bilaterally:

- the parietal peritoneum, by observation;
- the internal and external iliac lymph nodes, by palpations;
- the superficial inguinal lymph node, by palpation;
- the muscular part of the diaphragm, by making two incisions approximately 25 mm apart and removing the peritoneal layer to expose the muscle; and
- the kidneys, by exposure or incisions if necessary and the renal lymph node by palpation and if necessary, by incisions.



**Fig. 3:** Medial view of the hind quarter. Superficial inguinal, internal and external iliac and lumbar lymph nodes are palpated and incised in systemic or generalized disease.

When inspecting the forequarter, the meat inspector must inspect bilaterally: the parietal pleura by observation; the pre-pectoral lymph nodes, by palpation; and the M triceps brachii, by making one deep transverse incision through the distal part of the muscle. The sternum, ribs, vertebrae and spinal cord must be inspected on carcasses which have been split.



**Fig. 4:** Medial view of the fore quarter with intercostal, suprasternal, presternal and prepectoral lymph nodes. Presternal and prepectoral lymph nodes are incised.

#### **4.1.2 Heads**

- ❖ It is strongly suggested that the head be inspected before the carcass has been inspected in order to facilitate the operations. When inspecting the head, the meat inspector must inspect bilaterally.
- ❖ The inspection shall not commence until the head is clean, properly prepared, (free of hair, pieces of skin, contamination, palatine tonsils removed, etc.) and presented in a satisfactory manner.
- ❖ The inspector must perform a visual examination of the head, including the eyes, lips, gums, hard and soft palates, eyes and nostrils and the tongue, to detect any abnormality.
- ❖ The tongue shall be palpated to detect abscesses, actinobacillosis, and other abnormal conditions.
- ❖ The external masseters (*M. masseter*), by making two deep linear incisions parallel to the mandible, and the internal masseters (*M. pterigoideus medialis*), by making a single deep linear incision. Such incision should be made parallel to the mandible and right through the muscle (exposing at least 75% of the muscle's surface). The incision should expose predominantly the muscle tissue and to minimum extent the connective tissue in order to detect parasitic lesions (e.g. *Cysticercus bovis*).

- ❖ The medial retropharyngeal, lateral retropharyngeal, parotid and mandibular lymph nodes are to be exposed, examined visually and carefully incised. Two to three incisions/slices right through the nodes is considered sufficient.
- ❖ The tonsils must be removed after inspection as part of the slaughtering process and condemned.

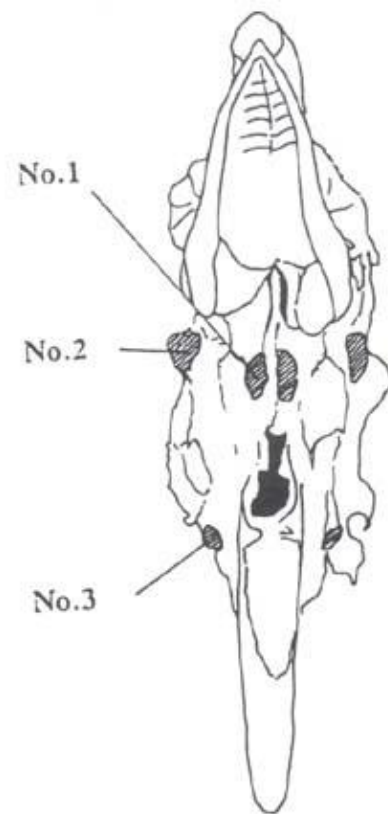
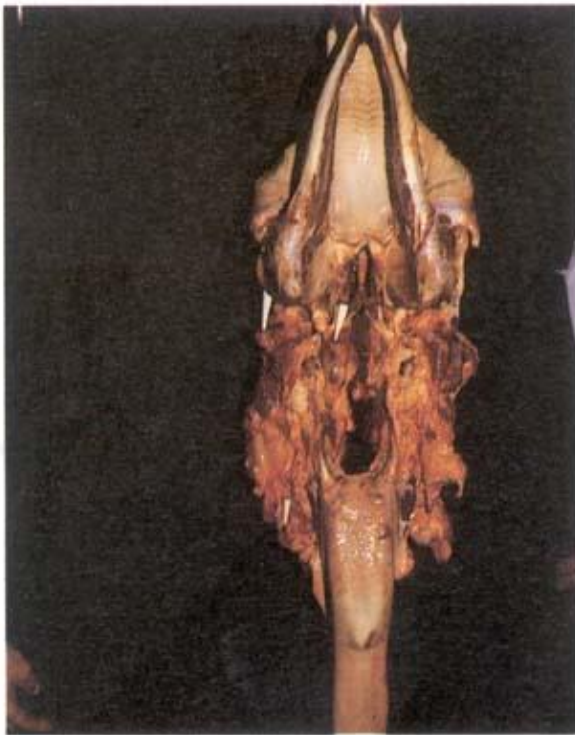


Fig. 5: Cattle head inspection. Retropharyngeal (No. 1), parotid (No. 2) and submaxillary (No. 3) lymph nodes

#### 4.1.3 Viscera

- ❖ The surface of the visceral pleura should be inspected by observation. The lungs should be visually inspected and palpated to detect chronic pneumonia, abscesses, tumors, etc. Incisions are made in the lungs in their posterior thirds perpendicular to their main axes to open the main branches of the bronchi. The right and left tracheobronchial, cranial and caudal mediastinal lymph nodes shall be incised and examined. The trachea may be inspected by a lengthwise incision and the oesophagus be observed.
- ❖ The liver shall receive a visual inspection and be thoroughly palpated. The hepatic lymph nodes shall be incised and examined. Incisions can be made into the gastric surface and the

base of the caudate lobe to open the bile ducts and incision as deemed appropriate to detect liver fluke.

- ❖ The exterior and interior of the heart (i.e. the valves and the endocardium) shall be visually inspected.
- ❖ In order to detect parasitic lesions (e.g. *Cysticercus bovis*), the cut surface of the heart musculature of all cattle shall be visually inspected by making one incision that passes through the interventricular septum from base to apex in order to open the heart and expose both ventricles and by everting the heart and making three shallow incisions in the heart musculature.
- ❖ Extra incisions of the heart may be performed when deemed necessary by the veterinary inspector.
- ❖ The mesenteric lymph nodes are to be visually examined. Mesenteric lymph nodes should be incised by the inspector when it is enlarged or when the inspector veterinarian found suspicious lesions in other lymph nodes during the routine inspection.
- ❖ The spleen shall be visually examined and palpated; it may be incised if a complete examination is found to be necessary.
- ❖ Kidneys may be examined, either in the carcass or separately, for example with the other viscera. In either case they shall be fully exposed by the operator prior to inspection and visually examined by the inspector.
- ❖ The reticulum, rumen, omasum and abomasum are to be visually inspected. The rumino-reticular junction shall be visually examined to detect any abnormalities that may affect this area of the gastro-intestinal tract such as existing inflammatory conditions, abscesses, presence of protruding foreign bodies as a result of reticular puncture, etc.
- ❖ both sides of the diaphragm and the visceral peritoneum as well as the omentum need to be inspected by observation;

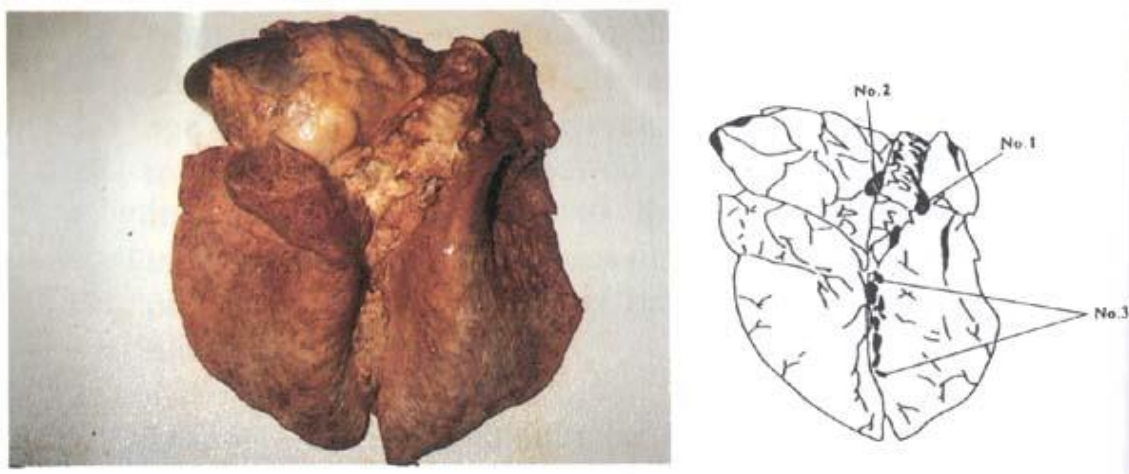


Fig. 6: Lung inspection – 1. Bronchial left 2. Bronchial right and 3. Mediastinal lymph nodes.

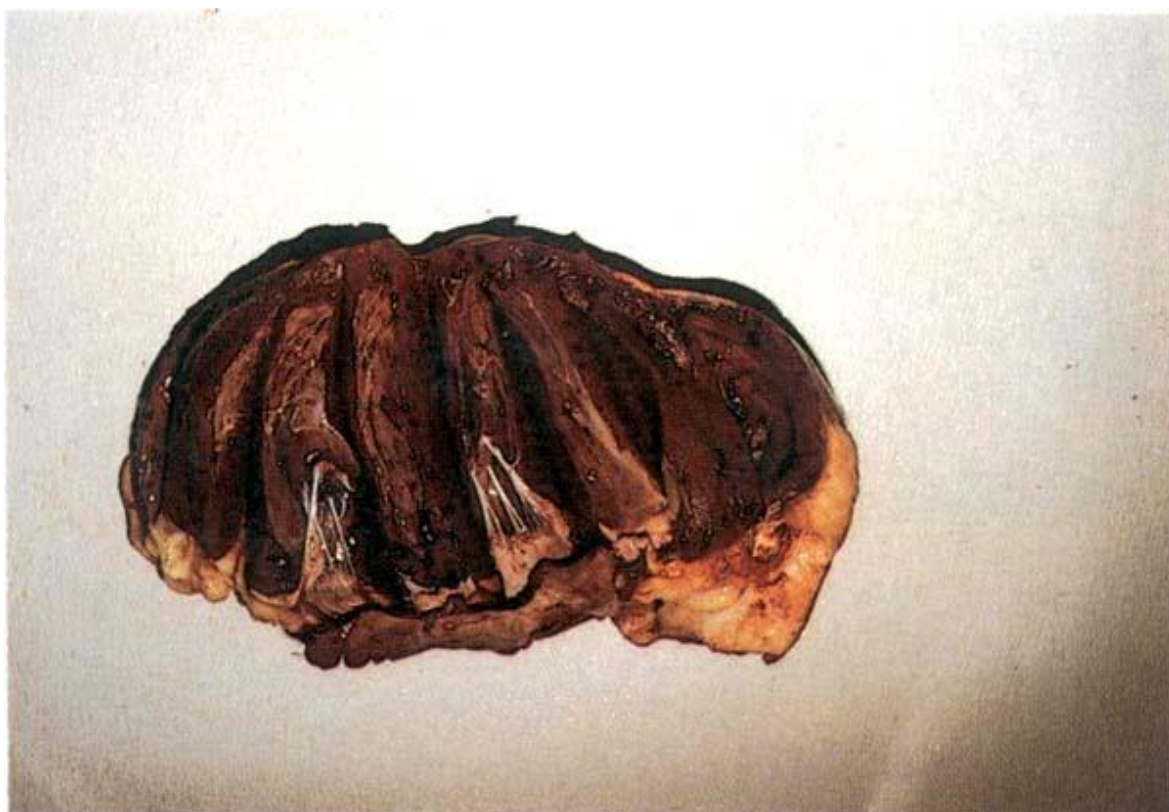


Fig. 7: Heart inspection - Lengthwise incisions from base to apex into the heart muscles.

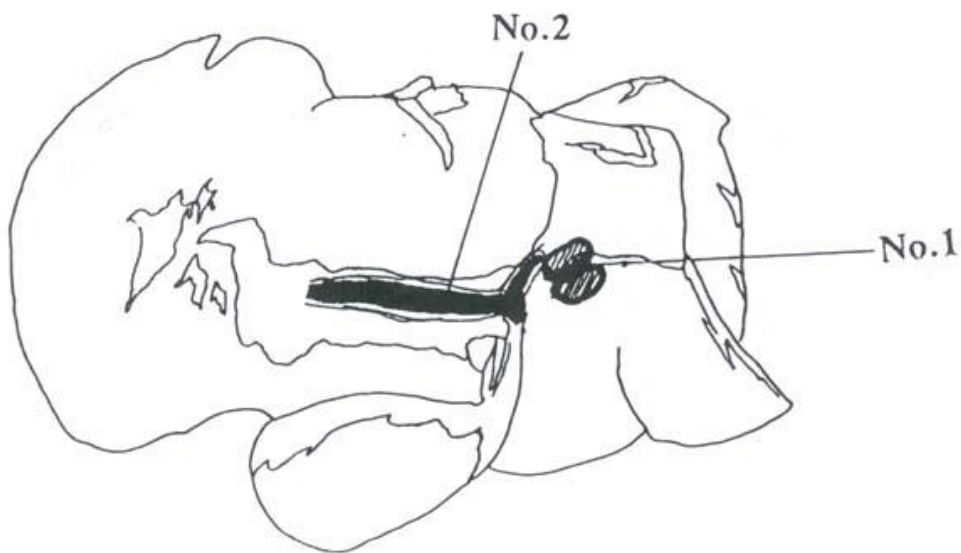


Fig. 8: Liver inspection – 1. Incised portal (hepatic) lymph nodes and 2. opened large bile duct.



Fig. 9: Stomachs and spleen inspection - Viewing of rumen and viewing and palpation of spleen.



Fig. 10: Viewing of rumen, reticulum, omasum and abomasum





Fig. 11: Viewing and incision of the mesenteric lymph nodes.

## 4.2 Sheep and goat

### 4.2.1 Carcasses

The meat inspector must inspect a carcass by means of observation, palpation, smell and, where necessary incision, and must take into consideration:

- ❖ its state of nutrition, color, odor and symmetry;
- ❖ the efficiency of its bleeding and any contamination;
- ❖ its pathological conditions; any parasitic infestation;
- ❖ any injection marks; any bruising and injuries;
- ❖ any abnormalities of muscles, bones, tendons, joints, or other tissues.

When inspecting the hindquarter, the meat inspector must inspect bilaterally:

- ❖ the parietal peritoneum, by observation;
- ❖ the internal and external iliac lymph nodes, by observation;
- ❖ the inguinal, popliteal and renal lymph nodes, by palpation;

- ❖ the kidneys, by exposure, observation and palpation
- ❖ the muscular part of the diaphragm by visual inspection.

When inspecting the forequarter, the meat inspector must inspect bilaterally:

- ❖ the parietal pleura and thoracic cavity, by observation; and
- ❖ the pre-pectoral lymph nodes, by palpation;

#### **4.2.2 Heads**

The meat inspector must visually inspect the head and when necessary, inspect the throat, mouth, tongue and mandibular, parotid and the retropharyngeal lymph nodes, making incisions as required.

#### **4.2.3 Viscera**

When inspecting the viscera, the meat inspector must inspect:

- ❖ the surface of the visceral pleura, by observation;
- ❖ the liver, by palpation and incisions into the gastric surface and the base of the caudate lobe to open the bile ducts;
- ❖ the hepatic lymph nodes, by multiple incisions;
- ❖ the lungs, oesophagus and trachea, by observation and palpation;
- ❖ the bronchial and mediastinal lymph nodes, by observation and palpation;
- ❖ the pericardium and the heart, by an incision made lengthwise to open the ventricles;
- ❖ the spleen, by observation and if necessary, palpation;
- ❖ both sides of the diaphragm, by observation; and
- ❖ the testes, by observation.
- ❖ the visceral peritoneum as well as the omentum, by observation;
- ❖ the gastric and mesenteric lymph nodes by observation.

### **5. Factors affecting post-mortem inspection judgement**

When assessing the disposition of a carcass or a part, the first step is to identify the pathological process and/or the nature of the condition. This helps in having a good understanding of the potential impacts that a condition could have on safety and suitability of a carcass or parts. In most circumstances, simply identifying a condition is not sufficient ground to warrant its condemnation. The next step is determining the distribution (i.e. localized versus systemic) and severity of the deviation. These are key elements in determining whether a meat product is edible or not.

The final outcome of the decision process may consist of removing and identifying as inedible of the circumscribed lesion; the lesion and the associated anatomical part (e.g. removal of the rib cage because of adhesions and pneumonia); or the entire carcass and its parts.

It is important to evaluate the effects of the condition on the entire carcass before determining that a whole carcass is inedible. If the carcass is in good body condition and the lesions are localized, whole carcass condemnation is not normally justified. Localized conditions can often be removed by excising the lesion itself or the removal of an affected area, leaving the remainder of the carcass or part to be considered edible. Whole carcass condemnation is rarely warranted in animals that pass ante-mortem inspection. In order to justify such action on a carcass based on a post-mortem evaluation or inspection, the carcass will have to meet specific criteria as detailed in this document.

A meat inspector should consider the following in order to determine the distribution and severity of a deviation:

- ❖ The lymph node(s) associated with an area of the body affected by a deviation will be evaluated. Presence of any reactive lymph node indicates an active lesion in the area drained by that lymph node.
- ❖ Chronic deviations tend to be more circumscribed and therefore more readily excisable, whereas active deviations require more investigation to evaluate the extent of their spread.

In situations where more than one pathological process exists, the underlying cause (primary process) that resulted in the carcass to be condemned will be used for declaration purposes. In situations where there is uncertainty as to the basic pathological process or disposition, an evaluator should hold the carcass or its packaged meat products and send samples to a laboratory for diagnosis and on receiving the diagnosis apply the correct disposition.

### **5.1 Localized versus generalized conditions**

It is important to differentiate between a localized or a generalized condition in the judgement of an animal carcass. In a localized condition, a lesion is restricted by the animal defense mechanisms to a certain area or organ. Systemic changes associated with a localized condition may also occur. Example: jaundice caused by liver infection or toxæmia following pyometra.

In a generalized condition, the animal's defense mechanisms are unable to stop the spread of the disease process by way of the circulatory or lymphatic systems. Generalized lesions usually require more severe judgement than localized lesions. Lymph nodes of the carcass should be examined if pathological lesions are generalized. Some of the signs of a generalized disease are:

- ❖ Generalized inflammation of lymph nodes including the lymph nodes of the head, viscera and/or the lymph nodes of the carcass
- ❖ Inflammation of joints
- ❖ Lesions in different organs including liver, spleen kidneys and heart
- ❖ The presence of multiple abscesses in different portions of the carcass including the spine of ruminants

## **5.2 Acute versus chronic conditions**

### **5.2.1 Acute conditions**

An acute condition implies that a lesion has developed over a period of some days, whereas a chronic condition implies the development of lesions over a period of some weeks, months or years. A subacute condition refers to a time period between an acute and chronic condition.

The acute stage is manifested by inflammation of different organs or tissues, enlarged haemorrhagic lymph nodes and often by petechial haemorrhage of the mucosal and serous membranes and different organs such as heart, kidney and liver. An acute stage parallels with the generalized disease complex, when an acute infection tends to overcome the animal's immune system and becomes generalized.

Each case showing systemic lesions should be assessed individually taking into account the significance that these lesions have towards major organ systems, especially the liver, kidneys, heart, spleen and lymphatic system as well as the general condition of the carcass.

### **5.2.2 Chronic conditions**

In a chronic condition, inflammation associated with congestion is replaced by adhesions, necrotic and fibrotic tissue or abscesses. The judgement in the chronic stage is less severe and frequently the removal of affected portions is required without the condemnation of the carcass. However,

judgement on the animal or carcass judgement tends to be more complicated in sub-chronic and sometimes in peracute stages. If generalized necrotic tissue is associated with previous infection, carcass must be condemned.

## **6. Meat inspection judgements**

The process of meat inspection judgement begins with decisions at the time of admission of slaughter animals to an abattoir, and normally ends with final judgement at the completion of post-mortem inspection. A judgement should be taken by an inspector as to whether an animal is suitable to be slaughtered for human consumption, and into which categories meat from slaughtered animals should be placed. The judgement to be made must protect:

- ❖ consumers against food borne infection, intoxication, and hazards associated with residues;
- ❖ meat handlers against occupational zoonoses;
- ❖ livestock against the spread of infections, intoxications and other diseases of socio-economic importance, in particular notifiable contagious diseases and officially controlled diseases;
- ❖ companion and other animals that closely associate with humans, and wild fauna and
- ❖ consumers against economic damage from meat of inferior standard or abnormal properties.

While passing judgement, the guidelines that the meat inspector to follow should include but not limited to, the following:

- ❖ Judgement should be based on the relevant legislation administered by the regulatory authority. While safeguarding human health and animal health, judgements should not impose unnecessary costs on meat industry.
- ❖ It is important that the individual inspector making judgements is fully supported by legislation and assured against the consequences of decisions taken in good faith.
- ❖ The regulatory authority through his inspectors should have ultimate responsibility for all decisions concerning admission of slaughter animals to an abattoir and all judgements at ante-mortem and post-mortem inspection.
- ❖ Consideration should be taken of any infection, disease or defect encountered and an appropriate final judgement made based on all available evidence, such as, observation during lairage, findings made at ante-mortem and post-mortem inspection and the results of any laboratory examinations that may be required.
- ❖ In case of suspicion, and if the initial findings at ante-mortem and/or post-mortem inspection do not enable the drawing of final conclusions, a provisional decision

should be taken. Meat that is awaiting a final judgement should be "retained for further inspection" and remain under the control of an inspector until further information enables a final judgement to be made.

- ❖ Meat that has been conditionally approved as fit for human consumption should remain under the control of a veterinary inspector, or of another person who is accountable to a veterinary inspector, until the required treatment has been applied. The meat should be condemned or otherwise disposed of if the required treatment is not applied.

## **6.1 Judgment categories**

Meat may be judged and placed in one of the following categories:

- unconditionally safe and wholesome and therefore fit for human consumption;
- totally unfit for human consumption, and therefore requiring to be condemned or otherwise disposed of; if unfit for human consumption, a subsequent decision has to be taken as to whether the meat can be recovered for some other purpose or whether it needs to be destroyed;
- partially unfit for human consumption, which requires the removal and disposal of abnormal parts before the remainder can be passed as fit for human consumption; a subsequent decision has to be taken as to whether the parts removed because they are unfit for human consumption can be recovered for some other purpose or whether they need to be destroyed;
- conditionally fit for human consumption, in which case a prescribed treatment is necessary to make it safe and wholesome;
- fit for human consumption despite showing minor deviations from what is normally considered wholesome, those deviations being the presence of defects of a type that may be specified as acceptable by the regulatory authority; or

### **6.1.1 Approved as fit for human consumption**

When the post-mortem examination has revealed no evidence of any unacceptable disease or defect and the slaughter operation has been implemented in accordance with hygienic requirements, the carcass and edible offals should be approved as fit for human consumption without any restriction.

### **6.1.2 Totally unfit for human consumption**

The carcass and offals should be condemned or otherwise disposed of for inedible purposes in one or more of the following circumstances:

- they are hazardous to food handlers, consumers and/or livestock;
- they contain residues that exceed established limits;
- there have unacceptable organoleptic deviations from normal meat; or
- the meat has been conditionally approved as fit for human consumption, but the treatment stipulated is either unavailable or not intended to be carried out.

The disposal and utilization of meat judged unfit for human consumption should reliably prevent such meat from illegally re-entering the human food chain; endangering human or animal health or causing a pollution problem. Wherever feasible, meat that is unfit for human consumption may be authorized to be used for animal feeding, provided there are adequate precautions to prevent misuse and to avoid dangers to human and animal health.

In general terms, the following criteria should be applied:

- ❖ utilization for animal feeding: if no health hazard involved, and if deviation from the authorized purpose can be reliably prevented;
- ❖ utilization for industrial non-food purposes after heat treatment: provided no hazards are involved for human health or animal health;
- ❖ incineration or deep burial or other safe means of destruction.

### **6.1.3 Partially condemned**

Where lesions are localized, affecting only part of the carcass or offals, the affected parts should be removed, and the unaffected parts passed as fit for human consumption (unconditionally and unrestricted, or conditionally, or otherwise as appropriate).

### **6.1.4 Conditionally approved**

Carcasses that are contaminated, or that are hazardous to human health may be treated under official supervision in a manner resulting in safe and wholesome meat, may be judged as conditionally approved as fit for human consumption. Where necessary, the organs should be treated in the same manner as carcasses. Until the required treatment has been applied, the meat should remain under the control of an inspector. Different diseases and defects may require different methods of treatment such as heat treatment or freezing.

A carcass, head and red offal found to be infested with one or more parasitic intermediate stages (*Cysticercus bovis*), if one or more parasitic intermediate stages are found on the majority of incision surfaces the carcass must be condemned. But where the infestation is not excessive the carcass and organs may be passed on condition that be treated by

freezing as sides in a freezer with air temperature at minus 18 °C for 72 hours or with air temperature at minus 10 °C for 10 days. Once the required treatment has been applied, the meat may be marketed according to the requirements of the regulatory authority. The meat should be condemned or otherwise disposed of as inedible if the required treatment is not applied in the prescribed manner.

#### **6.1.5 Meat showing minor deviations but fit for human consumption**

Where risk analysis has shown that meat does not constitute a risk to human health despite the presence of a defect or defects that are specified by the regulatory authority and not normally present in wholesome meat, that meat may be judged fit for human consumption provided it is identified in such a way that the consumer is made aware that the meat is inferior.

#### **6.2 Retention of meat for further inspection**

Meat should be retained, if findings at ante-mortem or post-mortem inspection would give reason for condemnation, unless the suspicion of an infectious or other condition can be reliably discarded by further inspection or laboratory examination. Retained meat should remain under the control of an inspector until final judgement is made.

#### **6.3 General guidelines for declaring meat unfit for human consumption**

Meat is considered to be unfit for human consumption if the meat:

- derives from animals that have not undergone ante-mortem inspection;
- derives from animals that have not undergone full ante-mortem and post-mortem inspections
- derives from animals which are dead before slaughter,
- results from the trimming of defects or abnormalities
- derives from animals affected by a notifiable disease that may require total or partial carcass condemnation based on the relevant national legislations.
- derives from animals affected by a generalized disease, such as generalized septicaemia, pyaemia, toxaemia or viraemia
- contains residues or contaminants in excess of the levels laid down in the national legislation.
- derives from animals or carcasses containing residues of forbidden substances or from animals that have been treated with forbidden substances
- contains specified risk materials,
- shows soiling, faecal or other contamination



- in the opinion of the official veterinarian, after examination of all the relevant information, it may constitute a risk to public or animal health or is for any other reason not suitable for human consumption

#### **6.4 Recommended final judgements**

- The judgements based on the general findings will generally overrule those applicable to more specific topographic and/or aetiological conditions, except where the judgement based on these findings is more severe.
- Where full ante-mortem and post-mortem inspections cannot be accomplished, the slaughter animals and their meat should be condemned.
- Laboratory examination for purposes of judgement should only be carried out in cases where the additional information to be obtained is believed to contribute for the decision making.

### **7. Meat inspection judgments on general pathological conditions**

#### **7.1 Anemia**

Ante-mortem: Fever; pallor of the mucous membrane; weakness/depression; poor condition; respiratory distress.

Judgement: Condemn severely affected animals. Otherwise, treat as suspect

Post-mortem: Lighter color of the carcass; blood that does not coagulate properly; splenomegaly; poor body condition.

Judgement: Condemn the carcass when it shows systemic signs or when the carcass is too anemic to produce safe and suitable meat (as shown by severe muscle pallor). Otherwise, pass the carcass.

#### **7.2 Brucellosis**

##### **Ante-mortem:**

Cattle: Abortion in the last 3 - 4 months of pregnancy; occasional inflammation of testes and epididymis; swelling of scrotum (one or both sacs); hygromas on the knees, farm history of abortion, lameness.

Sheep and goats: Fever, increased respiration and depression; edema and swelling of scrotum; in chronic stage enlarged and hard epididymis, thickened scrotal tunics and frequently atrophic testicles; Infertility in rams and abortion in ewes

**Judgement:** Treat as suspect all animals.

**Post-mortem:**

- ❖ Cattle carcasses affected with brucellosis are *approved* (after removal of affected parts), as Brucella bacteria remain viable for only a short period in the muscles after slaughter.
- ❖ In acute abortive form (after the miscarriage) or systemic cases, cattle carcasses are *condemned*. Sheep and goat carcasses require *total condemnation*. Affected part of the carcass, udder, genital organs and corresponding lymph nodes must be *condemned*.

### 7.3 Caseous lymphadenitis

**Ante-mortem:** Lethargy; fever; emaciation; pneumonia/respiratory distress; enlargement of superficial lymph nodes.

**Judgement:** Condemn severely affected animals. Otherwise, treat as suspect.

**Post-mortem:** Poor body condition; enlarged lymph nodes; abscess lesion(s) with greenish to white-yellow caseous material, which tends to become dry and granular: these lesions are located in lymph nodes and/or organs such as lungs, heart, liver, spleen, and kidneys;

**Judgement:** Condemn the carcass when the carcass shows systemic signs or the carcass is thin and exhibits generalized lesions of either the visceral or body lymph nodes or the carcass is well nourished but shows generalized lesions of the visceral and body lymph nodes. Otherwise, remove and condemn affected parts.

### 7.4 Fever (Pyrexia)

Fever is an abnormal elevated body temperature. It may be classified as septic and aseptic according to the presence or non-presence of an infection. In septic fever the infection is caused by viruses, bacteria, bacterial toxins, protozoa and fungi. Aseptic fever may be caused by tissue necrosis as seen in muscle degradation due to intermuscular injection of necrotizing substances, in rapidly growing tumours undergoing necrosis or lysis of burned tissue; by chemicals or surgery as by an administration of drugs and by breakdown of tissue and blood or during anaphylactic reaction of antibodies to the foreign antigens.

**Antemortem:**

- ❖ Chills and sweating; dehydration; elevated body temperature; increased pulse and respiration; depression and dullness and anorexia
- ❖ In septic fever the other signs may include, diarrhoea; urinous or phenolic odour or breath; shock, convulsions and coma

**Postmortem:**

- ❖ Rigor mortis; putrefaction
- ❖ Congestion of subcutaneous blood vessels and carcass
- ❖ Enlarged lymph nodes; evidence of cloudy swelling of liver, heart and kidneys

**Judgement:** Carcass is condemned if fever syndrome is associated with presence of bacteria or bacterial toxins in the blood and/or findings of drugs and antimicrobial substances. If typical signs of fevered carcass are not seen, carcass should be held for 24 hours after slaughter and re-examined. In case of mild fevered syndrome detected first on postmortem inspection, the carcass may be conditionally approved with heat treatment provided that bacteriological and chemical test are negative.

**7.5 Septicemia**

Septicemia is a morbid condition caused by the presence of pathogenic bacteria and their associated toxins in the blood. The positive diagnosis of septicemia can only be made by isolation of the causative organism from the blood stream. This is not practised on routine antemortem examination of animals in abattoirs; however, the evidence of septicemia is determined by the antemortem and postmortem findings.

**Ante-mortem:**

- Depression; difficult and rapid breathing; shivering and muscle tremors
- Changes in body temperature. The temperature is usually elevated but it can also be normal and subnormal during the terminal phases; lethargy; fever or hypothermia.
- Congestion or petechial haemorrhages of conjunctivae, mouth and vulvar mucosae

**Judgement:** Condemn severely affected animals. Otherwise, treat as suspect.

**Post-mortem:**

- Enlarged edematous or haemorrhagic lymph nodes; splenomegaly
- Degenerative changes in liver, heart and kidneys
- Congestion and petechial or ecchymotic haemorrhages in kidney, heart surface, mucous and serous membranes, connective tissue and panniculus adiposis
- Inadequately bled-out carcass as a result of high fever
- Blood stained serous exudate in abdominal and/or thoracic cavities.
- Anaemia and icterus may also be present.

All gross lesions in the carcass and organs must be considered before the animal is judged septicemic.

**Judgement:** One or more lesions may be absent. However, if one significant lesion such as generalized acute lymphadenitis is present, the carcass must be condemned. In borderline cases bacteriological examination should be done wherever possible.

## **7.6 Toxaemia**

Toxaemia is the presence and rapid proliferation of toxin derived from microorganisms or produced by body cells in the blood-stream. Clinical signs and postmortem findings are similar to those of septicemia. The gross lesions differ depending on the specific organisms and toxins involved.

**Antemortem:**

- Normal or subnormal temperature. Fever may be present if toxaemia is due to microorganisms.
- Confusion and convulsions; abnormal changes in locomotion;
- Moribund animal or evidence of pain (noted by grinding its teeth).
- Animal is not able to rise or rises with great difficulty
- Dehydration may also be present

**Postmortem:**

- Haemorrhage in organs; emphysema in cattle
- Normal or enlarged and edematous lymph nodes; areas of tissue necrosis
- Rarely degenerative changes of heart, liver and kidneys.

**Judgement:** If there is evidence of septicemia or toxemia the carcass and the viscera should be condemned and the implements used during inspection and the hands and arms of the inspector should be washed and disinfected. The primary lesions causing septicemia or toxemia including metritis, mastitis, pericarditis, enteritis and others, should be observed and recorded as causes of condemnation. Comatose or moribund animals should be condemned on antemortem examination.

**7.7 Moribund**

**Ante-mortem:** Severe depression and lethargy; fever or hypothermia; recumbency; dilated pupils; lack of response to external stimuli; convulsions or other involuntary movements.

**Judgement:** Condemn affected animals

**7.8 Tuberculosis**

**Ante-mortem:** Low grade fever; chronic intermittent hacking cough and associated pneumonia; difficult breathing; weakness and loss of appetite; emaciation; swelling superficial body lymph nodes

**Judgement:** Condemn severely affected animals. Otherwise, treat as suspect.

**Post-mortem:**

- ❖ Tuberculous granuloma in the lymph nodes of the head, lungs, intestine and carcass. These have usually a well-defined capsule enclosing a caseous mass with a calcified centre. They are usually yellow in colour in cattle and greyish white in sheep and goats.

- ❖ Active lesions may have a reddened periphery and caseous mass in the centre of a lymph node. Inactive lesions may be calcified and encapsulated.
- ❖ Nodules on the pleura and peritoneum; lesions in the lungs, liver, spleen, kidney,
- ❖ Bronchopneumonia; firmer and enlarged udder, particularly rear quarters; lesions in the meninges and joints.

When granulomatous lesions are detected in at least one of the primary sites (such as lymph nodes of the head; the lymph nodes of the lungs; and the mesenteric lymph nodes), the following lymph nodes will be incised and examined for the presence of granuloma: caudal deep cervical; superficial cervical, hepatic, renal, superficial inguinal (scrotal or mammary), medial iliac, subiliac and deep popliteal.

**Judgement:**

Condemn the carcass in the following situation when the animal was febrile at ante-mortem and either primary or secondary lesions are found post-mortem; or the carcass is showing systemic signs and/or generalized lesions resulting from spread of the infection from the primary site. Otherwise, if only primary site lesions are found, remove and condemn the implicated organ(s) or body part(s) (i.e. organ(s) or part(s) whose lymphatics drain into the reactive lymph node).

**7.9 Uremia**

**Ante-mortem:** Enlarged belly especially the lower belly (water-belly / uro-abdomen); tail twitching; restlessness; frequent attempts to urinate.

**Judgement:** Condemn severely affected animals. Otherwise, treat as suspect.

**Post-mortem:** Yellowish fluid in the abdomen and/or chest; fluid collection under the skin; urine odour; severely cystic kidneys; kidney or bladder stones; nephritis; previous surgery related to urethral obstruction; ruptured bladder and related peritonitis.

**Judgement:** Condemn the carcass when the carcass has generalized urine odour; or systemic signs. In cases where there is localized contamination with urine (e.g. bladder incision during evisceration), remove and condemn affected parts.

### **7.10 Endocarditis**

**Ante-mortem:** Fever; lameness; emaciation; lethargy.

**Judgement:** Condemn severely affected animals. Otherwise, treat as suspect.

**Post-mortem:** Vegetative lesion on valve and endocardium; embolic lesions in internal organs, especially the kidneys and lungs.

**Judgement:** Condemn the carcass when the carcass shows valvular lesions with active/acute embolic lesions in other internal organ(s). Remove and condemn affected parts when the carcass shows: no embolic spread; or previous embolic spread but lesions are chronic/resolved

### **7.11 Pericarditis**

**Ante-mortem:** Jugular pulse; enlargement of tissue under the jaw or brisket; shallow rapid breathing, fever, weakness; excitement or depression; emaciation.

**Judgement:** Condemn severely affected animals. Otherwise, treat as suspect.

**Post-mortem:** hard or fluid pus covering the outside of the heart; fluid accumulation in the chest or abdomen; edema especially under the jaw, belly and lower limbs; a foreign body protruding from the reticular area through the abdomen into the chest.

**Judgement:** Condemn the carcass when the carcass shows systemic signs or an acute and extensive infection. Otherwise, remove and condemn the affected parts.

### **7.12 Pleuritis**

**Ante-mortem:** Increased respiratory rate; shallow breathing; emaciation; wide based stance of the front legs; fever; depression or excitement.

**Judgement:** Condemn severely affected animals. Otherwise, treat as suspect.

**Post-mortem:** Fluid in the chest cavity; adhesions in the chest cavity; foul smelling clumpy pus in the chest cavity; walled off pockets of pus, redness in the chest cavity; enlargement of lymph nodes associated with the chest cavity.

**Judgement:** Condemn the carcass when the carcass shows systemic signs or an acute and extensive infection. Otherwise, remove and condemn the affected parts.

### **7.13 Pneumonia**

**Ante-mortem:** Increased respiratory rate and/or effort; fever; emaciation; lethargy.

**Judgement:** Condemn severely affected animals. Otherwise, treat as suspect.

**Post-mortem:** lesions in the lungs and associated lymph nodes; emaciation; septicemia. pleural lesions including adhesions and abscessation;

**Judgement:** Condemn the carcass when the carcass shows systemic signs; or acute and extensive lesion(s) with or without pleuritis. Otherwise, remove and condemn affected parts.

### **7.14 Gastritis/Enteritis**

**Ante-mortem:** loose watery feces with or without bloody stool; voluminous or frequent defaecation; gaunt belly; weakness; sunken eyes; teeth grinding.

**Judgement:** Condemn severely affected animals. Otherwise, treat as suspect.

**Post-mortem:** Enlarged or reddened areas of the gastro-intestinal tract; enlarged lymph nodes associated with the gastro-intestinal tract; degeneration of areas of the gastro-intestinal tract; peritonitis.

**Judgement:** Condemn the carcass when the carcass shows systemic signs; acute and extensive lesion(s). Otherwise, remove and condemn the affected parts.

### **7.15 Hepatitis**

**Ante-mortem:** Fever; teeth grinding; yellow exposed skin and sclera; depression or excitement.



**Judgement:** Condemn severely affected animals. Otherwise, treat as suspect.

**Post-mortem:** Enlarged friable liver with rounded edges; icterus/jaundice; peritonitis; enlarged abdominal lymph nodes.

**Judgement:** Condemn the carcass when the carcass shows systemic signs or apply condemnation criteria for icterus/jaundice or peritonitis. Otherwise, remove and condemn the affected parts.

#### **7.16 Nephritis / pyelonephritis**

**Ante-mortem:** Red tinged urine, purulent material in the urine or near the sheath/vulva; frequent attempts to urinate, fever; emaciation; lethargy.

**Judgement:** Condemn severely affected animals. Otherwise, treat as suspect.

**Post-mortem:** Lesions in the kidney(s) such as inflammation, necrosis, abscess, fibrosis; associated lymphadenopathy; urine odour; emaciation; septicemia/toxemia.

**Judgement:** Condemn the carcass when the carcass shows systemic signs; presence of uremia or acute and extensive lesion(s). Otherwise, remove and condemn the affected parts.

#### **7.17 Peritonitis**

**Ante-mortem:** Depression or excitation; emaciation; shallow rapid breathing; fever; sunken eyes.

**Judgement:** Condemn severely affected animals. Otherwise, treat as suspect.

**Post-mortem:** Hard or fluid pus in the belly; reddening of the surface of the abdominal wall and gastro-intestinal tract surfaces; fibrinous to fibrous adhesions on the abdominal wall and gastro-intestinal tract surfaces; enlargement of lymph nodes associated with the abdomen.

**Judgement:** Condemn the carcass when the carcass shows systemic signs; or acute and extensive lesion(s) (i.e. extensive areas of reddening, exudate, and enlarged lymph nodes). Otherwise, remove and condemn the affected parts (including adhesions).

## 7.18 Pigmentation

Pigments are coloured substances which accumulate in the body cells during the normal physiological process and abnormally in certain tumours and conditions. They have a different origins, biological significance, and chemical composition.

In anthracosis, the carbon particles are found as a black pigment in tissues. This condition is seen as black pigment of the lungs and corresponding lymph nodes in animals raised in urban areas. The lungs affected with anthracosis are condemned and the carcass is approved.

The carotenoid pigments are greenish-yellow in colour and cause yellowish discoloration in the fat and muscles of in certain breeds of cattle. The bovine liver affected with this condition is enlarged and shows a bright yellow colour. Such a liver is condemned with the rationale that the affected liver demonstrates some toxic changes.

### A. Melanosis

Melanosis is an accumulation of melanin in various organs including the kidneys, heart, lungs and liver and other locations such as brain membranes, spinal cord, connective tissue, periosteum etc. Melanin is an endogenous brown-black pigment randomly distributed in tissue. Melanin deposits in the oesophagus and adrenal glands in older sheep are a common finding on postmortem examination.

**Judgement:** Carcasses showing extensive melanosis are condemned. If the condition is localized, only the affected organ or part of the carcass needs to be condemned.



Fig.12 Melanosis in sheep viscera

**B. Myocardial lipofuscinosis (Brown atrophy of the heart, Xanthosis)**

Xanthosis (“Wear-and-Tear”) pigment is a brown pigmentation of skeletal and heart muscles of cattle. The condition is seen in old animals and in some chronic wasting diseases.



**Fig. 13:** Myocardial lipofuscinosis.

**Judgement:** Carcass showing extensive xanthosis is condemned. If the condition is localized, only the affected organ or part of the carcass needs to be condemned.

### **C. Icterus (Jaundice)**

Icterus is the result of an abnormal accumulation of bile pigment, bilirubin, or of haemoglobin in the blood. Yellow pigmentation is observed in the skin, internal organs, sclerae, tendons, cartilage, arteries, joint surfaces etc. Icterus is a clinical sign of a faulty liver or bile duct malfunction, but it may be also caused by diseases in which the liver is not impaired.

Jaundice is divided into three main categories (Prehepatic jaundice (haemolytic icterus; hepatic jaundice (toxic icterus and post hepatic jaundice (obstructive icterus). Prehepatic jaundice occurs following excessive destruction of red blood cells. Tick-borne diseases such as Babesia ovis and Anaplasmosis cause this type of icterus. Overproduced blood pigment, which cannot be metabolized in the liver, builds up in the blood (haemoglobinemia). It is excreted by the kidneys into the urine (haemoglobinuria). Normal urine colour changes and becomes bright red to dark red.

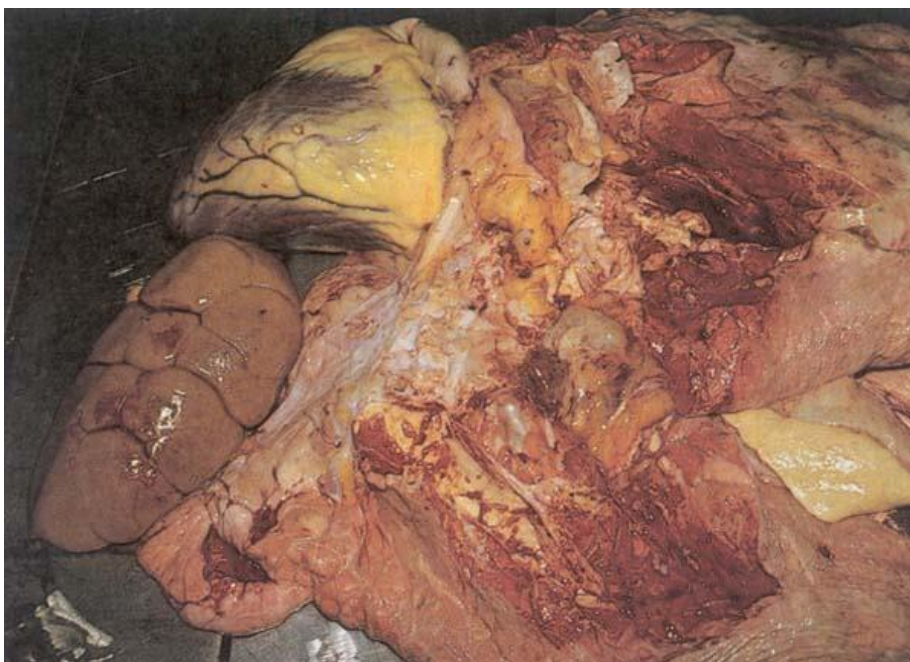
Hepatic jaundice occurs due to direct damage to liver cells as seen in liver cirrhosis systemic infections, and in chemical and plant poisoning. In sheep, jaundice may have been caused by phytogenic chronic copper poisoning. Obstructive jaundice occurs when the drainage of the bile pigment bilirubin is blocked from entry into the intestine. This usually occurs due to the obstruction of the hepatic ducts by a tumour, by parasites such as flukes or by gall stones. Obstruction may also occur due to an inflammation of the bile ducts.

**Ante-mortem:** Yellow coloured skin in areas of the animal with little or no hair; yellow sclera; weakness.

**Judgement:** Condemn severely affected animals. Otherwise, treat as suspect

**Post-mortem:** Generalized yellow discolouration of tissues including the sclera, cartilage, organs arteries and joint surfaces; abnormal colour of the kidney ranging from bright red to dark red and even reddish black; liver lesions or degenerative lesions of the liver; and enlargement or congestion of the spleen.

Feeding practices may influence the colour of fat in animals leading to yellow coloration. The fat tissues of certain breeds can also be yellow in colour. In such cases, normal carcasses can be differentiated from icteric carcasses by the fact their cartilage, connective tissue, sclera and renal pelvis are not affected.



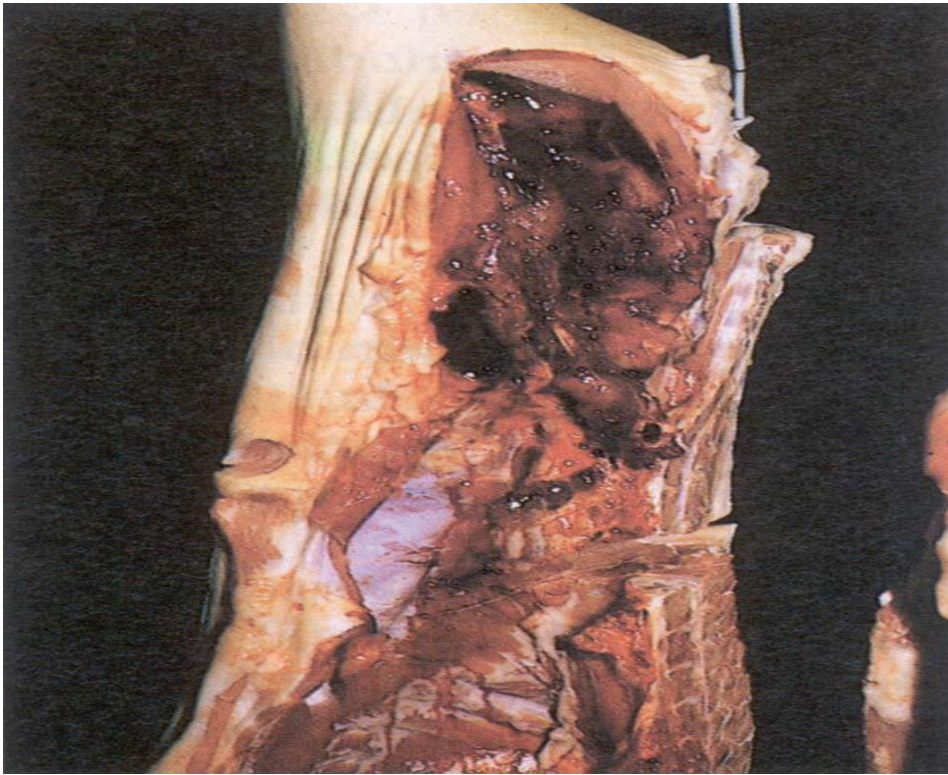
**Fig. 14:** Jaundice of a cow. Note yellow discoloration of body fat, lungs, heart and kidneys.

**Judgement:** Condemn the carcass when the carcass shows: severe discolouration (i.e. carcass and parts have a bright yellow or greenish-yellow colour); or discolouration associated with severe liver/kidneys lesions or pronounced affliction of the spleen; or lesions associated with systemic signs. In cases of slight discoloration, the carcass can be held in the cooler for up to 24 hours before making a final judgment of passing the carcass if the condition dissipates or otherwise, condemn the carcass.

### **7.19 Haemorrhage and Haematoma**

Haemorrhage is seen at slaughter in various organs, mucous and serous membranes, skin, subcutaneous tissue and muscles. It may be caused by trauma, acute infectious diseases or

septicemia. Lengthy transportation, exposure to stress before slaughter, hot weather and excitement are some of the other factors which contribute to muscle haemorrhage.



**Fig. 15:** Muscle haemorrhage

A lump formed from a blood clot in tissues or organs is called a haematoma. Haematoma varies in size. They are associated with trauma or a clotting defect.

Judgement: A carcass is approved if the haemorrhage is minor in extent and is due to physical causes. The affected tissue is condemned. A carcass affected with extensive haemorrhage where salvaging is impractical, or a haemorrhagic carcass associated with septicemia is condemned.



**Fig. 16.** Haematoma of the bovine spleen.

### **7.20 Bruises**

In cattle bruises caused by transportation or handling are commonly found in the hip, chest and shoulder areas and in sheep in the hind leg. Bruises and haemorrhage in the hip joint are caused by rough handling of animals during shackling.

Judgement: Bruised animals should be treated as suspects on ante mortem examination. On postmortem examination, carcasses affected with local bruising are approved after being trimmed. Carcasses affected with bruises or injuries associated with inflammatory lesions are also approved if tissue reaction does not extend beyond the regional lymph nodes. The affected area should be condemned. When bruises or injuries are associated with systemic change and the wholesomeness of the musculature is lost, the carcass will be condemned.



**Fig. 17:** Extensive bruises of a beef carcass.

### **7.21 Abscess**

An abscess is a localized collection of pus separated from the surrounding tissue by a fibrous capsule.





Fig. 18: Liver abscesses

**Judgement:** The judgement of animals and carcasses affected with abscesses depends on findings of primary or secondary abscesses in the animal. The primary abscess is usually situated in tissue which has contact with the digestive tract, respiratory tract, subcutaneous tissue, liver etc. The secondary abscess is found in tissue where contact with these body systems and organs is via the blood stream. A single huge abscess found in one of the sites of secondary abscesses may cause the condemnation of a carcass if toxæmia is present.

Inspectors should differentiate the abscesses in the active and growing state from the older calcified or healed abscesses. In domestic animals, the primary sites of purulent infections are post-partum uterus, umbilicus or reticulum. Secondary abscesses are frequently observed in distant organs. The animals affected with abscesses spread through the blood stream (pyemia) are condemned on antemortem if the findings of abscesses are over most areas of the body and systemic involvement is evident as shown in elevated temperature and cachexia.

On postmortem examination, the carcasses are condemned for abscesses, if the abscesses resulted from entry of pyogenic organisms into the blood stream and into the abdominal organs, spine or musculature. An abscess in the lungs may require condemnation of the lungs and passing the carcass if no other lesions are noted. associated with umbilical infection require condemnation of the carcass. If no other infection is present, liver abscesses can be trimmed off and the liver may be utilized for human food. Multiple abscesses in the liver require condemnation of the organ.



**Fig. 19:** Secondary abscesses in the spleen of a cow.

## **7.22 Emaciation**

Emaciation is characterized by a loss of fat and flesh following the loss of appetite, starvation and cachexia. It is associated with gradual diminution in the size of organs and muscular tissue as well as edema in many cases. The organs and muscular tissue appear thinner, moist and glossy. Cachexia is a clinical term for a chronic debilitating condition or general physical wasting caused by chronic disease.

Emaciation may be associated with chronic diseases and parasitic conditions such as round worms and fascioliasis in cattle and sheep, neoplasms, tuberculosis, John's disease, caseous lymphadenitis, and poor teeth and lack of nutrition. Emaciation is a postmortem descriptive term which should be differentiated from thinness.

**Ante-mortem:** Weakness; poor condition; wrinkled, dry leathery skin; rough hair coat; prominent bones and sunken eyes.

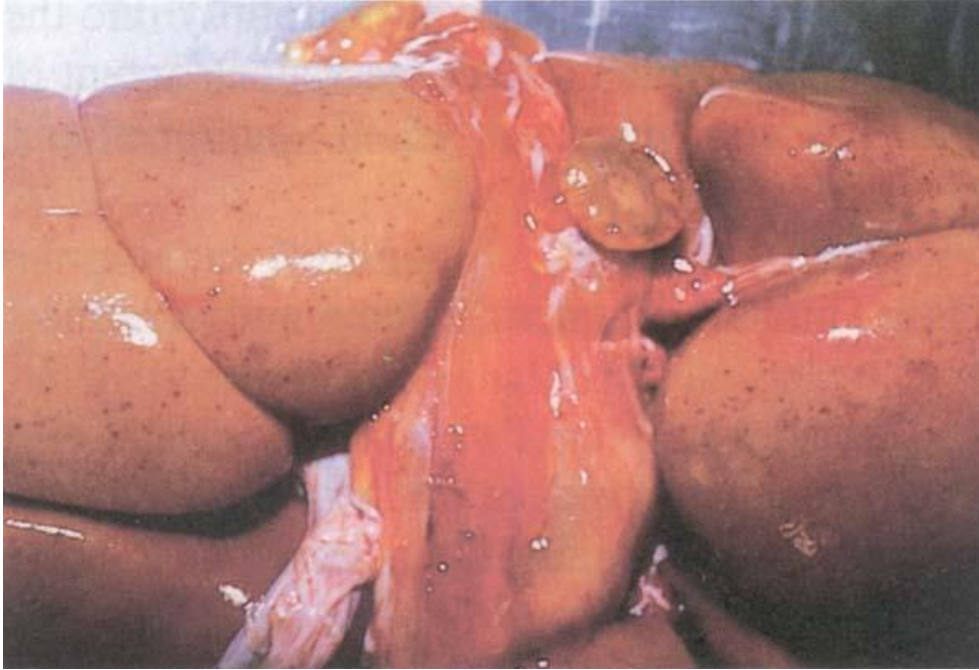
**Judgement:** Condemn severely affected animals. Otherwise, treat as suspect

**Post-mortem:**

- ❖ Poor body condition: reduction in the size of the organs, particularly the liver, spleen, and muscular tissue, and reduction in the amount of fat tissue;
- ❖ Serious atrophy of fat in the carcass and organs especially the pericardial and renal fat.
- ❖ the fat is watery, translucent or jelly-like and hangs from the intervertebral spaces.
- ❖ serous infiltration and degenerative change to visceral and body fat referred to as "Serous atrophy of fat" or "mucoid degeneration": the remaining fat may have a jelly-like appearance, a viscous feel and a yellow colour; and this is especially apparent around the base of the heart, around the kidneys and between the spinous processes of the vertebrae;
- ❖ flabby appearance of the muscular tissue; a moist appearance.
- ❖ edema and anaemia may develop due to starvation and malnutrition.

**Judgement:**

- ❖ Condemn the carcass when all signs mentioned above are found and no other underlying cause can explain the clinical lesions.
- ❖ On postmortem examination it is important to assess and differentiate emaciation from leanness. In case of doubt, the carcass may be held in the refrigerated room and the general setting of the carcass should be examined the following day. If the body cavities are relatively dry, edema of muscle tissue is not present and fat is of an acceptable consistency i.e. has "set", the carcass may be passed for food.
- ❖ Well-nourished carcasses with serous atrophy of the heart and kidneys and mere leanness may also be fit for human consumption. A carcass with any amount of normal fat may be approved if everything else appears normal.
- ❖ The carcasses from animals being in transport for a long period of time may show extensive serous atrophy of fat without any changes in organs and muscles. If after being in the cooler for 24–48 hours, the fat resumes its normal consistency, the carcass is approved. Otherwise, the carcass is condemned. The carcass and viscera must be condemned if emaciation is due to chronic infectious disease.



**Fig. 20:** Serous atrophy of renal fat. Note petechial haemorrhages, seen frequently in septicemic diseases.

### 7.23 Edema

Edema is the accumulation of excess fluid in the intercellular (interstitial) tissue compartments, including body cavities. There are two types of edema: inflammatory (exudate) and non-inflammatory (transudate) edema. Inflammatory edema shows yellow, white or greenish clear or cloudy fluid in the area of inflammation. Non-inflammatory edema is an accumulation of fluid in subcutaneous tissue, submucosae, lungs and brain.

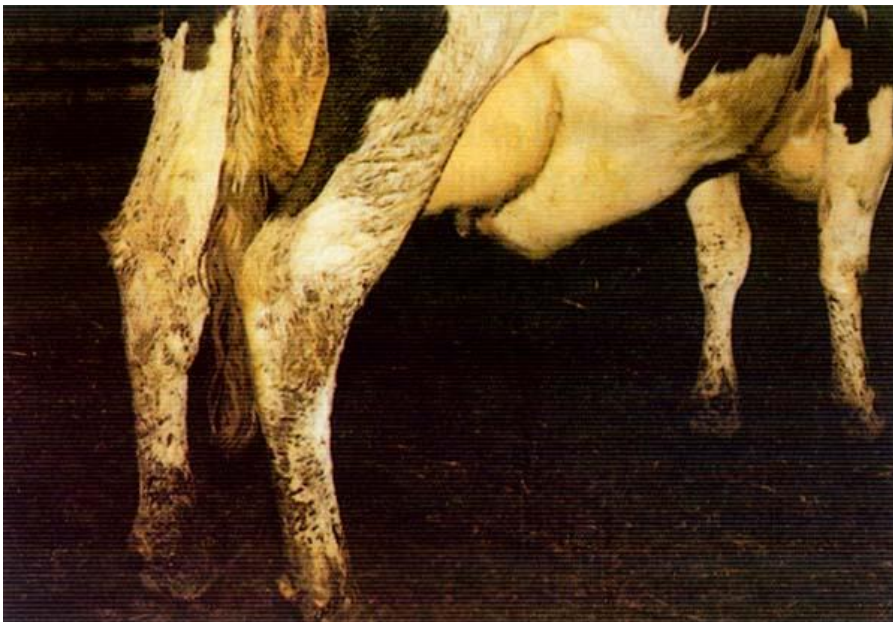
**Antemortem:** Depressed and drowsy; swelling of the mandible, dewlap, legs, shoulder, brisket and abdomen; edematous tissue is cool upon touch and is of a firm, doughy consistency

**Judgement:** Condemn severely affected animals. Otherwise, treat as suspect

**Postmortem:** Wet, sloppy musculature which pits on pressure; accumulation of clear or faint yellow fluid in the thorax, abdomen and subcutaneous tissue; affected organs appear full and rounded.

**Judgement:**

- ❖ The presence of localized edema necessitates removal of the affected area. The carcass is then approved.
- ❖ Edema associated with diseased conditions such as traumatic pericarditis, malignant neoplasm or septicemia requires condemnation of the carcass because of the primary condition.
- ❖ Edema observed in the mesentery is commonly related to circulation interference in the caudal vena cava due to liver abscess or chronic liver disease. Such a carcass may be held in the cooler for re-examination. Dry serous membranes of the abdominal and thoracic walls and a carcass appearing normal after re-examination can be passed for human consumption.



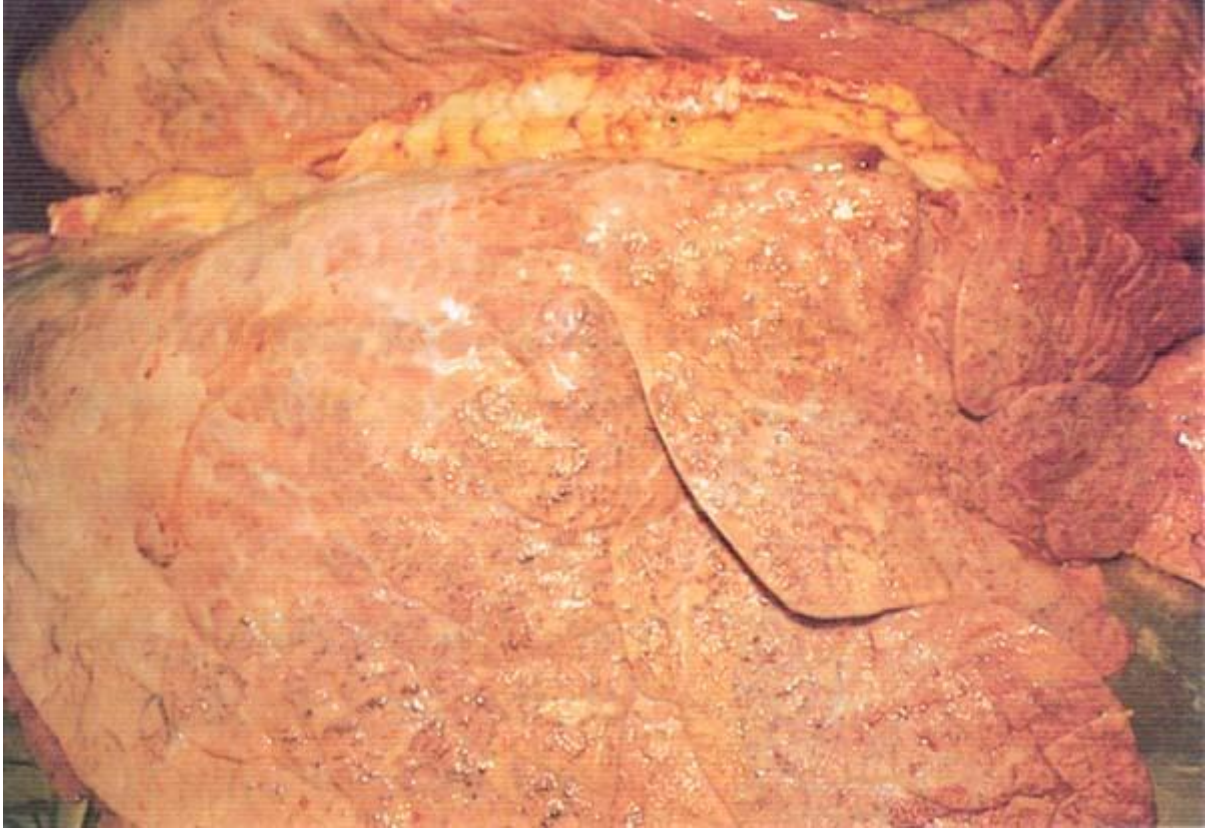
**Fig.21:** Abdominal edema caused by liver disease.

### **7.24 Emphysema**

Emphysema in animals is associated with some disease conditions and is caused by an obstruction to the outflow or by extensive gasping respiration during slaughter procedures.

**Postmortem findings:** Postmortem findings of the emphysematous lungs include a pale, enlarged greyish-yellow, pearl like shiny lesion. Upon palpation, the affected area feels puffy and crepitant.

**Judgement:** Affected lungs are condemned.



**Fig. 22:** Interstitial emphysema in the cow's lungs.

### **7.25 Tumours or neoplasms**

A tumour is an abnormal mass of tissue which grows without control and uncoordinated with the tissue or organs of origin or those nearby. Its presence is often cumbersome to the tissue or organ it arose either by pressure or by replacement of normal functional tissue. The spread of neoplasm is by direct expansion and infiltration, via lymphatics and blood circulation and by implantation.

**Judgement:** Carcass affected with metastatic neoplasms is condemned. Multiple benign tumours in different organs also require condemnation of carcass. Carcass affected with circumscribed benign tumours is approved.

### **7.26 Melanoma**

**Post-mortem:** Neoplastic tissue growth(s) dark in colour (tar-like appearance); ulcerative tissue growth(s) dark in colour; palpable changes to tissue structure; metastases to local lymph nodes; metastases to internal organs such as the lungs/liver/spleen; emaciation.

**Judgement:** When a lesion is suspect, evaluate associated lymph nodes and internal organs and condemn the carcass when the carcass shows metastasis; or systemic signs. Otherwise, remove and condemn the affected parts/areas.

### 7.27 Arthropathy

**Ante-mortem:** enlargement of one or more joints; lameness/abnormal locomotion; tendency to remain lying on the ground; difficulty rising; reluctance to move or stand; poor body condition (thin, emaciation); fever.

**Judgement:** Condemn severely affected animals. Otherwise, treat as suspect.

**Post-mortem:** Swollen joint(s) and obvious asymmetry of the joints' enlargement of the associated lymph node (e.g. medial iliac); abundant fluid in the joint (synovial fluid); cloudy synovial fluid that can contain fibrin/pus/debris/blood; enlargement of the finger-like projections of the joint cavity lining; swelling of tissues surrounding the joint; thick fibrous tissue surrounding the joint(s).

**Judgement:** Remove and condemn affected parts (including the associated lymph node(s)) when the carcass has localized lesions. The lymph node(s) draining the area will be examined and incised, as necessary, to help determine which affected parts need to be removed.

### 7.28 Bovine Cysticercosis

**Post-mortem:** Presence of cyst(s) in predilection sites such as the heart, tongue, masseters, oesophagus and diaphragm and its pillars; presence of cyst(s) in other muscles of the body;

**Judgement:** Condemn the carcass when the infestation is extensive where cysts are found in at least two predilection sites during routine primary inspection; and in at least two (2) of the sites exposed by incision into the rounds and forelimbs. Otherwise, carcasses considered slightly infested must be trimmed in order to remove and condemn visible cysts and treated with one of the following methods in accordance with the regulations:

- the meat product is subjected to a heat treatment of at least 60°C; or
- the meat product is subjected to a cold treatment not exceeding -10°C for not less than 10 days; or

- the meat product is subjected to an alternative treatment approved by the Ministry of Agriculture.

### **7.29 Ovine cysticercosis**

**Post-mortem:** Presence of cyst(s) in the heart, oesophagus, tongue, masseters and diaphragm; presence of cyst(s) in other muscles of the body; cysts are usually calcified.

**Judgement:** Condemn the carcass when it shows generalized infestation. Otherwise, remove and condemn affected parts. *Cysticercus ovis* is not a food safety concern; accordingly no additional treatment is required.

### **7.30 Injection sites (Injection myositis)**

**Ante-mortem:** Signs of pre-existing disease; and localized bulging enlargement under the skin.

**Judgement:** Treat as suspect.

**Post-mortem:** An area of blanched tissue often with a red line penetrating the muscular tissue as well as a red circle at the periphery; local bruising in the affected area; localised abscess; a medicinal odour.

**Judgement:** Hold the carcass for chemical/veterinary drug testing as per procedures of the regulatory authority:

- ❖ When the initial carcass chemical residue screening test is negative: remove and condemn affected parts.
- ❖ When the initial carcass chemical residue screening test is positive: condemn the carcass when it shows presence of violative level of veterinary drug residues/chemicals after laboratory confirmation;
- ❖ When there is absence of violative level of veterinary drug residues after laboratory confirmation, remove and condemn the affected parts. for inspection. Otherwise, pass the carcass.



### 7.31 Calcification

Calcification is the deposition of calcium salts in dead and degenerating tissue. It may be regarded as a body reaction to immobilize some foreign agents. It may occur in any tissue or organ. In dairy cows, calcification is noted in the heart (endocardium) and is caused by excessive dietary supplementation with Vitamin D. Calcification is also seen in parasitic infections and in many chronic infections such as tuberculosis etc. The presternal pressure necrosis of fat (putty brisket) seen in cattle and rarely in sheep may also eventually mineralize. If calcium particles are removed from the surrounding tissue, they appear white or grey, irregularly rounded and frequently honeycombed. Calcification is detected on postmortem examination by a gritty sound upon incision with a knife.

**Judgement:** Carcass and viscera affected with presternal calcification are approved. Affected brisket is condemned. Calcified parasitic organs and heart in dairy cows are also condemned.

### 7.32 Degeneration

Degeneration implies the change of tissue to a lower or less functionally active form or deterioration (impairment) of an organ or cell due to changes in its size. In cloudy swelling, cell proteinaceous substances become cloudy and the cell increases in size. It is observed in the heart, kidneys, liver, glands and muscles. Affected organs are pale, lustrous and softer than normal, slightly enlarged and have the appearance of having been boiled.

Fatty infiltration is an accumulation of fat in the heart, liver, kidneys, pancreas, etc. The liver is yellow, soft in consistency, has round edges, dimples on pressure, is enlarged and has a greasy texture on cut surfaces. Fatty infiltration may disappear from the tissues if the causative agent is removed. Fatty degeneration is an irreversible process and occurs when fat accumulates in the damaged cell. The liver capsule is dull and has a turgid appearance. The liver and kidneys affected are a pale, clay-red colour and greasy on touch. They have a patchy or spotted appearance.

**Judgement:** Organs and muscles affected with cloudy swelling are condemned. Detailed examination of the carcass is necessary since systemic changes are usually present and the carcass is therefore condemned. A liver affected with fatty infiltration is approved.

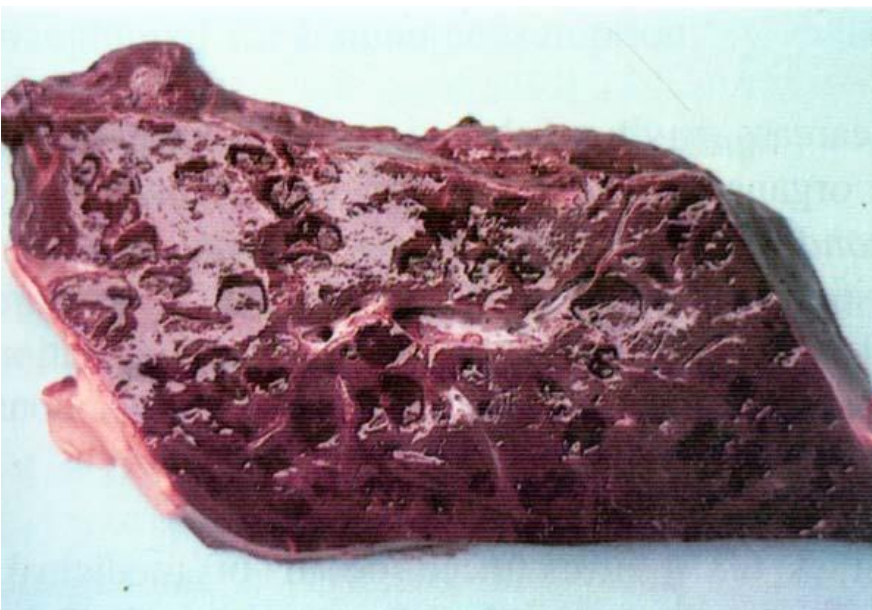


**Fig. 23:** Degeneration, Cloudy swelling and associated fatty change of the liver.

### **7.33 Telangiectasis**

This liver condition is found in cattle and sheep. The liver lesions are bluish black and irregular with depressed surfaces and dilated blood-filled hepatic sinusoids.

**Judgement:** Slightly affected liver is approved after appropriate trimmings. Extensively affected liver requires condemnation.



**Fig. 24:** Bovine liver affected with telangiectasis

### **7.34 Abnormal odours**

Abnormal odours may result from the ingestion of certain feedstuff, drugs, various pathological conditions, absorption of odours from strong smelling substances and sexual odour from some male animals. Drugs which may cause absorption of odours include turpentine, linseed oil, carbolic acid, chloroform, ether, aromatic spirits of ammonia etc.

In cows affected with ketosis, the sweetish odour of acetone may be present in the muscles. If treatment was not successful in dairy cows affected with milk fever, the odour of acetone may be noted in the connective tissue, kidney fat and musculature. The flesh of bloated and constipated animals may give off a faecal odour.

A diet of an animal may give the flesh a characteristic odor (i.e. fish, garlic); a pathological condition (e.g. abscess, gangrene, clostridial infection, etc.) may also impart characteristic odours. If the meat is kept in a room which was recently painted, the odour may pass on to the carcass. The odour is most noted in a carcass right after slaughter.

**Judgement:** If the odour is related to a pathological condition, refer to relevant pathology and dispose of accordingly. Otherwise, treat as suspect. Delay slaughter of the affected animals if it is believed that such a measure will allow the odour to dissipate.

#### **Post-mortem judgement:**

- ❖ Generalized drug treatment requires condemnation of the carcass. If local treatment and withholding periods are observed, the carcass and viscera are approved.
- ❖ A carcass which gives off a pronounced odour of medicinal, chemical or other foreign substances shall be condemned.
- ❖ If the odour can be removed by trimming or chilling, the carcass may be passed for human food after the removal of affected parts or dissipation of the condition.
- ❖ Carcasses affected with sexual odour should be held in the cooler and re-tested periodically. If the odour disappears the carcass is approved but if the odour is still present after 48 hours, the carcass

Unless the origin of the odour can be clearly determined, the following general principles will apply:

- Any carcass with a lingering odour is unfit for human consumption.
- The carcass can be held in the cooler for up to 48 hours before making a final judgment and determine if the odour is still present.
- Carcass should then be evaluated making a deep incision in the musculature, by placing tissue in a sealed plastic bag and placing it into hot water, or any other effective method. Pass the carcass when odour does not persist and cannot be detected. Otherwise, condemn the carcass.

When it can be determined that the odour is associated to a pathological condition; reference should be made to the appropriate section for disposition criteria and actions. If guidance allows for removal of affected parts, remaining carcass and parts must no longer carry any lingering odour. In case of ketosis, follow the general principles for odour of an undetermined origin (as mentioned above).

When it can be determined that the odour is associated to chemical or medicinal drugs:

- ❖ For ammonia contamination, the operator will either take measures to mitigate the contamination and return the carcass to an edible status or reject the carcass.
- ❖ For other chemical and medicinal odours, hold the carcass for chemical/veterinary drug testing as per relevant procedures described by the regulatory authority. Should screening/testing turn out to be non-violative or inconclusive but odour still persists after 48 hours after slaughter, condemn the carcass.

When it can be determined that the odour is associated to the diet; **pass** the carcass to be used in processed meat products.

When it can be determined that the odour is associated to a sexual odour;

- ❖ Affected carcasses and their parts may be chilled for up to 48 hours in an attempt to dissipate the odour. If the odour completely dissipates, carcass and parts can be used without restriction.
- ❖ Affected carcasses and parts with a strong persistent sexual odour are rejected.

- ❖ Carcasses and parts affected to a lesser extent are properly identified, controlled, and treated as required.
- ❖ Affected carcasses and their parts may be sold without other treatment provided that meat products derived from them are adequately described and labelled. This ensures that buyers are not being misled as to the quality of the product and preparation needed.

### **7.35 Spear grass penetration**

Grassland in many parts of Africa contains scattered grasses with spear-like seeds. These seeds may penetrate through the wool and skin to the subcutis, and further through to the abdominal wall into the abdominal cavity.

**Postmortem:** Spear-like seeds in the connective tissue, fat and musculature; acute inflammation of the affected tissue; Abscessation; spear-like seeds in the abdominal cavity causing low grade peritonitis.

**Judgement:** If an acute generalized inflammation is associated with haemorrhages and abscesses, the carcass should be condemned, otherwise the carcass is approved.



**Fig. 25:** Spear grass penetration of sheep carcass.

## **8. Meat inspection judgements on process related abnormalities**

### **8.1 Contamination**

A carcass may show evidence of being dropped (floor material adhered to the carcass); evidence of extensive contamination with gastro-intestinal tract or abscess content as a result of the slaughter process; evidence of extensive carcass degeneration due to having fallen off the line and not returned to the line in a timely manner or due to failure to process in a timely manner.

**Judgement:** Reject the carcass when it cannot be restored to edible standards or it shows generalized lesions. Otherwise, remove and reject affected parts.

### **8.2 Inadequate bleeding**

**Post-mortem:** Increased blood retention in the abdominal organs; increased blood retention in the carcass vasculature; increased blood retention and redness of muscular tissue; areas of the skin or subcutaneous tissues with deeply reddened patches.

**Judgement:** Mildly affected carcasses may be passed without restriction. For carcasses with severe lesions, reject the carcass or the severely affected parts/areas

### **8.3 Loss of identity**

**Post-mortem:** Where viscera, head and/or carcass: cannot be correlated; or are not presented to the inspector veterinarian for further evaluation.

**Judgement:** Discard the carcass when, based on the judgement of the inspector veterinarian, a reasonable chance exists that a condemnable condition might be present and part(s) necessary for veterinary evaluation is(are) not available.

## **9. Branding and health marking**

The inspection of a carcass at a slaughter establishment is said to be completed when the inspector veterinarian has inspected the carcass; identified the carcass as passed, held, inedible, or condemned and the inspector or a person authorized by the inspector, has placed an impression of the inspection legend stamp on each half or quarter carcass that is identified as passed.

The application of information to carcasses and parts or their containers by a brand or mark is a fast, distinctive, and durable method of identification. The brand is the official meat inspection legend that is stamped onto carcasses and meat to indicate that the products are fit for human consumption. After a decision has been made by an inspector that meat is fit for human

consumption, conditionally fit for human consumption or unfit for human consumption, it is necessary that it be marked in a systematic manner to show the result of inspection. This is to enable control and proper handling of meat and meat products prior to reaching to the consumer as well as to assure consumers of the official guarantee of safety and wholesomeness of meat.

In applying meat inspection legend by marking or stamping of carcasses and their parts, the following guidelines should be followed.

- ❖ All stamps or roller marks used to mark any carcass or meat must be constructed of a non-toxic, noncorrosive material and must be so constructed as to be readily cleanable.
- ❖ The stamps must contain the abattoir registration number; and the wording “**Inspected and Passed**” must be written in Amharic and English languages.
- ❖ The size, shape, and wording of any brand, as well as the colour and composition of marking ink used for the branding of meat, should be based on the requirements laid down by the relevant national regulation or directive set by the regulatory authority.
- ❖ A purple colored ink is required where stamps are applied to carcasses or meat and must be manufactured from harmless, edible ingredients approved for use by the relevant legislation of the country.
- ❖ Carcasses, heads, organs and viscera that are passed as fit for human consumption without further restrictions should be legibly and appropriately branded.
- ❖ Any meat (including heads, organs and viscera) that requires treatment by heat or by freezing to render it fit for human consumption should be suitably identified and, if necessary, branded as such and kept under the supervision of an inspector until the necessary treatment has been completed and the carcass and any parts can be passed as fit for human consumption.
- ❖ All carcasses, parts of carcasses, organs and viscera that are found to be unfit for human consumption, should be held securely to the satisfaction of the inspector until they are branded, stained, rendered, denatured or otherwise destroyed for the purpose of excluding them from the human food chain.
- ❖ The stamp of approval must be kept and used only under an inspector's supervision and should be kept clean while in use. When not in use the stamp must be kept in safe custody to the approval of the veterinary inspector; and a stamp of approval must never be used at an abattoir where the abattoir number differs from the number on the stamp.

- ❖ The use of the meat inspection legend is only permitted in connection with edible meat products slaughtered in a registered and licensed export abattoir and should be applied to the carcass before cooling. The use of the meat inspection mark should not be used on inedible meat products or on containers of inedible meat products.
- ❖ All carcasses after being approved at inspection and as soon as the carcass is dry enough to hold the ink, should be legibly branded with the official inspection legend (**Inspected and Passed**). Brands are to be applied by company staff under the direct supervision of the inspector and inspector veterinarian.
- ❖ All carcasses are to be branded legibly with four stamps per side (in neck, thoracic, abdominal hind quarter areas) and one stamp on each of the left and right peritoneum (a total of 10 stamps per carcass) but carcasses intended for de-boning within the abattoir can directly be transferred to the de-boning room without branding or marking (which will be branded after being packed and labeled).
- ❖ Stamps and roller marking equipment must be cleaned and sterilized regularly during use. All marking equipment must be kept hygienically, away from the floor and other dirty surfaces.
- ❖ No person may place a stamp of approval on, or remove such mark from any carcass, part thereof, meat or a wrapping, packing or container, except under the supervision of the veterinary inspector.
- ❖ The veterinary inspector may at any time re-inspect a carcass or meat in an abattoir, notwithstanding that it may already have been passed for consumption and, if upon re-inspection he or she is of the opinion that it is no longer fit for human or animal consumption, he or she must remove the stamp from the carcasses or their parts.

## **10. Condemned products handling**

Condemned meat products include carcasses and portions of carcasses which upon inspection or re-inspection are found to be affected by disease or an abnormal condition that renders them unfit for human consumption as well as carcasses of animals condemned on ante-mortem inspection, animals that died while being driven or that died in the premises of the export abattoir. The following guidelines should be applied:

- ❖ When a carcass is condemned the inspector veterinarian should put a "Condemned" mark on its outer surface to make identification obvious.



- ❖ Under no circumstance should the skinning, evisceration and other preparation of animals condemned on ante mortem inspection, or found dead carcasses, be allowed on the slaughter floor.
- ❖ Condemned head, carcass, or viscera should be removed from the killing floor and transferred to the condemned and inedible room as soon as possible. There should be no direction reversal of condemned meat products to the edible products section.
- ❖ The condemned materials, which were transferred from the slaughter hall, should stay in the condemned room until they are treated by the inspector veterinarian to make them obviously unfit for human consumption either by sight, smell, or taste by adding certain chemicals such as powdered charcoal, kerosen, food grade dyes, etc.
- ❖ Before they leave the abattoir for further processing or to be destroyed, they should be packed in leak proof containers marked with the word 'condemned'.
- ❖ Containers used for condemned meat products should be distinctly marked as "Condemned" and should be of a color that distinguishes them from containers used for edible meat products.
- ❖ An employee working in the condemned and inedible room of the abattoir should completely change his protective clothing and thoroughly wash his hands before he/she is required to enter in to the edible section of the abattoir.
- ❖ There should be proper segregation of condemned and inedible products, but if mixing of condemned meat products and other inedible meat products occur, all inedible meat products must be treated as condemned meat products.

### **10.1 Condemned product approved for pet animal food**

- ❖ Operators can salvage certain condemned meat products, which may be unfit for human consumption but be safe for pet animals, with the consent of the inspector veterinarian.
- ❖ Denaturing is required to clearly distinguish such pet animal meat products from those prepared and approved for human consumption.
- ❖ In order to be considered as being properly denatured, charcoal or another denaturing agent that is accepted by the Ministry of Agriculture would have to be added to the meat product and be liberally stamped with "Condemned" before they leave the abattoir
- ❖ The dispatch containers for meat products destined for pet animal meat should be labeled **"pet meat"**.

## 11. Non-condemned inedible meat products handling

Inedible meat products include those meat products which are not condemned but are not edible due to their nature (such as lungs, spleen, uterus, ovaries, udder and others). The guidelines to follow include, but not limited to, the following:

- ❖ There should be no direction reversal of inedible meat products to the edible products section once they are placed in the condemned and inedible room.
- ❖ Inedible meat products should stay in the condemned and inedible room until they are treated by the inspector veterinarian to make them obviously unfit for human consumption (by sight, smell, or taste) and be liberally stamped with “**Condemned**” before they leave the abattoir.
- ❖ The dispatch containers for meat products destined for pet animal meat should be labeled “**pet meat**”.
- ❖ The inedible products, which are not to be used for pet meat, once treated by the veterinarian to make them obviously unfit for human or pet animal meat and be liberally stamped with “**Condemned**” should be packed in a properly “**inedible**” marked and leak proof containers and send to designated rendering plant or to incinerator to be destroyed.
- ❖ In similar manner, other by-products such as, horns, hoofs and bones should be kept away from the meat stores and disposed according to the provisions of the relevant regulations and guidelines.

## 12. Records and communication of inspection results

The following guidelines should be followed:

- ❖ The results of the ante - mortem and post-mortem meat inspections must be recorded by the inspector veterinarian and be evaluated.
- ❖ If inspections reveal the presence of any disease or condition that might affect public or animal health, or compromise animal welfare, the inspector veterinarian should inform the abattoir operator so as to make urgent interventions.
- ❖ The results of inspections and tests should be compiled and sent regularly to the federal authority to be included in the relevant databases.
- ❖ When the inspector veterinarian, suspects the presence of a notifiable disease including zoonoses, he/she should immediately notify the relevant federal authority of the Ministry of Agriculture responsible for animal disease control and should take all necessary measures and precautions to prevent the possible spread of the infectious agent in accordance with applicable national legislation and guidelines.

- The regulatory authority should make meat inspection findings available to assist other agencies involved in human health and animal health. In meeting this objective, the regulatory authority should ensure that surveillance activities are distinguished from normal meat inspection activities, and do not jeopardize the efficient delivery of meat inspection services or the efficient operation of the meat industry.
- The regulatory authority should take an active role in animal health management programmes that assure a safe and wholesome food supply and information on zoonotic disease should be provided to the appropriate agencies.
- The regulatory authority should closely collaborate with the authorities responsible for animal disease control and with public health authorities so that the greatest possible use can be made of meat inspection findings.
- Research and surveillance activities should be distinguished from routine meat inspection and from those laboratory examinations that may be required for the immediate purpose of decision making, and should have no delaying effect upon the normal course of post-mortem judgement.
- The regulatory authority should periodically assemble and evaluate statistics relating to meat inspection findings and of the judgement decisions taken. These statistics should be made available to animal health authorities, for the monitoring of fluctuations in the animal health situation, as reflected by meat inspection findings.
- Where applicable, veterinary inspectors in abattoirs should take an active part in animal disease and health control, not only as providers of information for feedback but also as associates in the field control of animal health.

## 15. Reference

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