

# THE MAJOR DIAGNOSIS AND THEIR JUDGEMENT AT POULTRY INSPECTION

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## SUMMARY

*Key principles of poultry post mortem inspection are to take into account ante mortem inspection results, the carcasses and accompanying offal are to be subjected without delay after slaughter to post mortem inspection, all external surfaces are to be viewed, and minimal handling of the carcass and offal should take place. Precautions must be taken to ensure that contamination of the meat by actions such as palpation, cutting or incision is kept to a minimum, and inspection staff should pay particular attention to the detection of zoonotic and notifiable diseases.*

**Key words:** poultry, post mortem inspection, judgement.

## GENERAL REQUIREMENTS

The inspector is required to inspect the external surface of all carcasses and accompanying offal. Inspection of the whole carcasses of birds is recommended so that diseased birds can be removed early in the process and this should be included in Good manufacturing practices. Correlated carcasses and offal either attached or detached are inspected. Removal of inedible viscera (guts, gall bladder) prior evisceration (EV) post mortem inspection is allowed unless intended for identification as a Category 3 animal by-product, whereby it must be treated in accordance with (EC) No. 1774/2002.

Delayed evisceration of poultry is possible in accordance with EC 853/2004 Annex III, Section II, Chapter IV, 7 © which states “viscera or parts of viscera remaining in the carcass, except for the kidney, must be removed entirely, if possible, and as soon as possible, unless otherwise authorised by the competent authority”. The official veterinarian (OV) may authorise delayed evisceration if the food business operator (FBO) requests it. *Post mortem* inspection

must include inspection of certificates on farm production.

Poultry feet for human consumption include inspection of harvested feet. Feet that are not separately identifiable e.g. feet belonging to carcasses rejected at evisceration must not be released for human consumption.

General contamination represents meat, carcasses and offal affected with faecal material, bile, grease or disinfectants and should be considered unfit for human consumption. A hygienic trimming system must be in place if the FBO decides to trim contaminated carcasses. Any part of the carcass or offal affected with bile staining should be trimmed. Where plucking machines break the skin of poultry the underlying musculature should be considered as contaminated and trimmed from the carcass. The FBO should have a system in place to deal with carcasses or offal that fall on the floor. This could include the provision of a meat tray off the floor at “weak point” in the line and trimming of affected parts. The OV/MHI (meat hygiene inspector) should verify that the FBO has a system in place to ensure meat contaminated after post mortem inspection is not released for human inspection.

Guideline on trimming poultry – rectification resulting from post mortem findings must be supervised under the responsibility of OV/MHI. Plant operatives should carry out removal of unfit meat identified at post mortem inspection. Identification of unfit meat for trimming must not be delegated to untrained individuals. Removal of more significant quantities of meat is usually impracticable with high-speed lines, and in these cases an adjacent trimming area should be provided. Trimming of minor blemishes

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as bruises is at the discretion of the FBO, preferably completed following evisceration, to minimise the risk of contamination of exposed meat. Trimming of carcasses may be delayed until after chilling, providing that: there is no risk of contamination to other carcasses (faecal contamination has to be removed before chilling) and arrangements are in place for the trimming to be done under the supervision of MHI at regular time. The OV and FBO should agree recognised methods (marking and identification of parts to be trimmed) to ensure that plant staff effectively completes trimming.

## JUDGEMENTS AT POULTRY POST MORTEM INSPECTION

### Technological conditions

The professional judgement of the OV should be used in assessing whether birds are fit for human consumption or whether rectification is required. The following topics give advice on judgements to be made when conditions are identified at post mortem inspection. Where the OV considers the entire carcase/offal is not fit for human consumption, the affected parts of the carcase may be removed. This is to be carried out by plant operatives.

Birds that **die before slaughter** should not be presented for processing but rejected onto the shackle line. If they are processed inadvertently the following signs may be observed: dark colour due to poor bleeding (since the bird was dead when bled) and engorged blood vessels. These carcasses must be considered unfit for human consumption. The following conditions can indicate poor welfare either on farm, during transport, or at the slaughterhouse: broken bones, bruising, badly bled carcasses, breast blisters.

**Badly bled** carcasses indicate that the skin of carcasses, which are insufficiently bled, may be cherry red. The colouration may extend over all or part of the carcase and may be most obvious in the neck region. Badly bled carcasses might be the result of insufficient sticking practices or due to inefficient/absent severance of at least one carotid artery, with birds entering alive into the scalding tank. The OV should monitor badly bled rejections, as they are result of a possible breach of the welfare regulations.

Judgement means that carcasses and offal are unfit for human consumption.

**Over-scald** can occur in the scald tank when carcasses remain there too long. Where over-scalding of the carcasses is suspect, a cut should be made into the pectoral muscle. If the flesh has a cooked appearance to a depth of more than 2 mm, it should be considered as over-scalded. Judgement means that, except in the case of large turkeys, where salvage of non-scalded meat may be possible after trimming, over-scalded carcasses and offal should be considered unfit.

Extensive **bruising** or *ecchymosis* renders the whole carcase unfit. When bruising is significant but localised the carcase may be passed following removal by trimming of all affected parts. When trimming, the extension of blood between muscles, bones, etc. should be considered and care must be taken to ensure that all affected parts are removed. Provided that the carcase is otherwise fit, superficial, discreet or uncomplicated bruises, which are not a food safety tissue may be trimmed at the FBO discretion. Judgement should be made on the extent and nature of the bruising and how practical is to carry out trimming. The OV needs to consider that bruises, fractures, breast blisters or leg injuries might be the result of a welfare problem.

**Fractures** may be sustained ante mortem, when they are normally associated with haemorrhage, or *post mortem* by machine damage, when haemorrhage is absent. If broken bones are associated with haemorrhage, judgement means that affected parts should be trimmed from the carcase. Where a limb is affected the cut should normally be made at a joint, which ensures that all the affected tissues are removed. Where only one side of the pelvis is affected, the backbone should be split from the tail forward until the affected tissues can be removed by making second cut laterally from the backbone. If the whole pelvis is affected, the posterior of the carcase should be removed by cutting through the vertebral column anterior to the pelvis. Broken bone without haemorrhage/broken bone with ruptured skin usually represents lesions, which are sustained in the plucking machines and as the skin has broken, the affected bone and associated muscle should be removed. This usually means making the same cuts as in case

of broken bones associated with haemorrhage. Broken bone without haemorrhage / broken bones with no ruptured skin means that the assessment of this lesion usually depends on the seriousness of the fracture. If there are several pieces of broken bone, then trimming should be carried out as in the above case. If there is a straight break of one bone this can usually be left as fit for human consumption.

Infected, haemorrhagic or enlarged **breast blisters** should be trimmed. The affected tissue may be adherent to the keel bone and when this happens a part of the bone will have to be removed together with the affected tissues. Trimming of small, uninfected, non-haemorrhagic blisters may be deferred until after chilling, when some of them will disappear. The OV needs to consider that breast blisters might be the result of poor husbandry on the farm. If appropriate, the local DVM should be informed.

#### **Infectious and nutrition conditions**

There are a number of lesions associated with **joints**. *Mycoplasma synoviae* infection may affect the synovial membranes associated with joints, tendon sheaths and bursae. At first thickening and oedema are seen, but later the exudate is creamy, and in older birds may be caseous and orange. In chickens the lesions also occur commonly in the respiratory tract, but this is rare in turkeys. Judgement means, if infection is generalised, both the carcass and offal should be considered unfit. Localised lesions require trimming. Ruptured gastrocnemius (green leg disease) may be associated with viral arthritis or staphylococcal infection. The affected parts must be removed. Localised staphylococcal infections of the foot (bumble foot) may become generalised and affect the joints and synovial bursae, including the sternal bursa. Remove the affected tissues if localised. If generalised, the carcass and offal should be rejected. Plantar pododermatitis is the ulceration and necrosis of the footpad through infection by various bacteria. It occurs in broilers and meat turkeys associated with poor litter conditions. It may result in black scabs developing on the hocks (hock burn) and an enlargement of sternal bursa (breast blister). Scabbing or pressure necrosis of the sternal bursa may also be seen. Removal of the affected tissues, if localised, is required. If generalised, the carcass and offal should be rejected. This condition is a welfare problem.

It is difficult to distinguish between benign and malignant **tumours** in the slaughterhouse, however, in poultry are commonly malignant and may affect any part of the body. They can develop in case of Marek's disease and Avian leucosis complex. If tumours are malignant or multiple, rejection of the carcass and offal is required. Individual benign tumours are removed together with the surrounding tissue.

**Marek's disease** may be seen in one or more forms e.g. the ocular, skin, visceral or nervous forms. Visceral lesions can affect any organ but are most commonly seen in ovary, testicles, heart, liver, proventriculus and kidneys. Carcasses and offal should be considered unfit.

**Avian leucosis complex** has four forms. In all cases the carcass and offal should be considered unfit. Lymphoid leucosis indicates tumours, almost invariably involving the liver, spleen and cloacal bursa. The tumours are soft, smooth, and glistening, and the cut surface appears slightly greyish to creamy white. The growth may be nodular or diffuse and in the latter case the liver can be extremely large. Myeloid leucosis presents lesions that can be diffuse or nodular. The diffuse form usually affects the liver, spleen, and kidneys with greyish infiltration. The organs can have a mottled or granular appearance. Erythroleucosis is characterised by lesion seen as diffuse enlargement of the liver and spleen and, to a lesser extent, the kidneys. The organs are usually cherry red to dark mahogany and are soft and friable. The bone marrow is very soft or watery, dark blood red or cherry red, and haemorrhages may be present. Osteopetrosis is manifested in a thickening of the long bones occurring first in the diaphyses. On palpation and inspection the tibio-tarsal bone is thicker and smoother than normal.

**Fatty liver** – haemorrhagic syndrome is considered to be of dietary origin. The liver is enlarged, fatty, friable and often associated with subcapsular haemorrhages, which may be long – standing or massive with rupture of the liver. If carcass and offal are otherwise fit, the rejection of the liver is usually sufficient.

**Liver granulomas** are fairly common in turkeys. They are usually firmly embedded in the liver and consist of light coloured, spheroid masses, having a hard, caseous core. They may be numerous, up

to twenty or more and either non-encapsulated or surrounded by a dense fibrous capsule. If carcass and offal are otherwise fit, the rejection of the liver is usually sufficient.

**Air sacculitis** is used to embrace several diseases, which cannot be distinguished accurately at the post mortem inspection in the slaughterhouse. These diseases include: chronic respiratory disease (CRD) in chickens and turkeys, *Escherichia coli* and *Salmonella septicaemia* in all species, and *Pasteurella septicaemia* in ducks. Lesions may be seen in the air sacs, pericardium, peritoneum, liver, oviduct and intra-orbital sinuses. Air sacs may be affected by a scarcely perceptible cloudiness, may contain catarrhal exudates or in the later stages of disease they may be much thickened and contain caseous exudates. Heart and liver may be congested and affected with a fibrinous and fibrino-purulent pericarditis/perihepatitis. A grossly distended pericardial sac containing mucopurulent exudates is often seen in cases of *Salmonella enteritidis* septicaemia. Oviduct may be affected by salpingitis, characterised by an inactive oviduct filled with caseous exudates. This condition is particularly common in ducks, but may also be seen in broilers. It should not be confused with salpingitis of laying hens. The guide for the assessment of carcasses is the following: mild air sacculitis (no accumulation of exudates) means removing of air sacs and pass the carcass. Air sacculitis with catarrhal exudates (small amount) or air sacculitis with caseous exudates means removing of affected air sacs and if clavicular air sacs are affected, the humeral deep pectoral muscles and neck are unfit. If abdominal air sacs are affected, remove also the kidneys. If pericarditis and perihepatitis is present, total rejection is recommended.

Birds suffering from acute fowl cholera (*Pasteurellosis*) will exhibit signs on post mortem typical of septicaemic carcasses. Petechial and ecchymotic haemorrhages are frequently found and are widely distributed. The liver may be swollen and contain multiple small focal areas of necrosis. The lungs of turkeys are affected more severely than those of chickens, and pneumonia is common. The chronic infection is characterised by localised exudative, purulent or necrotic lesions, which may affect the respiratory tract, lungs, hock joints, sternal bursa, footpads, peritoneal cavity and oviduct. Occasion-

ally, the only lesion seen is an abscess in the wattle. Judgement means that localised chronic lesions may be trimmed. In cases of acute or generalised infection, carcasses and offal must be considered unfit.

Infection by *Aspergillus* species may be seen in all poultry species and severe outbreaks are often associated with faulty flock management. The respiratory system is most commonly affected with yellow or white nodular plaques, which may coalesce. Green, fluctuating bodies will be present in more generalised forms of the infection, occasionally resulting in septicaemia or emaciation. Mixed infections are common and associated peritonitis may be seen. Judgement in cases of generalised air sacculitis, associated septicaemia or emaciation means that carcass and offal should be considered unfit. Where a few plaques affect the carcass or caseous casts in the air sacs, the viscera including the lungs should be considered unfit and salvage of the carcass/carcass meat is carried out similarly to that indicated for air sacculitis.

**Avian tuberculosis** usually affects older birds with lesions seen most commonly in the liver, kidneys, intestinal tract and bone marrow. The lesions are irregularly shaped greyish – white nodules varying in size from that of a pinhead to large masses. The tubercles can be shelled out from the surrounding tissue. When cut through, the nodules are firm with a dry, cheesy appearance. If the long bones are split lengthwise, small and spherical nodules may be found in the bone marrow. Confirmation can be made by microscopic examination for the causal organism. Judgement means that carcasses and offal must be considered unfit.

**Erysipelas** is primarily a disease of turkeys and the affected birds are listless with, rarely, a swelling of the snood. Mature domestic fowl may also be affected. Where possible, the affected birds should be rejected by the pre-slaughter health inspection, but if they inadvertently reach the post mortem inspection station they will show signs typical of septicaemia. The liver is often enlarged, congested, and friable and sometimes light brown in colour. The intestines are commonly congested and there may be catarrhal enteritis. A valvular endocarditis may be present in more chronic cases. Judgement means that carcasses and offal must be considered unfit.

The deposition of black melanin pigment (**melano-**

sis) in abnormal sites may be seen in all species. Carcasses with small deposits of melanin in the skin may be passed. Otherwise, it is rare for such infiltrations to be localised, and deposits of melanin in any other sites justify classification of the carcass and offal as unfit.

**Green muscle disease** (Oregon disease) is an ischaemic necrosis of the deep pectoral (supracoracoid) muscle, and it is classically described in turkey breeders but may be seen less frequently in fattening turkeys, broiler breeders and young poultry. In turkeys, it appears to occur more often in females than in males. The affected breast may appear slightly concave and the lesion may be unilateral or bilateral. Deep within the affected muscle will be found the characteristic green, necrotic or fibrous lesions. Judgement means the affected area is unfit; it must be trimmed and rejected. Any non-affected part of the breast muscle could be passed as fit for human consumption.

**Reproduction disorders** in laying poultry are various. Impaction of the oviduct only, with no associated systemic effects, represents rejection of oviduct and passing of carcass and offal. Salpingitis may be associated with large quantities of thickened yolk material in the oviduct. The condition may also be associated with *Escherichia coli* infection in immature chickens and ducks. Where the normal condition is associated with abnormal smell or systemic effects, the carcass and offal should be considered unfit. Egg peritonitis occurs when free egg yolk in the peritoneal cavity becomes infected with *Escherichia coli* or other organisms. This condition could be confused with the presence of free yolk in the peritoneal cavity, which may occur in normal healthy birds and is not the cause for rejection. Egg peritonitis usually merits total rejection of the carcass, but in chronic cases where there is no systemic reaction or abnormal smell, the breast muscle, legs and wings can be salvaged, providing the knife making the salvage cuts does not enter the abdominal cavity.

**Poultry feet** may be affected by the following conditions that makes them unfit for human consumption. Tibial dischondroplasia when post mortem lesions are localised on the plug of cartilage in the proximal end of tibia, distal tibia and proximal metatarsus. Bumble foot (*Staphylococcal arthritis*) is

characterised by tenosynovitis, most common in the plantar area of the foot or just above the hock joint. This may progress to abscess formation in these areas. The infected joints may have clear exudates with fibrin clots.

## CONCLUSION

Key principles of post mortem inspection are to take into account ante mortem inspection results, the carcasses and accompanying offal are to be subjected without delay after slaughter to post mortem inspection, all external surfaces are to be viewed, and minimal handling of the carcass and offal should take place. Precautions must be taken to ensure that contamination of the meat by actions such as palpation, cutting or incision is kept to a minimum, and inspection staff should pay particular attention to the detection of zoonotic and notifiable diseases. The speed of the slaughter line and the number of inspection staff present are to allow proper inspection to be completed and records maintained.

## SAŽETAK VAŽNIJE DIJAGNOZE I NJIHOVA PROCJENA PRI PREGLEDU PERADI

*Pri pregledu mesa i organa peradi nakon klanja u obzir se mora uzeti nalaz pregleda životinja prije klanja. Pregled trupova i organa na liniji klanja obavlja se bez odgode neposredno nakon klanja pri čemu treba postupke palpacije i zasijecanja mesa svesti na najmanju mjeru radi smanjenja stupnja kontaminacije. U radu je opisan postupak klaoničke obrade i utjecaj tehnoloških propusta na higijensku ispravnost mesa peradi. Navedeni su principi prosuđivanja ispravnosti mesa kod nalaza organskih i zaraznih bolesti peradi.*

*Ključne riječi: perad, pregled nakon klanja, procjena.*

## REFERENCES

**COMMISSION REGULATION** (EC) No 853/2004 of the European Parliament and of the Council of 29 April 2004 laying down specific hygiene rules for food of animal origin

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**The Meat Hygiene Service operations manual** for official controls, May 2007

Received / Prispjelo: 17.4.2007.

Accepted / Prihvaćeno: 27.5.2007. ■