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MINISTRY OF AGRICULTURE

Food and Agriculture Organization of the United Nations

Ministry of Agriculture

Veterinary Public Health Directorate



Meat Inspection Guidelines for Domestic Abattoirs

December, 2021

Addis Ababa

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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

Acknowledgements

The first edition of this guidelines document, which served as the basis for the current revised version, was developed by Dr. Wondwosen Asfaw and Dr. Nega Tewolde while the current version was reviewed and updated by Dr. Amsalu Demissie. The contribution of Dr. Hassen Chaka (Coordinator, Improving Sanitary Capacity and Facilitating Export of Livestock and Livestock Products from Ethiopia Project of FAO-ECTAD Ethiopia), Dr. Ayalew Shumet (Director, Export Abattoirs Inspection and Certification Directorate, Ministry of Agriculture), Dr. Sisay Getachew (Director, Veterinary Public Health Directorate, Ministry of Agriculture) and other technical experts of the Ministry of Agriculture, for making this document to have its current form by providing insightful comments and suggestions at various stages of the review and revision process is highly appreciated.

Foreword

This technical document entitled "Meat Inspection Guidelines for Domestic 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.

These Guidelines and Standard Operating Procedures are 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 assigned by the regional regulatory authorities to work at different categories of the domestic abattoirs. The document describes, among other things, the aims of meat inspection, scientific principles, methodologies and procedures to follow while conducting meat inspection activities at the different levels of domestic abattoirs in order to certify that the meat and meat products produced there are wholesome and 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 Veterinary Public Health 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 guidelines document.

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PART I: General

1. Introduction

In different parts of the country meat is considered as an important part of the diet. The contribution of meat for the health and well-being of the society is well understood. However, there are several diseases well known to the general public that are directly related to the handling and consumption of meat and meat products.

The general public requires to be confident that the meat and meat products available for sale is safe and wholesome. Meat inspection is therefore concerned with that the animals slaughtered are healthy, the animals are slaughtered and the meat is handled in a clean slaughter facility, the products are marked with inspection marks indicating they are safe for human consumption.

The responsibility for ensuring the meat is safe for public consumption lies primarily with the relevant public health authorities who are represented by meat inspectors at the abattoir stage. This necessitates the development of meat inspection guidelines to be used for regulating the safety and quality of meat and meat products produced and supplied by domestic abattoirs to local consumers.

At present, there is a general consensus among regulatory authorities and different stakeholders that the domestic abattoirs need to be classified in to 4 different categories depending on their daily throughputs and available facilities. Regardless of the capacity and facility differences that may exist in the different categories of the domestic abattoirs, all of them are expected to meet basic, structural, facility and operational and hygienic requirements and need to be subjected to strict regulatory meat inspection controls. Both the ante-mortem and post-mortem meat inspection activities are among the major functions that the regulatory authority should perform in any one categories of the domestic abattoirs.

1.1 Objective

The objective preparing this meat inspection guidelines document is to provide a reference guide for domestic meat inspectors to carry out their day to day regulatory activities of ensuring the meat and meat products coming from domestic abattoirs are safe and wholesome for human consumption.

1.2 Scope

These guidelines apply to ante-mortem and post-mortem meat inspection activities to be carried out the different categories of domestic abattoirs that slaughter cattle, sheep and goats for domestic consumption.

2. 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 that may include municipal and private owners.

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.

Condemnation (partial): means only parts of the slaughtered animal are condemned, while others are judged otherwise.

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.

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.

Domestic abattoir: means an abattoir or slaughterhouse that is approved and registered by the regional regulatory authority and engaged in slaughtering of animals for human consumption within the country.

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

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 regional regulatory authority for the purpose of meat inspection and control of hygiene in domestic abattoirs.

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 Ethiopian standard 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 federal or regional authority legally mandated to control 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.

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.

3. Meat inspection overview

Ante-mortem and post-mortem inspection of slaughtered animals is carried out to ensure that fresh meat produced for human consumption is safe and wholesome. The objectives of meat inspection programs are to ensure that only apparently healthy, physiologically normal animals are slaughtered for human consumption and that abnormal animals are separated and dealt with accordingly and meat from animals is free from disease, wholesome and of no risk to human health. These objectives are achieved by ante-mortem and post-mortem inspection activities and by hygienic dressing and meat handling procedures.

The inspection procedures should be appropriate to the spectrum and prevalence of diseases and defects present in the particular geographic area and species of livestock being inspected. Meat inspection is part of the wider process of screening animals and meat for fitness for human consumption. The type of inspection system to be applied should reflect local disease risk situations.

4. Major responsible bodies

Regional Veterinary Services have the legal authority mandated to ensure the safety, quality and wholesomeness of meat and meat products coming out of domestic abattoirs to be marketed within the country. The authority to conduct ante- mortem and post-mortem inspections and

certifying the meat and meat products as fit and wholesome for human consumption is therefore a responsibility of the respective regional veterinary services.

The abattoir operators (that may include city and tows municipalities and/ or private individuals or organizations) have also a legal responsibility for ensuring the meat and meat products produced within their premises are in compliance with the relevant national regulations and guidelines with regard to safety and quality standards. In this regard, the role and responsibilities of the different actors in facilitating production and supply of safe and quality meat products for the domestic consumers are outlined below.

4.1 Federal regulatory authority

The federal regulatory authority under the Ministry of Agriculture has the following major duties and responsibilities:

- Develop national construction requirements for any domestic abattoir to be registered and licensed to operate within the country.
- Develop and implement national programs that would train and certify meat inspection staff that conduct meat inspection in each category of the domestic abattoirs.
- Develop standard inspection and operational guidelines required to be used by the meat inspectors and abattoir operators of domestic abattoirs.
- Develop and implement a regular monitoring and evaluation system that would ensure provision of required technical supports to the domestic meat inspection service.

4.2 Regional meat inspection service

The duties and responsibilities of regional meat inspection service includes, but not limited to, the following:

- Provide the necessary guidance and information to relevant stakeholders on the regional requirements set for the construction and operation of domestic abattoirs
- Inspect and certify domestic abattoirs constructed and operating in accordance with the relevant guidelines.
- Assign competent meat inspectors depending on the categorization level of the abattoirs.
- Monitor, supervise and evaluate the performance of assigned meat inspectors and inspector veterinarians as well as the abattoir operators on a regular basis
- Provide materials, logistics and finance required to conduct the meat inspection activities
- Provide regular refreshment training programs for the meat inspectors and abattoir employees.

4.3 Regional meat inspection personnel

Meat inspectors should be responsible for all decisions relating to human health and animal health at admission of slaughter animals to the abattoir and subsequent decisions made through ante-mortem and post-mortem inspections. The duties and responsibilities of the meat inspection personnel assigned by the regional meat inspection service and stationed in the domestic abattoirs include, but not limited to, the following:

- Supervise and verify that the domestic abattoir operators (public or private) have met and maintained the regulatory requirements set while being licensed to establish and operate a domestic slaughter abattoir.
- Ensure that animals are handled humanely, free from excessive dirt and sufficiently rested in lairages before slaughter.
- Conduct ante-mortem inspection for all animals unloaded in the domestic abattoir's facility for the purpose of slaughter on their arrival and re-inspect them if they stayed for more than 24 hours after conduct of the first inspection before they are slaughtered.
- Supervise and guide abattoir operators on humane handling of livestock including provision of water, rest and feed as may be required.
- 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, be removed immediately to the rendering station or other place of destruction, and there should be adequate precautions to prevent misuse.
- Ensure that only animals certified as fit for slaughter be moved to the slaughter floor.
- Ensure the cleanliness of the abattoir before slaughter of animals begins.
- Supervise and monitor conduct of hygienic practices of abattoir employees during the slaughter and dressing operations
- Conduct post-mortem inspection and pass appropriate judgements
- Ensure stamping of inspection legend on carcasses and parts that are fit for human consumption.
- Ensure condemned and inedible products are segregated, identified and properly denatured and or disposed in order to prevent their misuse for human consumption.

- Take necessary and immediate action(s) to correct the errors made if the abattoir operator fails to meet one or more of its obligations.
- Record and maintain all relevant inspection data and regularly submit summarized reports to the relevant regulatory expert in charge of receiving the reports

4.4 Domestic abattoirs operators

The domestic abattoir operators (such as municipalities, private individuals or community organizations) have the responsibility to comply with the regulatory requirements set while obtaining their licenses to establish and operate slaughter abattoirs. Besides the routine operational and managerial activities that they perform in the abattoir, they are also expected to assist the ante-mortem and post-mortem inspection activities of the regulatory inspectors on a regular basis in the following manner:

- Employee qualified personnel who work closely with the meat inspection service and in charge of ensuring fulfilment of all the regulatory requirements set for running the abattoir at all times.
- Assign trained and experienced livestock handlers that will manage the slaughter animals properly while unloading/receiving and during their stay in the lairage.
- Ensure all the animal welfare and sanitary practices in the abattoir are performed in line with the relevant regulations and guidelines.
- Provide sufficient drinking water to slaughter animals on their arrival and at all times in lairages.
- If animals are not to be slaughtered within 12 hours after arrival, feed should be provided on arrival and at intervals appropriate to the species. Feed restriction is required for 12 hours before slaughter. However, according to the Muslim slaughter, the 12 hours fasting is not recommended and therefore can be omitted.
- Provide appropriate rest to slaughter animals as may be directed by the meat inspector until presented for slaughter.
- Keep livestock pens clean, well-drained and satisfactory for conducting ante-mortem inspection.
- Should not remove any animal which entered the lairage from there, whether for slaughter or otherwise, unless permission has been granted by the meat inspector.

- Should not slaughter any animal in the abattoir unless the animal(s) has been subjected to an ante-mortem inspection within 12 hours before the time of slaughter and certified as fit for slaughter.
- Ensure isolation and holding of animals that are identified by the inspector as suspect or condemned.
- 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.
- Properly identify slaughter animals to relate their identity with the carcasses and parts after slaughter
- Ensure conduct of the slaughter, dressing and meat transport operations based on the operational guidelines presented by the regulatory authority and direction of the inspector.
- Identify 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 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.

5. Livestock reception and handling

Inspectors and inspector veterinarians should make sure that livestock reception and handling procedures, that include the following, before slaughter are followed properly:

- Conduct livestock reception in the presence of competent abattoir livestock handler.
- If animals come on truck, make sure they are unloaded as soon as possible after arrival quietly to minimize the risk of injury or stress.
- Make sure that each animal has enough space to stand up, lie down and turn around while kept in lairage including isolation pens.
- Mixing of different species of animals should be avoided, as this will cause disturbance among them.
- Fractious animals should not be penned with other animals.
- Where ties are used, they should allow animals to stand up and lie down without causing injury or distress.

- Animals should be kept securely in the lairage, and care should be taken to prevent them from escaping and from predators.
- Provide a period of 12-72 hours rest for sheep, goats and cattle in the lairage before slaughter
- Potable drinking water should always be provided to all animals, including those kept in the isolation or suspect pen.
- Feed should be supplied if they are to be kept for more than 12 hours before slaughter. But for those animals to be slaughtered using halal methods, feed can be provided throughout their stay in the lairage.
- The lairage area should be well lit in order to enable the animals to see clearly.
- Animals which are sick, weak, injured or showing visible signs of distress should be separated, and veterinary advice should be sought immediately regarding treatment or the animals should be humanely killed immediately if necessary.

Ante-mortem and post-mortem meat inspections of livestock slaughtered in abattoirs should be recorded. All inspection items and documentations should be kept together under lock in the inspector's office. The materials and supplies that are recommended to be available for performing ante-mortem and post-mortem inspection include, but not limited to, the following items:

- Ante-mortem inspection format; thermometer, stethoscope, pen, pencil, pad of paper and clipboard
- Suspected and condemned tags to be attached to the animal's ear or other type of identification materials for animals.
- Tagging pliers, stamps for marking carcasses as fit for human consumption
- Different equipment such as hooks, knives etc required by inspectors for post mortem inspection.

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 or inspector veterinarian within the premises of the abattoir before they are slaughtered. 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.

In any category of the domestic abattoirs, 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 floors. 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 and inspector veterinarian should be 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

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 slaughter animals.
- Identify sick animals and those treated with antibiotics, chemotherapeutic agents, insecticides and pesticides.

3. Ante-mortem inspection procedures

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

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.

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 uncleanliness, disease or defect) to be identified and given that special handling, as well as permitting the identification of animals requiring special post-mortem inspection.

4. Ante-mortem inspection methodology

Ante-mortem inspection should take place as soon as possible on arrival of animals at the slaughterhouse. If ante-mortem inspection has occurred and there is a delay of more than 24 hours before slaughter, ante-mortem inspection should be repeated. Only animals that are judged to be sufficiently rested should proceed to slaughter and should not be withheld from slaughter any longer than necessary.

Ante-mortem inspection should commence by observing animals while they are unloaded. The inspector should follow the following guidelines:

- Inspect the animals on arrival at the abattoir while unloading.
- If an animal is kept for more than 24 hours after its post-arrival ante-mortem inspection, the ante-mortem inspection should be repeated so that it takes place within 24 hours of slaughter.

- Verify that the animals do not have dirty hide, skin or fleece conditions which cause risk of contamination of the meat.
- Verify that the animals are healthy and are in a satisfactory state as regards to welfare.
- Only animals that are judged to be sufficiently rested should proceed to slaughter and should not be withheld from slaughter any longer than necessary.
- Ante-mortem inspection should be carried out in adequate lighting where the animals can be observed both collectively and individually at rest and motion.
- While inspecting at rest, the inspector should position her/himself at various locations outside the pen and observe all animals and note their general behavior while they are at rest. The inspector should determine if any of the animals show abnormal behavioral patterns such as excessive excitability or severe depression and also should look at the heads, necks, sides, rumps, and legs of as many animals and make a note of any abnormalities.
- While inspecting in motion, the inspector should take the following precautions:

    - Should position her/himself outside the pen next to the open gate to easily view the animals as they are driven and direct the abattoir employee to move all animals slowly and individually back and forth, while she/he observes each animal for abnormalities by viewing the head, neck, shoulder, flank, legs, and rump.
    - The inspector should not make in-motion inspection immediately behind a loose, swinging gate and 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 should not climb on high, unstable fences to view the animals during ante-mortem inspection and use safety helmet if required.

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. 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 domestic abattoir
- History of the affected lot or animals***:*** Description on the source and purchase areas, presence and/ or absence of current livestock movement bans imposed by federal authority on livestock originating from specified areas and/or trade routes, etc
- Livestock supplier or owner's name

- Origin or source area of the slaughter animals
- 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
- Reason why the animal was held
- Judgement passed (isolate, condemn, etc)
- Name, date and signature of inspector

5. 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*** 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.

- Examples ***of abnormal discharges*** or protrusions from the body are discharges from the nose; excessive saliva from the mouth; 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*** is difficult to detect but the odour of an abscess or an acetone odour of ketosis may be observed.
- ***Abnormal body movement:*** An animal may have a condition or disease which may be associated with body movement such as:

  - Lameness or limping: that 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

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 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 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 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 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 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 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.

6. 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: "*passed for slaughter without restriction", "passed for slaughter conditionally", "suspected and isolated" and "condemned".*

Judgement:

- 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.
- 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 for slaughter and post-mortem inspection.
- Where signs of disease are equivocal, the animal should be withdrawn from normal slaughter and placed in an isolation pen set aside for detailed examination, observation or treatment; or slaughter under special conditions so as to preclude contamination of the premises, equipment and personnel.
- Animals that were found to be treated with veterinary drugs but not completing the drug withdrawal period should be withheld from slaughter until the completion of the drug withdrwal time.
- Where signs of disease indicate a systemic involvement, communicability to humans, or toxicity from chemical or biological agents that render or may render the meat unsound, the animal so affected should be condemned as unfit for human consumption.

- Any animal that as a result of ante-mortem inspection is not passed for slaughter should be examined for a final decision on its disposition by the veterinary inspector.
- The remains of animals that have died, 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.

PART III: Post-mortem inspection

1. Overview

In general, 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/slaughter 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 should 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 post-mortem inspection guidelines

- Post-mortem inspection should be carried out in a systematic manner and should ensure that meat passed for human consumption is safe and wholesome.
- 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.
- 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 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 should correlate information available from ante-mortem inspection with what can be discerned by examining the head, carcass and viscera.
- Conduct of stunning/slaughter, 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.
- 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.

- No person should remove 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.
- Marking of carcasses passed as fit for human consumption should follow immediately after the completion of inspection and carcass washing and before cooling. The mark should be clearly visible and unambiguous; unfit carcasses should not be marked in this way.
- 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;
- 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.
- 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 should 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.
- Post-mortem 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 should be examined.

- The final responsibility for inspection decisions on fitness for human consumption rests with the meat inspector and inspector veterinarian in charge.
- A meat inspector should 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 domestic abattoir operator, regardless of its ownership, (be it private or municipalities) should ensure that carcasses and their parts are presented for post-mortem inspection in such a way as to permit proper examination by the 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. Where the dressing of the carcass includes its splitting, the carcass should be split prior to 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 should 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.

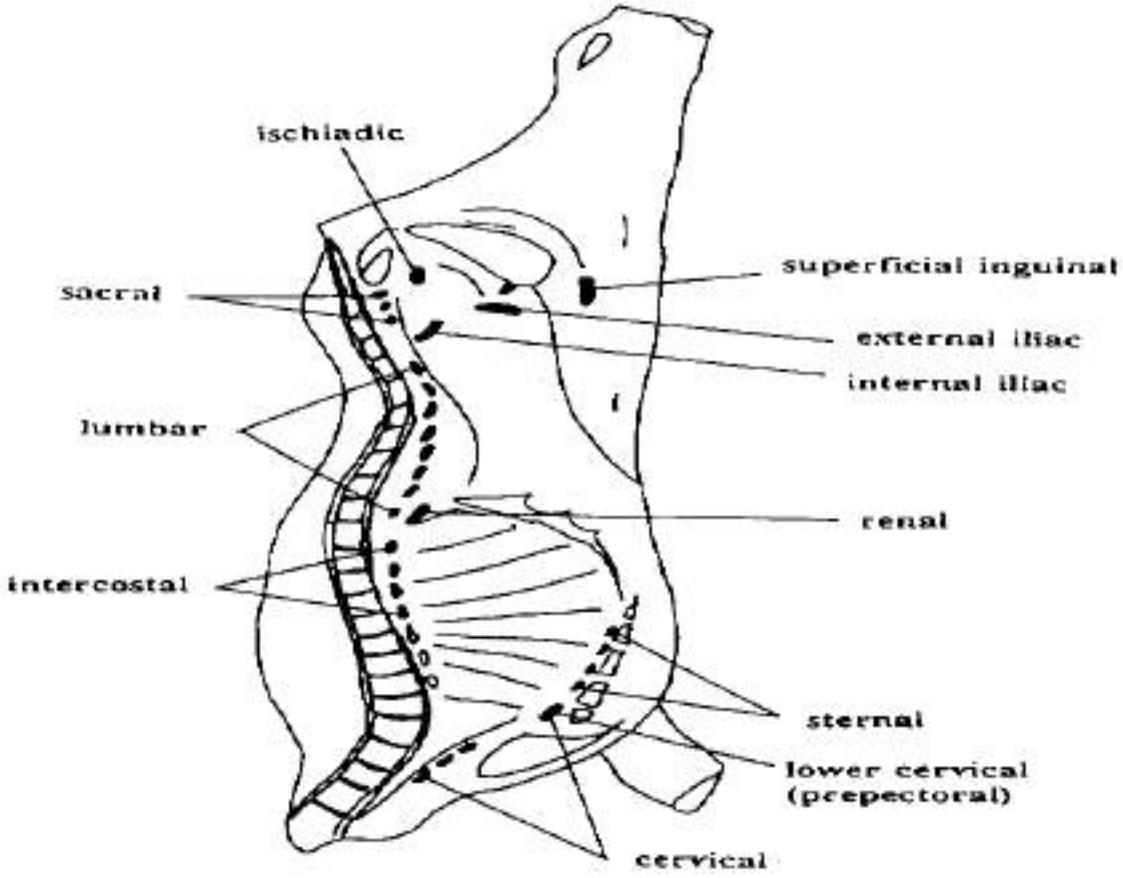

Fig. 2: Medial view of carcass with relevant lymph nodes

When inspecting the hindquarter, the inspector should 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.

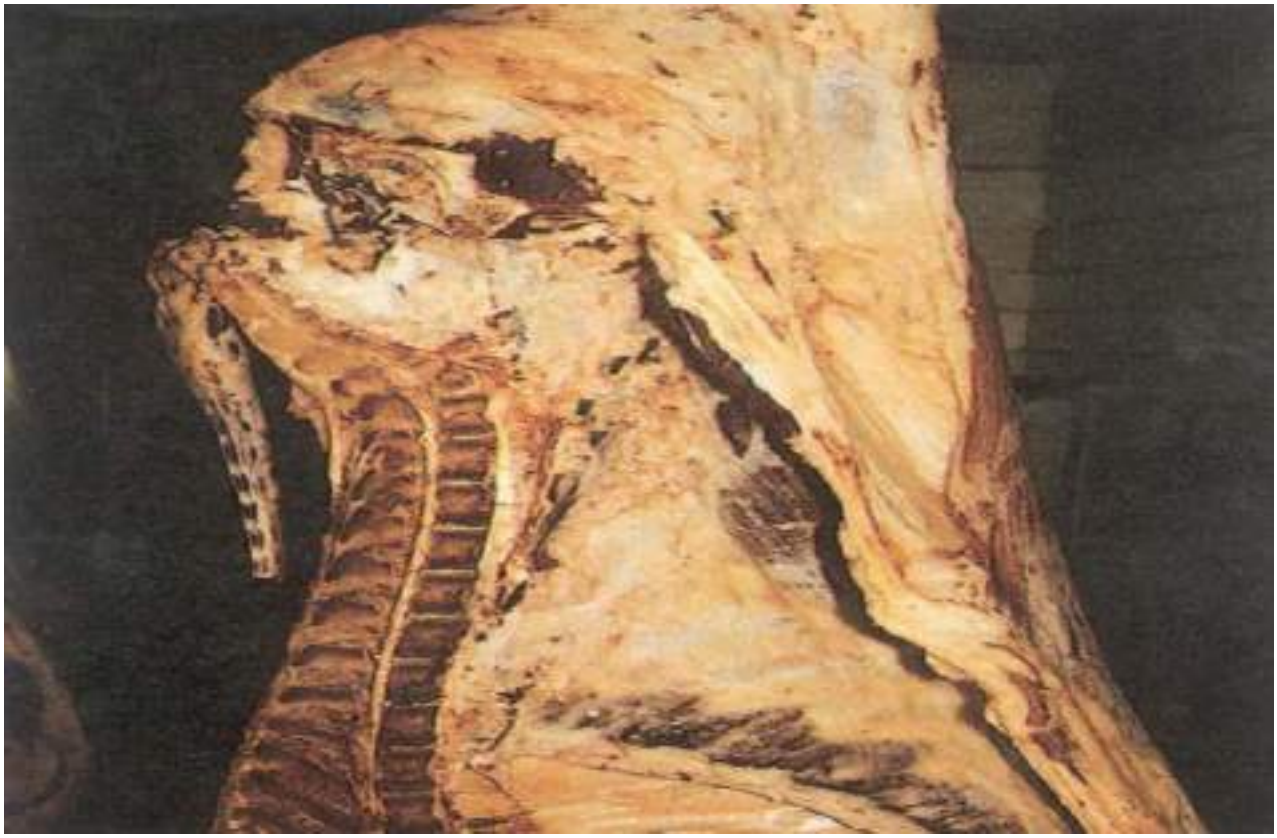

Fig. 3: Medial view of the hind quarter. Superficial inguinal, internal and external iliac and lumbar lymph nodes are palpated and incised in systemic or generalized disease.

When inspecting the forequarter, the inspector should 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 should be inspected on carcasses which have been split.

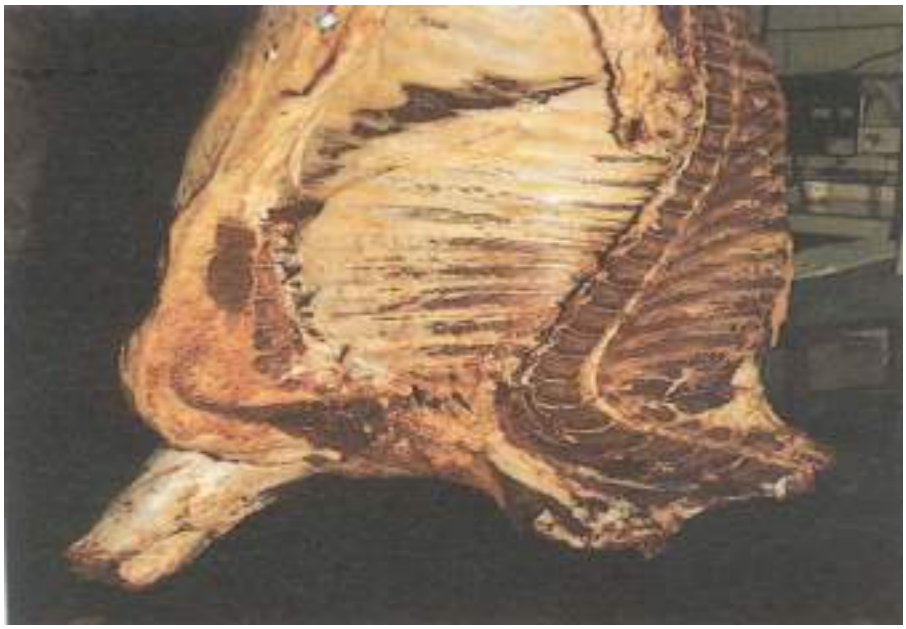

Fig. 4: Medial view of the fore quarter with intercostal, suprasternal, presternal and prepectoral lymph nodes. Presternal and prepectoral lymph nodes are incised.

4.1.2 Heads

- The head should be inspected before the carcass has been inspected in order to facilitate the operations. When inspecting the head, the inspector should inspect bilaterally.
- The inspection should 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 should 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 should be palpated to detect abscesses 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 right through the nodes is considered sufficient.

- ❖ The tonsils should be removed after inspection as part of the slaughtering process and condemned.

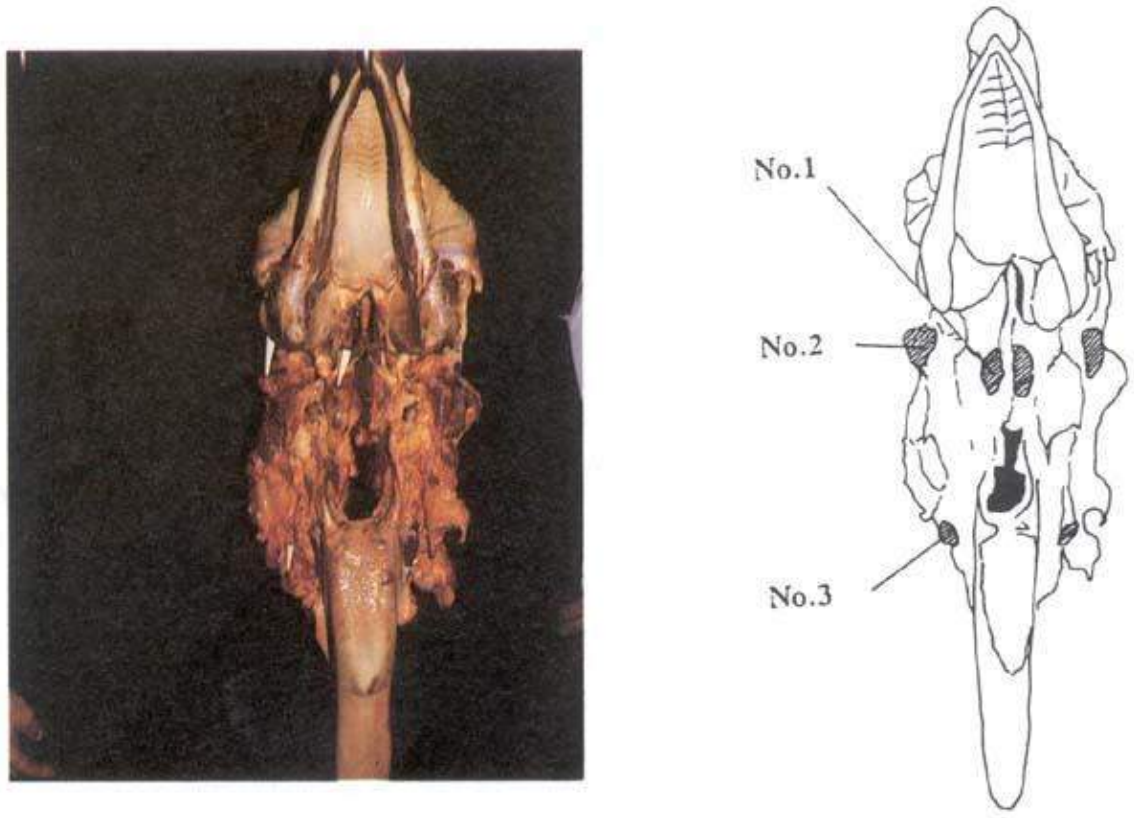

Fig. 5: Cattle head inspection. 1.Retropharyngeal, 2. parotid and 3. submaxillary lymph nodes

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 should be incised and examined. The trachea may be inspected by a lengthwise incision and the oesophagus be observed.
- The liver should receive a visual inspection and be thoroughly palpated. The hepatic lymph nodes should 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) should be visually inspected.

- In order to detect parasitic lesions (e.g. Cysticercus bovis), the cut surface of the heart musculature of all cattle should 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 incisions in the heart musculature.
- Extra incisions of the heart may be performed when deemed necessary by the 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 should 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 should 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 should 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;

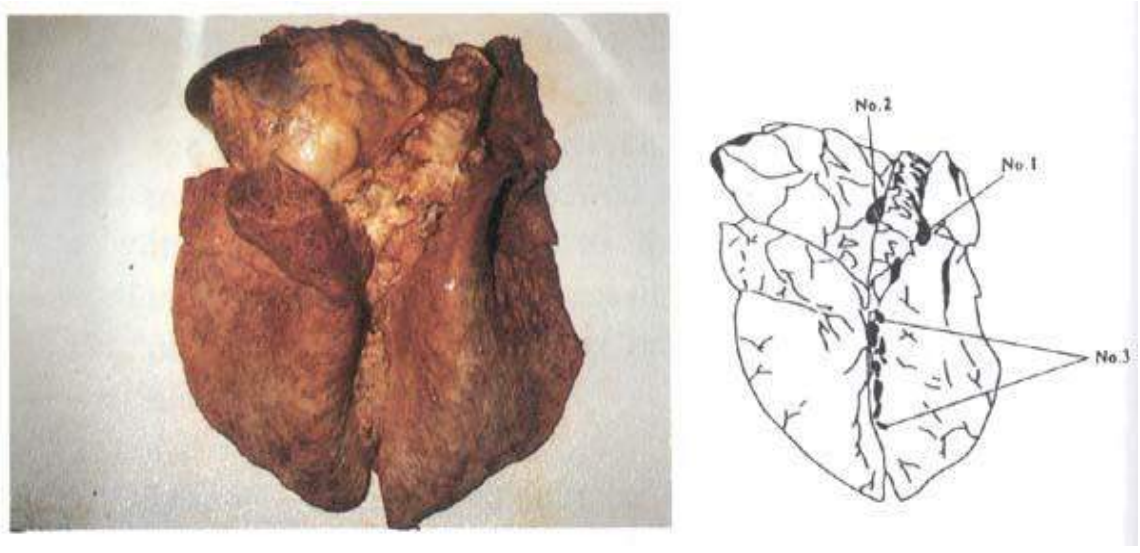

Fig. 6: Lung inspection – 1. Bronchial left 2. Bronchial right and 3. Mediastinal lymph nodes.

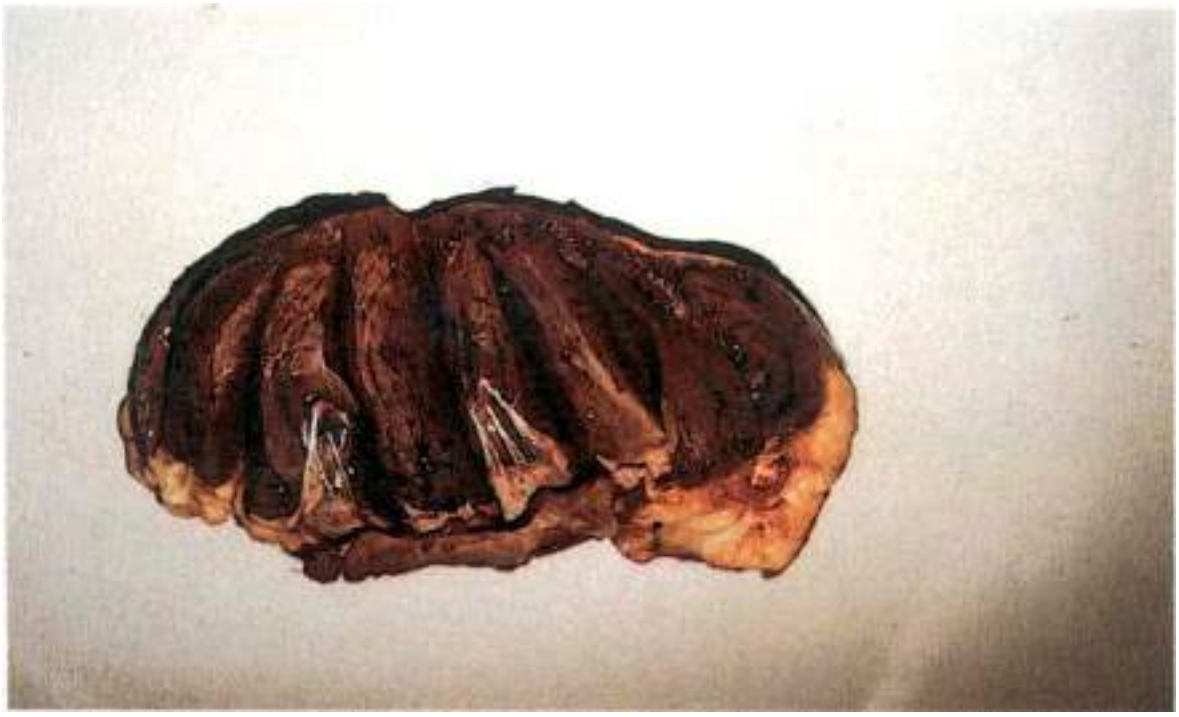

Fig. 7: Heart inspection - Lengthwise incisions from base to apex into the heart muscles

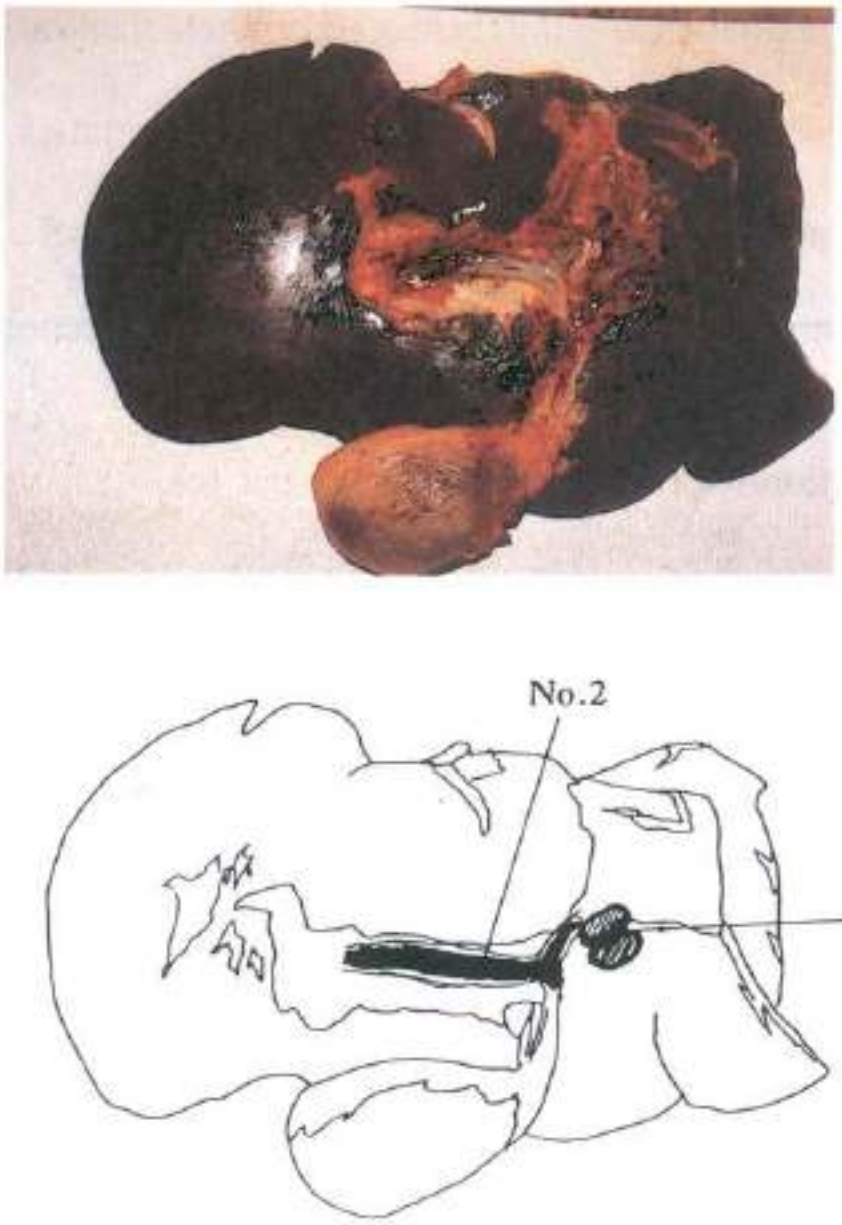

Fig. 8: Liver inspection – 1. Incised portal (hepatic) lymph nodes and 2. opened large bile duct



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 inspector should inspect a carcass by means of observation, palpation, smell and, where necessary incision, and should 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 inspector should 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 inspector should inspect bilaterally:

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

4.2.2 Heads

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

4.3.3 Viscera

When inspecting the viscera, the inspector should 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 following steps should be followed in determining whether a meat product is edible or not:

- First, 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 grounds to warrant its condemnation.

- Second, determine the distribution (i.e. localized versus systemic) and severity of the deviation.

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 inspector should hold the carcass or it's 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 toxaemia following pyometra.

Generalized lesions usually require more severe judgement than localized lesions. The 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 should 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 should 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 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 the 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 the 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 the inspector, or of another person who is accountable to the 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;

The following should be the general criteria and principles of implementation for the categories of post-mortem judgement:

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;
- 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 should 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.

6.1.6 Retention of meat for further inspection

Meat should be retained when the 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.

6.2 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 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 specified risk materials,

- shows soiling, faecal or other contamination
- in the opinion of the meat inspector, 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

6.3 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.

7. Meat inspection judgments on general pathological conditions

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.

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 judgement: 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), cattle carcasses are *condemned*. Sheep and goat carcasses require *total condemnation*. *Heat treatment* may be recommended in some areas for these species due to economic reasons. Affected part of the carcass, udder, genital organs and corresponding lymph nodes must be *condemned*.

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 exhibits generalized lesions. Otherwise, remove and condemn affected parts.

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. 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.

Septicemia

Septicemia is a morbid condition caused by the presence of pathogenic bacteria and their associated toxins in the blood. The evidence of septicemia is determined by the antemortem and postmortem findings.

Antemortem:

- 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.

Postmortem:

- 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.

Judgement: One or more lesions may be absent. However, if one significant lesion such as generalized acute lymphadenitis is present, the carcass should be condemned.

Toxaemia

Toxaemia is the presence and rapid proliferation 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.

Ante-mortem:

- 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 toxaemia 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 toxaemia 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.

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.

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).

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.

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 and report 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

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.

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.

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.

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.

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. Otherwise, remove and condemn the affected parts.

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.

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).

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.

B. 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.

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 discoloration 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.

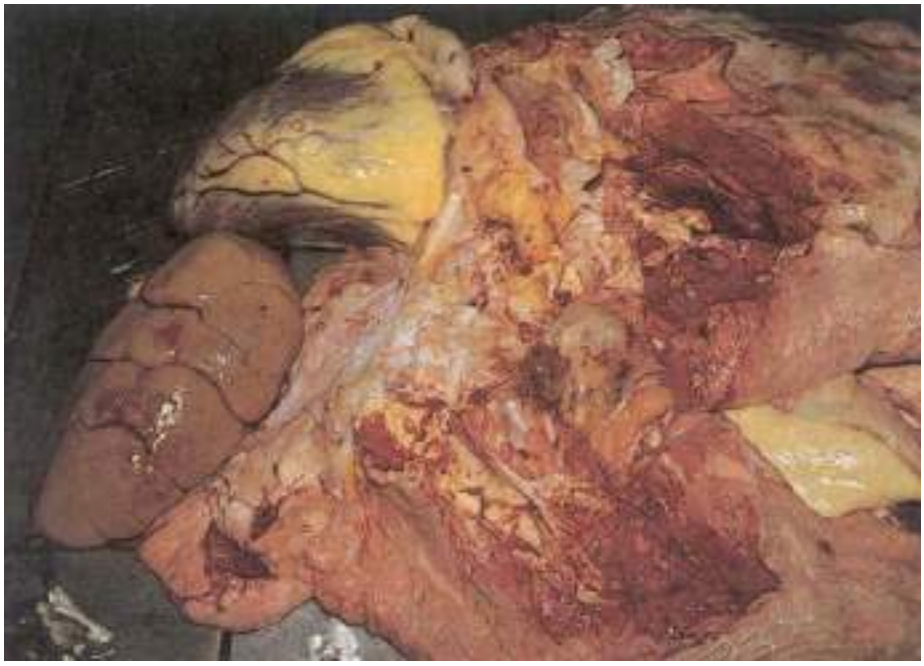

Fig. 12: Jaundice of a cow. Note yellow discoloration of body fat, lungs, heart and kidneys.

Judgement: Condemn the carcass when the carcass shows severe discoloration (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. Otherwise, in cases of slight discolouration, 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.

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.

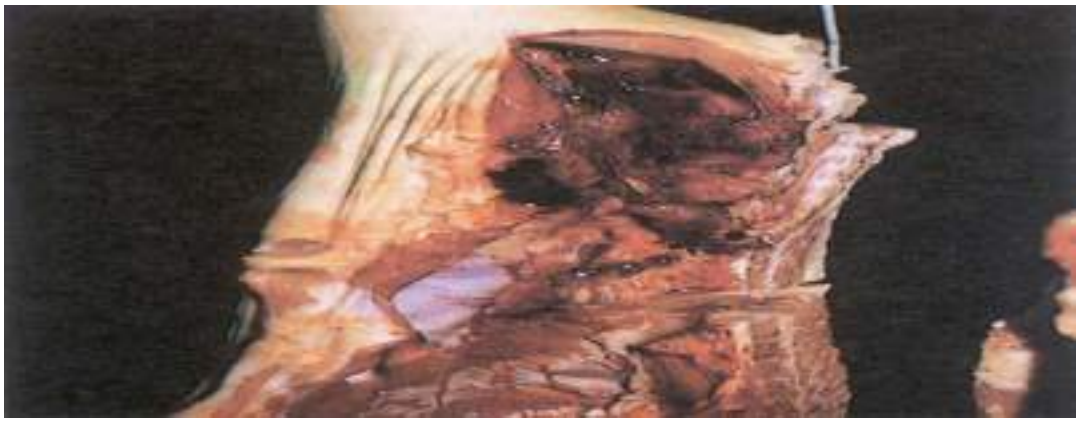

Fig. 13: Muscle haemorrhage

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 associated with septicemia is condemned.



Fig. 14: Haematoma of the bovine spleen.

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. 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. 15: Extensive bruises of a beef carcass.

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

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 toxaemia 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 the abscess is 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. 16: Abscesses in the spleen of a cow.

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 and should be differentiated from thinness.

Antemortem: Weakness; poor condition; wrinkled, dry leathery skin; rough hair coat; prominent bones and sunken eyes.

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

Postmortem: 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; serous atrophy of fat in the carcass and organs especially the pericardial and renal fat; fat is watery, tranluscent 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 and edema and anaemia may develop due to starvation and malnutrition due to parasite infestations.

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 should be condemned if emaciation is due to chronic infectious disease.

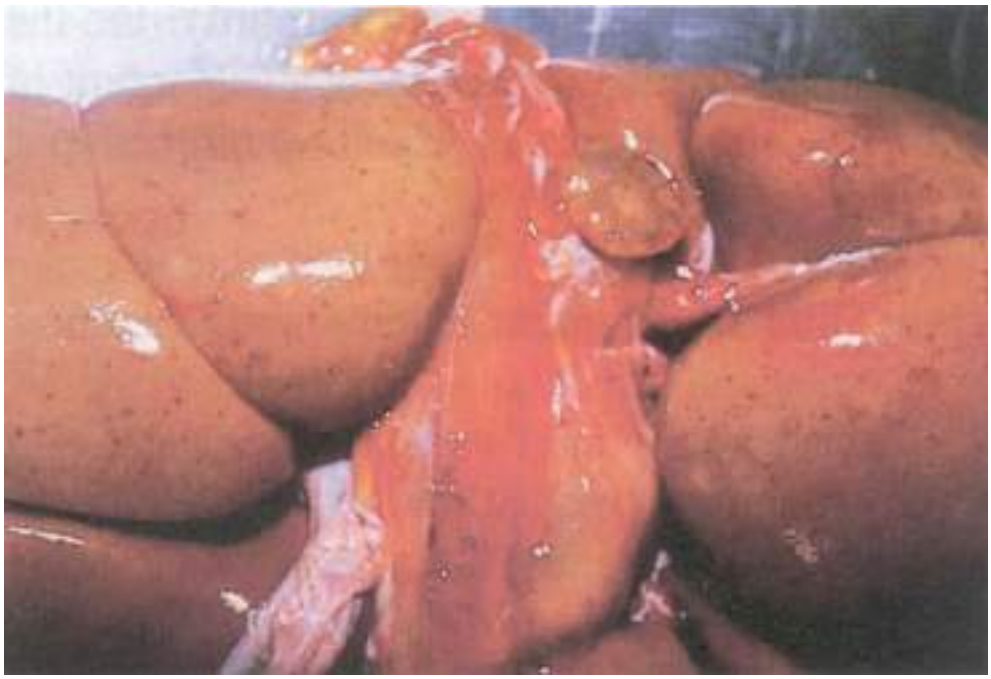

Fig. 17: Serous atrophy of renal fat

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: In localized edema remove the affected area and approve the carcass. Edema associated with diseased conditions such as traumatic pericarditis or septicemia

requires condemnation. Edema observed in the mesentery is commonly related to circulation 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.18: Abdominal edema caused by liver disease.

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: 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. 19: Interstitial emphysema in cattle lungs

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 if 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 circumscribed benign tumours is approved. Carcass affected with metastatic neoplasms or multiple benign tumours in different organs require condemnation of the carcass.

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.

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 contains 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 need to be examined and incised, as necessary, to help determine which affected parts need to be removed.

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 of the sites exposed by incision into the rounds and forelimbs. Otherwise, carcasses considered slightly infested should be trimmed in order to remove and condemn visible cysts and treated with one of the following methods in accordance with the relevant 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.

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.

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.

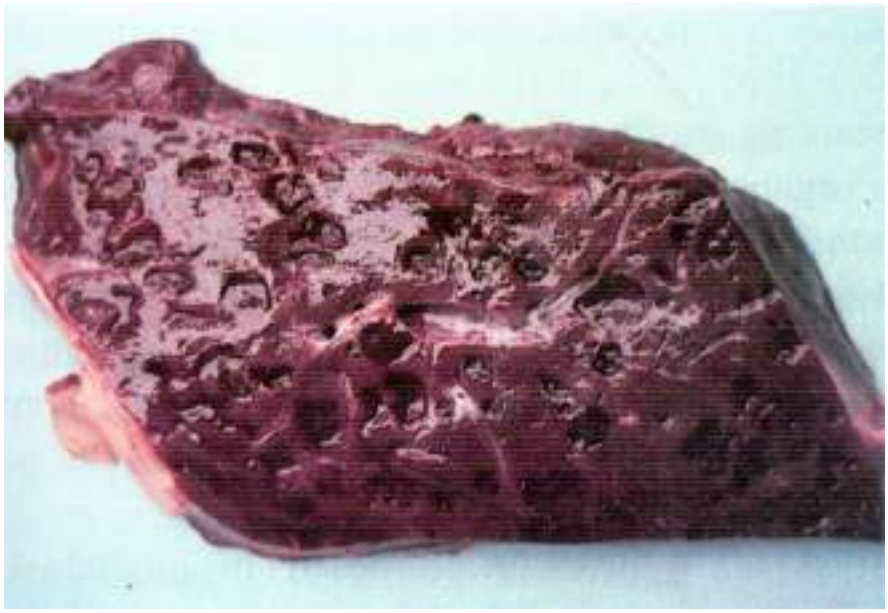

Fig. 20: Bovine liver affected with telangiectasis

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. 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 should 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. In case of ketosis, follow these general principles.

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 should no longer carry any lingering odour.

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. This meat will most likely be "inferior" in terms of quality. Accordingly, affected carcasses should be used in processed meat products or, alternatively, rejected.

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.

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. 21: 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 for further evaluation.

Judgement: Discard the carcass when 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 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 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 used to mark any carcass or meat should be constructed of a non-toxic, non-corrosive material and should be so constructed as to be readily cleanable.
- The stamps should contain the abattoir registration number; and the wording **"Inspected and Passed"** should be written in Amharic and English languages in city administrations and regional states that may use Amharic as their official language. But in those regions in which the official regional language is other than Amharic, the wording **"Inspected and Passed"** should be written in Amharic and the respective official language the regional state in which the abattoir is located.
- 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.
- 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.
- Brands and stamps used to apply the marks of inspection should be held under the control of an inspector and used only under an inspector's supervision and should be kept clean while in use.
- 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 abattoir staff under the direct supervision of the inspector and inspector veterinarian.
- The use of the meat inspection legend is only permitted in connection with edible meat products slaughtered in licensed domestic abattoirs 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 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).
- The stamp of approval should never be used at an abattoir where the abattoir number differs from the number on the stamp.
- Stamps and marking equipment should be cleaned and sterilized regularly during use. All marking equipment should 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 inspector.

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 domestic abattoir. The following guidelines should be applied:

- When a carcass is condemned the inspector or inspector veterinarian should put a "Condemned" mark on its outer surface to make identification obvious.
- 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.
- There should be proper segregation of condemned and inedible products, but if mixing of condemned and inedible meat products occur, all inedible meat products should 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 or 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

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 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 or 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 inspector 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.
- 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 inspections should be recorded by the inspector in charge.
- If inspections reveal the presence of any disease or condition that might affect public or animal health, or compromise animal welfare, the inspector should inform the abattoir operator to make urgent interventions.
- The results of inspections should be compiled and sent to the respective regional and/or federal authorities regularly through established reporting channels to be included in the relevant databases.
- When the inspector, suspects the presence of a notifiable disease including zoonoses, he/she should immediately notify the relevant regional and federal authorities of the Ministry of Agriculture responsible for animal disease control while taking all necessary measures and precautions to prevent the possible spread of the infectious agent.

13. References

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