



PARTNERS IN
PROGRESS

From Brooding to the Slaughterhouse. Challenges & Proposed Solutions

Tuesday 1 November 2022



Quality Challenges in Broiler Processing

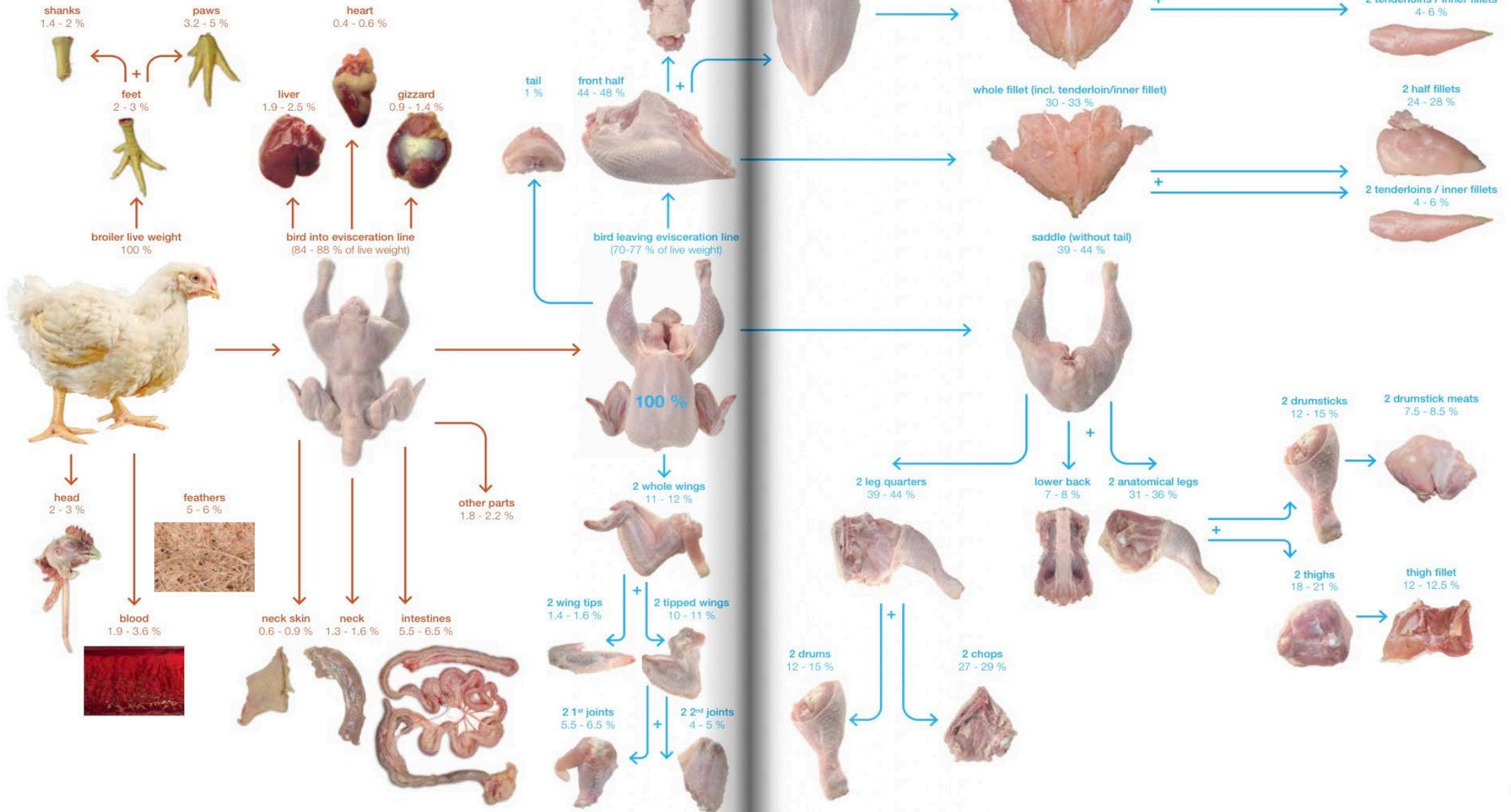
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Cutting up the Chicken

- The purpose of slaughter is to convert all the desirable qualities laid down in the bones and muscles of live birds into safe and tasty meat for consumers, and to do this without loss of quality and getting the maximum value.
- To achieve that goal, birds are slaughtered, stripped of non-edible parts and divided into cuts.

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Achieving high Yields



Quality Challenge - Hatchery

2 major factors: Bacterial + Mechanical

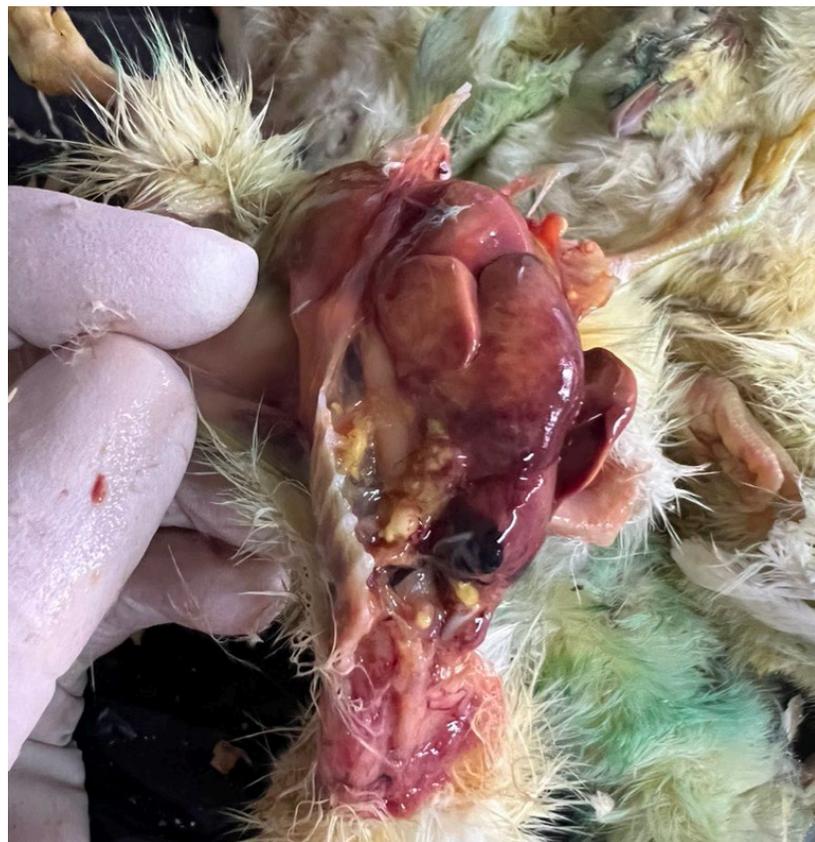
BACTERIAL

- High early mortalities – effects lingering in rest of the flock
- Added normal stresses bird face during growing period, other issues appear – e.g. leg problems, FHN, etc.

MECHANICAL

- Dehydration, navel issues (prevent chick from getting proper start to achieve optimal performance) >>>> uniformity issues as early as 1st week

Quality Challenge - Hatchery



Quality Challenge - Hatchery





Quality Challenge Hatchery

Quality Challenge – Broiler Farm

- Maximizing yield: good chick quality + sound management practices = healthy broilers.
- Poor management + sickness **cannot** maximize yield.
- GENETIC POTENTIAL FOR YIELD CAN BE REALIZED OR REDUCED BY THE QUALITY OF THE HUSBANDRY AT THE BROILER FARM!!

Quality Challenge – Broiler Farm

- **Salmonella Control:** In RSA SE and ST notifiable diseases to DALRRD (*Dept of Agriculture, Land Reform and Rural Development*) and therefore must be notified to the state veterinarian. SE is a controlled disease by DALRRD.
- **SE Monitoring:** Day old CBL of all breeder flocks / d10 cloacal swabs
- In case of positive results: Rx with enrofloxacin for 5d, withdrawal 5d, repeat cloacal swabs, MUST have negative SE results before slaughter allowed.
- **Campylobacter Control:** no specific control on farm but monitored at processing plant by retailers.

Quality Challenge – Broiler farm

Farm/Processing plant concern

1. Carcass quality – bruises and scratches
2. Feed intake + growth negatively affected
3. Plant Condemnations
4. Footpad dermatitis, breast blisters
5. Poor uniformity
6. Carcass shrinkage

Cause

1. Stocking density
2. Inadequate temperature and ventilation
3. Excessive bruising, disease, poor uniformity
4. Poor litter management, high stocking density
5. Poor brooding
6. Improper feed/water withdrawal



Quality Challenge – Broiler Farm



Quality Challenge – Broiler Farm





Quality Challenge – Broiler Farm

Quality Challenge - Catching

- Using caution during the time just prior to slaughter will reduce the downgrades and resulting loss of yield by delivering more birds into the plant free of any defects.
- The Yield (Kg of saleable meat through the processing plant) can be affected (reduced) considerably due to broken bones, scratches, bruises obtained prior to slaughter.
- Catching procedures designed and implemented to keep stress to an absolute minimum will result in higher yields from bruising, leg and wing damage, less thermal stress and/or smothering and reduced DOA.

Quality Challenge - Catching

Farm / Processing Plant Concern

1. Scratching, bruising
2. Shrinkage
3. Bruise rate of up to 25%
4. DOA

Influence of feed withdrawal on weight

50,000 broilers, 10g of feed in crop
= 500 kg feed

Feed price: € 0.37/kg >> cost € 185

Per 10 g feed there is 20 g fluid in the crop as well, so 50,000 x 30 g = 1500 kg body weight.

Return on live weight:
€ 0.87 /kg

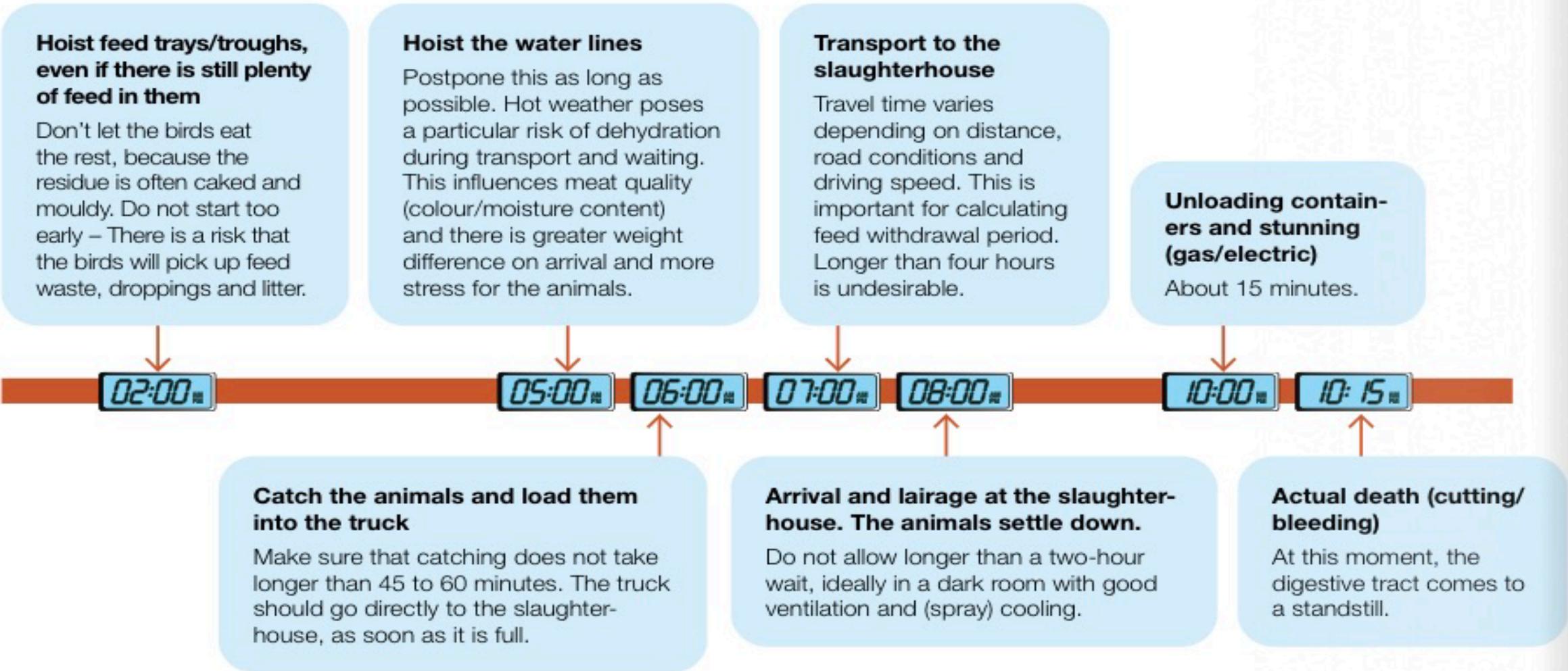
Revenues € 1305 *Quickly earned cash?!*

Cause

1. Rough activity in the house setting up for catching
2. Withdrawing feed / water before catch
3. Rough handling during catching
4. Birds overheating / exceeding density limits of the crates / vehicle

Quality Challenge - Catching

Schedule from start of feed withdrawal to actual slaughter





Quality Challenge - Catching

Quality Challenge – Transport and Holding

- Minimizing holding times and providing proper holding areas for live birds waiting to be slaughtered are necessary to reduce thermal stress and provide proper bird welfare.
- This is CRITICAL to reduce live shrink and DOA's – the 2 factors normally used to measure performance in the holding area.

Problem

1. Thermal stress / Overheating
2. Loss of yield through live shrink
3. Poor feather removal and also discoloration of meat
4. DOA

Cause

1. Improper control of temp during holding
2. Excessive holding times
3. Extreme stress of temp while waiting for slaughter
4. Thermal stress, diseased or weak birds



Quality Challenge – Transport and Holding

Quality Challenge – Unloading and Hanging

- Sets the stage for the rest of the plant operations.
- It dictates the efficiency of the kill operation and if not done properly, will cause problems and yield loss throughout the operation!

Quality Challenge – Unloading and Hanging

Processing Plant Concern

1. Bruising / Broken wings

Cause

1. Bird damage from crate damage
2. Rough unloading of crates
3. Dump system
4. Hanging area



Quality Challenge –
Unloading and Hanging



Quality Challenge – Unloading and Hanging

Quality Challenge – Unloading and Hanging



Quality Challenge – Stun and Kill

- One of the biggest areas of product loss and downgrade in all plants if not done properly.
- Regardless of method, government or religious requirements, the aim is to slaughter the bird humanely and to remove blood from the carcass.
- Doing this without damage or downgrade to the carcass is a challenge

Quality Challenge – Stun and Kill

Processing Plant Concern

1. Broken long bones / Shoulder bone damage / Dislocated wing joints
2. Hemorrhages / Blood spots in breast meat / Wing discoloration

Cause

1. Over-stun: Stunner voltage and milli-amp per bird is set too high
2. Inconsistent stun due to uneven bird sizes

Quality Challenge – Stun and Kill

Processing Plant Concern

- Mechanical problems on the line, incorrect neck slitting, etc. cause impaired bleeding.
- Hot water of the scalding tank coagulates the blood in the neck arteries and stops all further bleeding out.
- This problem is noticed often in the neck and wing areas.

Quality Challenge – Stun and Kill

- Red spots on the skin are subcutaneous blood spots, often caused by electric stunning.
- The electrical current seeks the pathway with least resistance and that is through blood vessels.



Quality Challenge – Scalding and Plucking

- This area has by far the most potential for yield loss.
- Half a degree of scald temperature can mean a huge loss or gain in yield. Heat destroys the underlying tissue and collagen.
- *Not only is the weight lost, but also the ability to retain moisture!*
- **HEAT IS THE ENEMY OF YIELD**

Quality Challenge – Scalding and Plucking

Processing Plant Concern

1. Over-scald
2. Broken wings, skin tears, mutilation, one-leg birds coming out of the plucker
3. Too many feathers left on the bird

Cause

1. Scalding temperature too high or too much dwell time in scalding
2. Plucker setting too aggressive
3. Scalding temperature too low or dwell time too short



Quality Challenge – Scalding and Plucking



Quality Challenge – Scalding and Plucking



Quality Challenge – Scalding and Plucking





Quality Challenge – Scalding and Plucking

Quality Challenge - Evisceration

- The goal is to efficiently prepare the bird for chilling while maintaining quality, wholesomeness and yield.

Quality Challenge - Evisceration

Processing Plant Concern

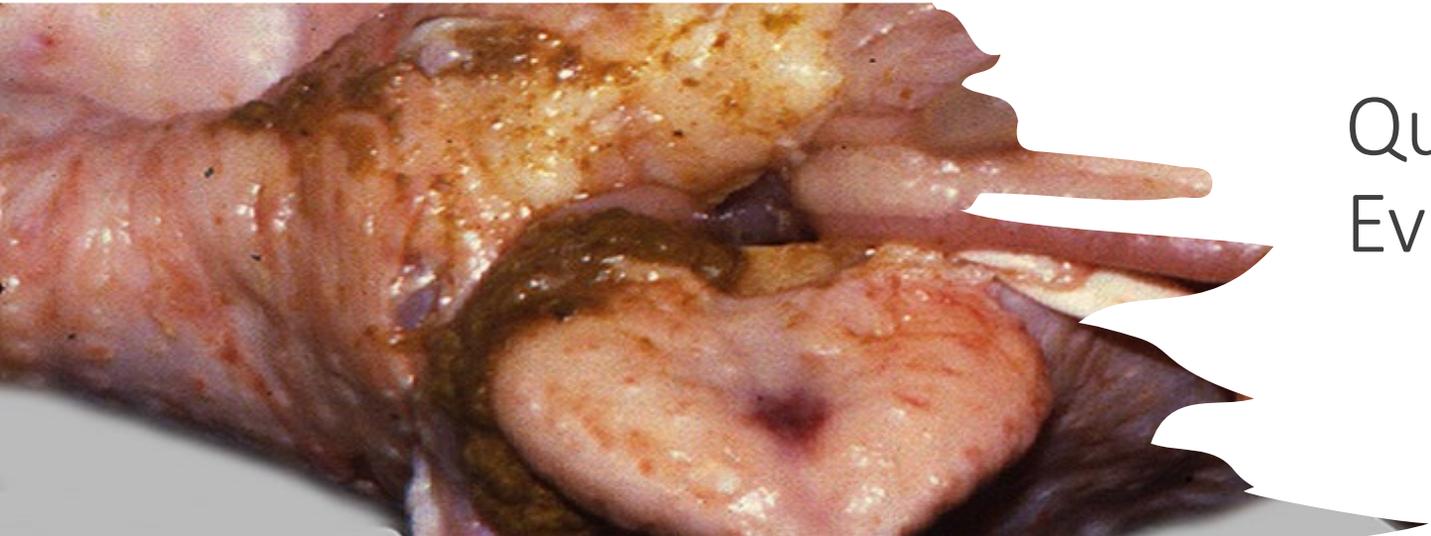
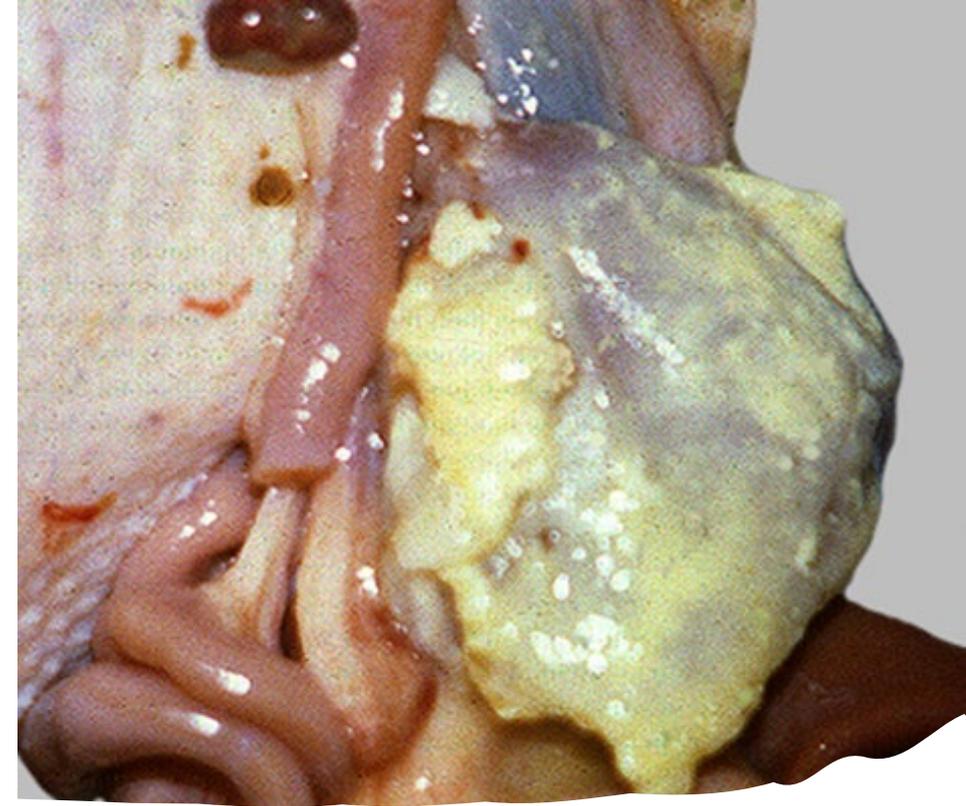
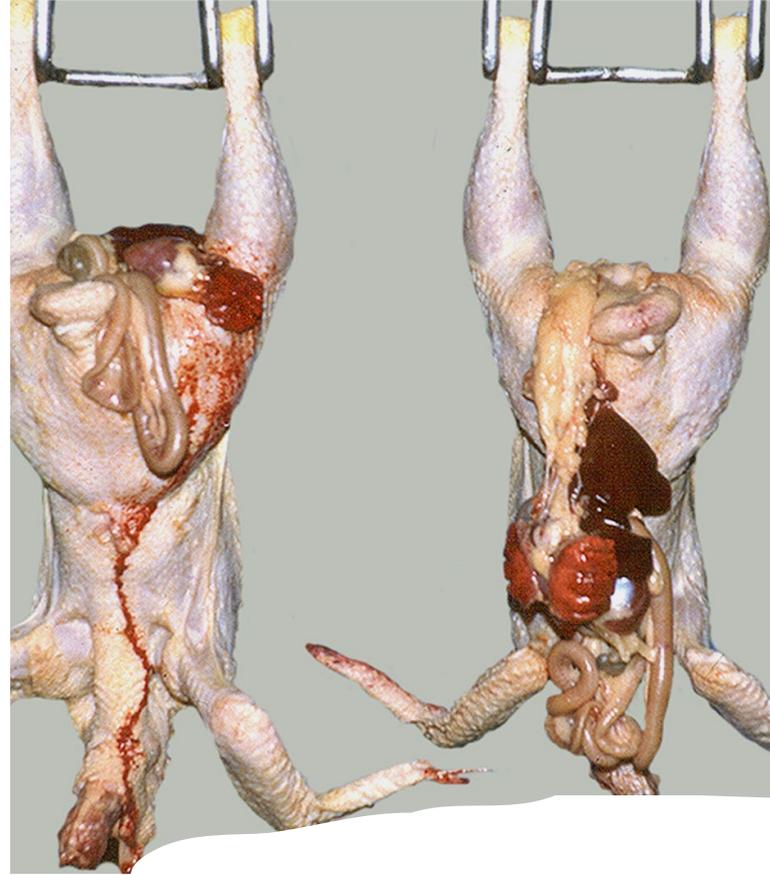
1. Contamination
2. Excessive Trim and Product defects

Cause

1. Improper feed withdrawal
2. Improperly hung birds
 - Bird uniformity
 - Neck removal
 - Empty shackles causing misfeeds

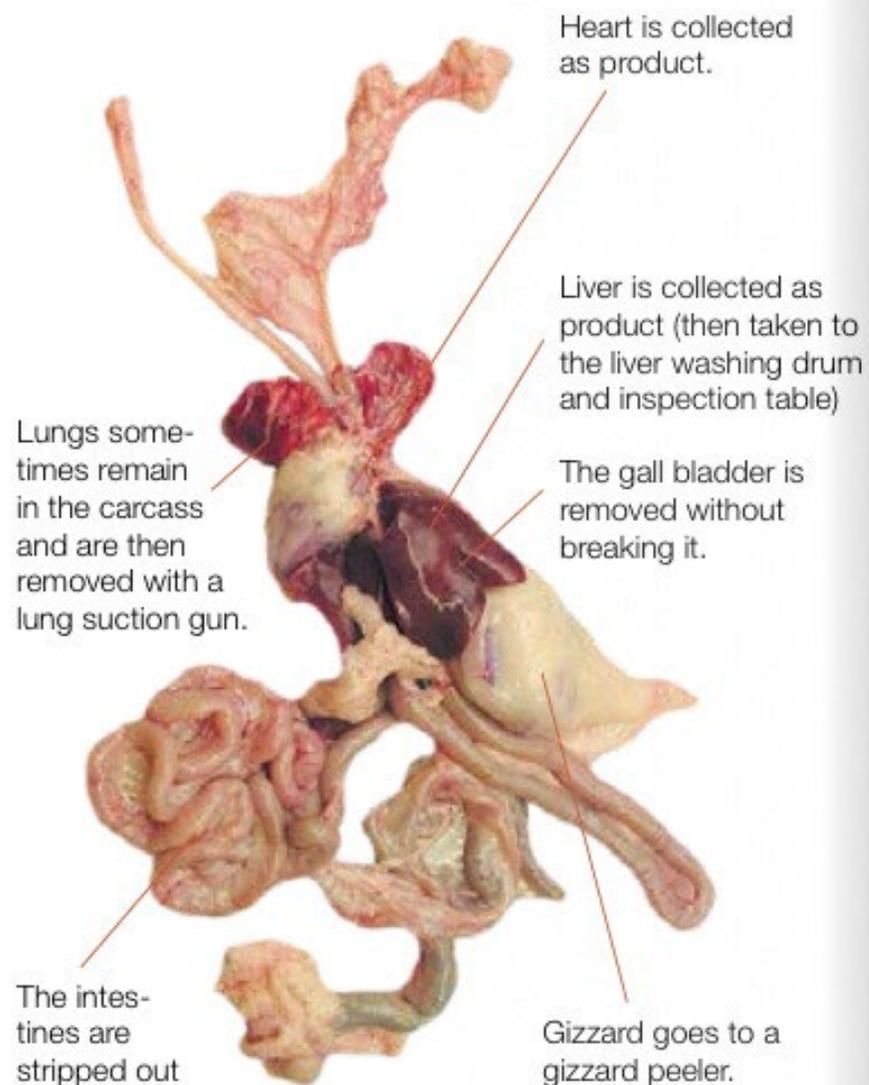


Quality Challenge – Evisceration / Contamination



Quality Challenge –
Evisceration / Contamination

Quality Challenge – Evisceration and Contamination



Immediately after evisceration the carcass and accompanying package are inspected.

Package is processed so that edible organs can be harvested.

Focus on gizzards, hearts and livers.

Bird Health Influence on Yield

- Direct impact on processing yield and condemnations
- Quality carcasses can only be obtained from healthy live birds – Best Management Practices are CRITICAL to ensure best carcass quality.
- Poor management conditions >> broiler health >> poor uniformity, airsacculitis, septicaemia, myopathies, pododermatitis >> bird performance >> carcass quality >> plant performance.
- Some disease agents >> poor uniformity, airsacculitis, septicaemia, skin tumors (CAV, IBD, RSS, Marek's, E.coli, O.R., NCD, IB, TRT, etc.)
- Any form of contamination of the carcass lowers quality and shortens storage time as a wholesome product.

Bird Health Influence on Yield

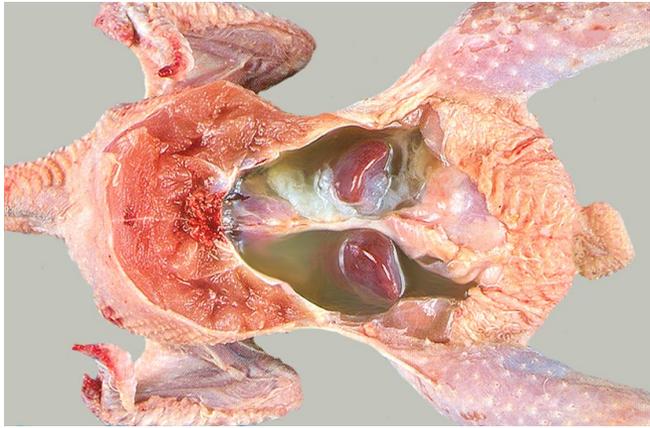
Health Concern

1. Cellulitis
2. Septicemia / Airsacculitis
3. Foot pad dermatitis
4. Deep pectoral myopathy
5. Dorsal myopathy
6. Ascites

Effect on Meat Yield at Plant

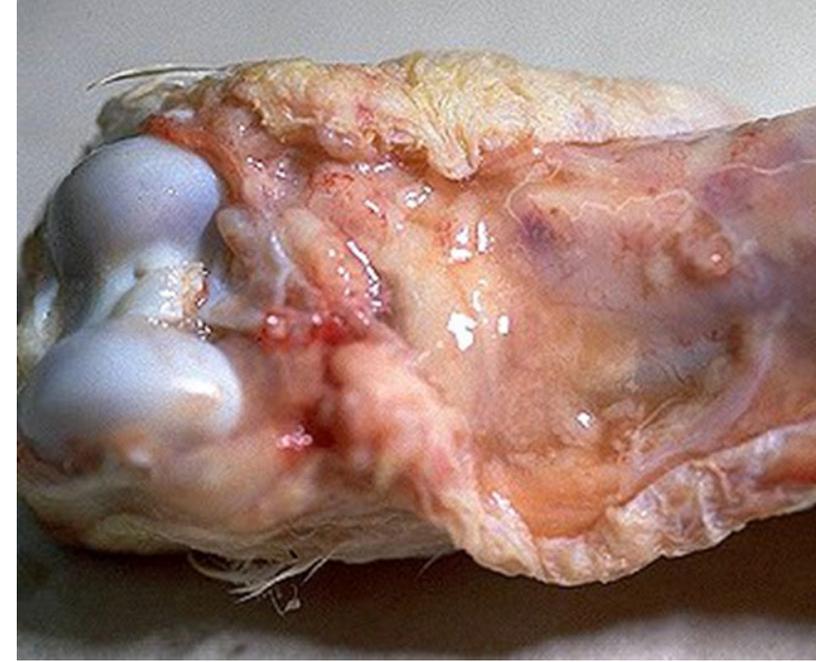
1. Can be a major cause of condemnation. High numbers of carcasses must be re-worked.
2. Carcass condemnation
3. Foot pad condemnation
4. Breast condemnation, carcass downgrading
5. Carcass downgrading
6. Total Carcass condemnation

Bird Health
Influence in
Yield

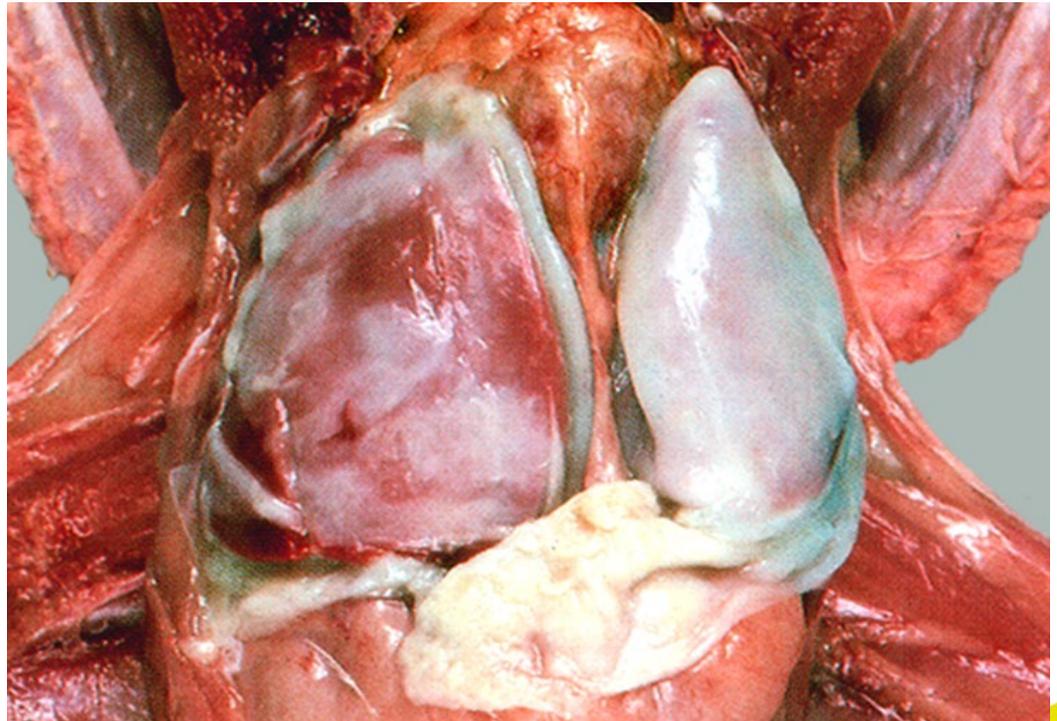




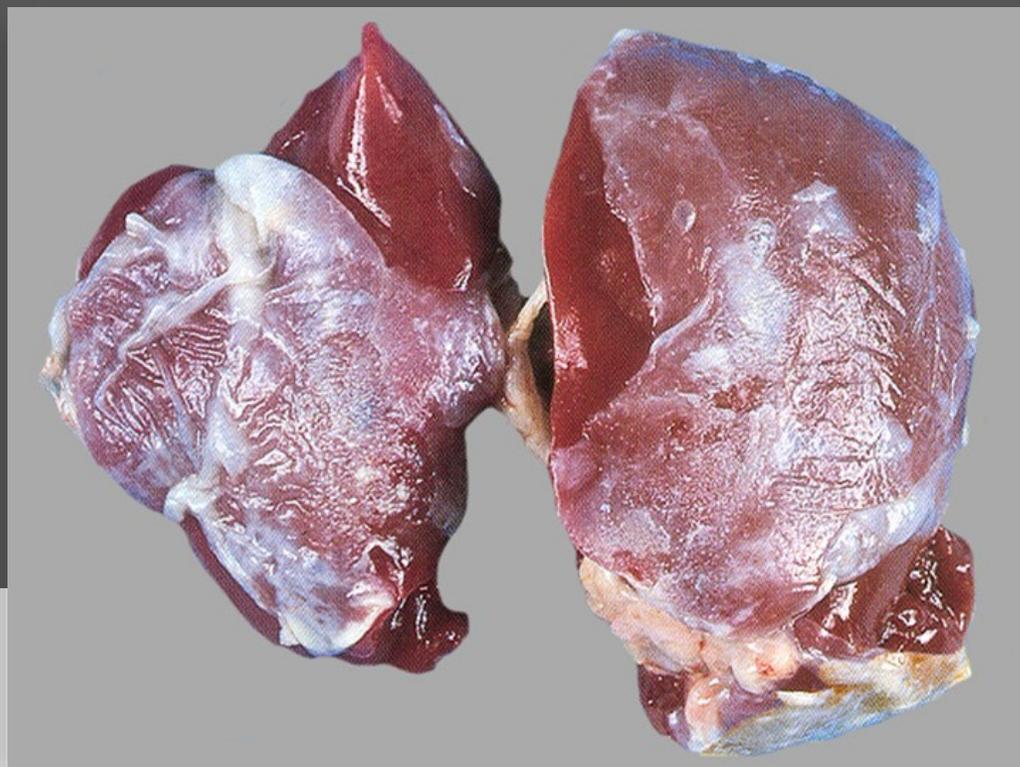
Bird Health Influence on Yield



Bird Health Influence on Yield



Bird Health Influence on Yield



Nutritional Impacts on Yield

Excessive abdominal, carcass or breast fat >> excessive trimming of parts, liquefying of fat during scalding.

Bloody legs (drumsticks), thighs or overall bruising >> increased condemned or over-trimmed parts [aflatoxin < 20ppb (capillary fragility), Vit. E (membrane integrity) must be 80 IU/kg of feed, Vit. A (epithelial development) @ 13 000 IU/kg of feed].

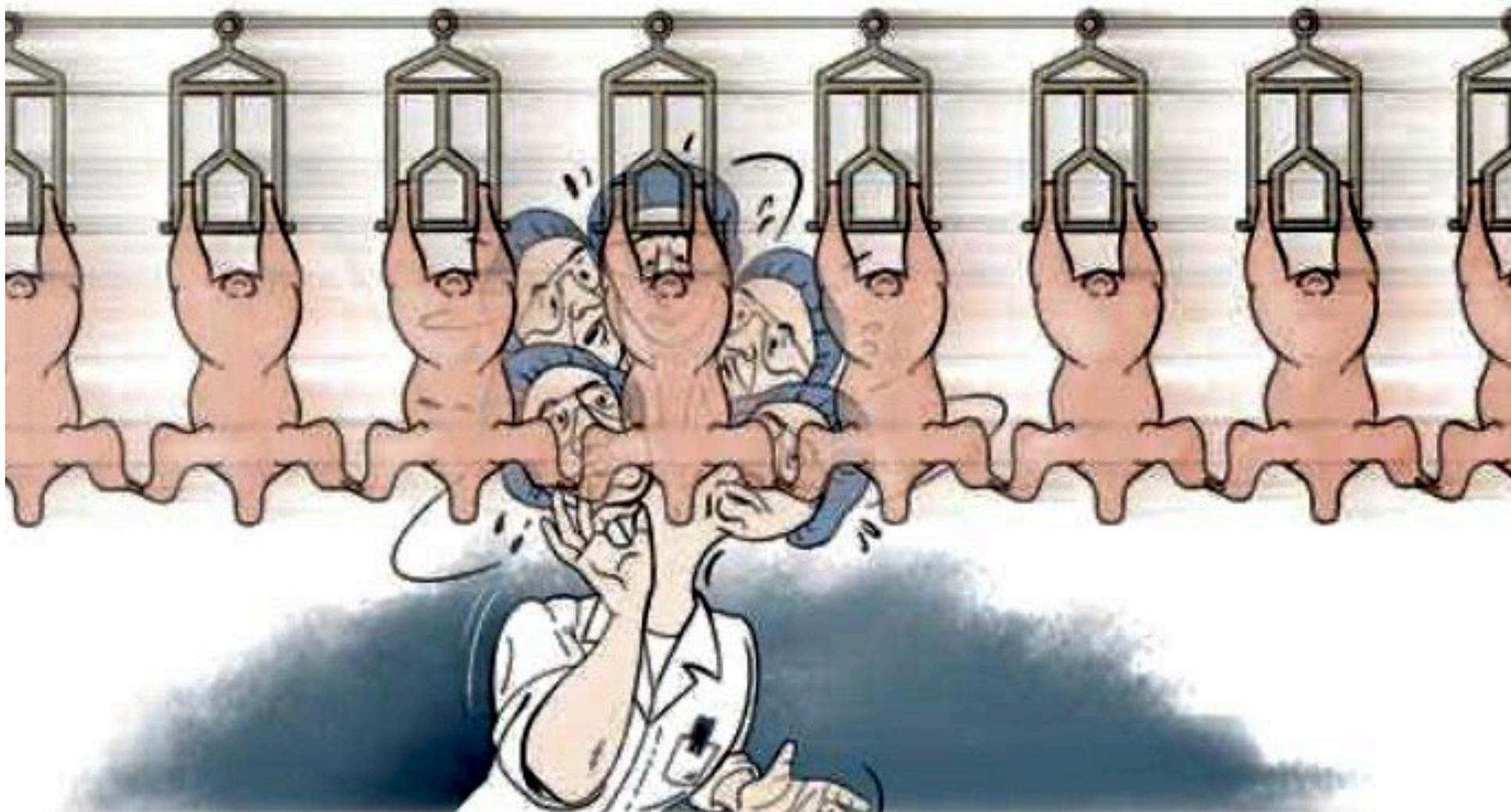
Broken bones in processing plant (shanks, rib cages) >> increased condemned or over-trimmed parts (calcium + available phosphorous levels, Vit. D3 @ 5000 IU / kg of feed, low-cost diets at end of cycle, malabsorption)

Nutritional Impacts on Yield – Assessing the Skin Color ew|nutrition

- You can assess the skin color for the first time when the bird is plucked.
- Skin pigmentation can occur genetically (melanin) or from feed, like yellow maize or feed additives (xanthophyl) present in the epidermis.



Inspection





Final Carcass presentation



Questions & Answers

THANK
YOU!

