

HYGIENE AND SANITATION IN SLAUGHTER HOUSE MANAGEMENT

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A slaughter house, if let uncared, can become a potent source of infection to not only the consumers of its product, but also to the society as a whole. Unfortunately the hygiene status of domestic slaughter houses in our country remains even today below the mark. Various reasons can be attributed to this, from poor planning during installation to negligent day-to-day management.

In the processing of animals for meat, microbial contamination of the product and the environment are almost inevitable. The hide and viscera are potential sources of contaminants. Advancements in the dressing and eviscerating procedures have improved the quality of meat considerably. However contaminated walls, floors, utensils and equipments necessitate checks for hygiene and sanitation at each level in the process flow of slaughter.

LAIRAGE

In the lairage, the animals brought for slaughter are made free of adhering dirt, dust, faecal matter etc. They are jet washed under pressure and allowed to dry before slaughter. Lairage pens have to be kept hygienic by regular removal of dung and urine. Animals having diarrhoea can become potential source for infectious agents such as *E.coli*, *Salmonella* etc. and hence are to be segregated carefully. Since ante-mortem inspection is a lairage operation, the inspectors are bound to assess the lairage sanitation and hygiene. Remnants of feed stuffs are to be removed. Disinfectants such as bleaching powder and sodium carbonate are ideal for use in lairage. Also the passages leading from lairage to the stunning pen are to be kept free of excreta and soil.

STUNNING PEN, AND HOISTING AREA

The contaminants in this area can vary from dung and urine to blood in certain stunning systems. During hoisting the stunned animal for bleeding, slitting of oesophagus will contaminate the whole area with rumen contents and blood. Hence clamping or ligating of oesophagus is advisable. The walls, the stunning box, instrument for stunning etc harbour the microorganisms. The captive bolt in penetrating stunning will harbour brain tissue which is very significant in areas where brain is consumed. Also researchers have conclusively shown that bacteria on the bolt during the stunning are later in the process isolated from even hind quarters. During bleeding, the violent contractions of the blood vessels will suck in rumen contents with very high bacterial count and distribute it to different regions of this carcass. It is preferable to have washable walls and floors in the stunning and slaughtering areas.

FLAYING AREA

Skinning imparts the highest number of micro flora to the carcass and slaughter hall. It is an unclean operation. Mechanical flaying can yield carcasses with excellent surface microbial quality. During hand skinning, the contaminated hand of the operator adds to the microbial load of meat. Also the use of legs by certain operators without any hygienic consideration can deteriorate meat quality. Flaying instruments, such as knives and sharpeners are to be kept in special holders without getting contaminated. A very untidy practice followed in our country of holding the knives in the mouth is hazardous from a public health stand point. Potable water only is to be used in the flaying area.

EVICERATION

Next to flaying, evisceration can liberate very high number of microorganisms. Gastrointestinal tract and urogenital systems are potential sources of contamination. The GI tract organs are never to be opened except in the post mortem inspection area. Bunging or ligating the oesophagus and tying the rectum are efficient tools for hygienic evisceration. While eviscerating, the placement of suitable trolleys underneath can help prevent spread of contamination. Organs for inspection and organs for disposal should be removed quickly to the respective locations for further prevention of contamination.

Jet washing (compressor washing) of the carcass after evisceration is significant. Washing without pressure will enhance the microbial load of forequarter by spread from hind quarter in head-down portion. However washing with chlorine water spray, mild organic acids such as lactic and acetic acids are very efficient in reducing the microbial load. Electrical stimulation of the carcass for enhancing the glycolysis will yield blood and small pieces of meat on the floor which are to be removed.

PORTIONING OF THE CARCASS

The back splitting saws and band saws used for splitting the carcasses contribute to meat quality depending on the microbial contamination, ease of cleaning and sterilization. Automatic sterilization of the saw within the casing after each operation will take care of this.

The split carcasses are never allowed to touch the floor. Instead they are to be hung or placed on table. Bone pieces are to be safely disposed. Lymph nodes are to be excised carefully wherever possible. The table tops should be cleaned thoroughly with hot water and chemicals such as sodium carbonate. Cutting

boards especially wooden should be thoroughly scrubbed after each operation shifts.

FLOORS AND WALLS

Floors should be made leak proof. Drains should have sufficient slope to avoid retention. The waste removal on floors is done in different stages such as dry picking, force water wash, hot water wash, chemical disinfectants and degreasing and jet water wash. The drains should be frequently checked for clogging at sieves especially by blood clots, pieces of flesh, and sinews. The walls should be made bird proof ventilated. The hall should be made insect free with electronic repellants.

EFFLUENT TREATMENT

Blood and the wash water are to be meticulously treated before being released. Ingesta, excreta and the paunch manure are to be judiciously disposed in a biogas plant for energy generation in the slaughter house. Manure pits should be impervious, and never allowed to overflow. The biofertilizers from blood and manure can add to the revenue of the process and reduce pollution. By products removal, when outsourced should be carried out quickly.

PERSONAL HABITS AND HYGIENE OF THE MEAT HANDLERS

The common personal habits such as unguarded cough, sneeze, licking the fingers to touch papers, nose picking, open spitting, fingering the nose etc are against the hygienic principles. Hair should be kept tidy using a cap, net or head scarf. Hair and dandruff can spread Staphylococci to the food stuffs. The use of tobacco in any form should be prohibited in the slaughter house since it facilitates contact with saliva. Diarrheic meat handlers and persons with wound not only in hand but anywhere on the body are carries of contamination. Protective clothing, preferably light coloured, made of drip-dry fabric eases the daily laundering. In addition to the foot operated hand washing basins, shower-baths in the changing rooms enhances the personal hygiene. Rest rooms and provisions for keeping personal belongings such as dress in cubicles should be provided. Education on good standards of health and hygiene for all those working in the plant should be provided. It is wise to remember that food should not be touched with bare hands more than what is absolutely necessary.

CLEANING IN SLAUGHTER HOUSE

The main concerns of cleaning are

- 1 To remove the coatings of remnants of products and dirt.
- 2 To reduce the number of bacteria on the surface of machines and utensils, preparing the field for a following disinfection.

During cleaning, it is important to remove from the surface as much organic material as possible to avoid protein failure of the ensuing disinfection and to withhold organic matter for further growth of bacteria. Each part of the building should have

a cleaning protocol which must be practical, well exhibited and well supervised.

CLEANING METHODS

Cleaning can be done by

1. Hand, using brushes
2. Cleaning in place (CIP) method - to clean pipe systems, tanks and machines without disassembling them
3. Flushing with low pressure (less than 100psi) and using much water with chemicals.
4. Flushing with high pressure (above 100 psi) and little water.
5. Foam cleaning - chemicals are incorporated in the foam with a contact period of 15-20 minutes and washing away later.

DISINFECTION

Disinfection is the method of reducing the number of bacteria living on surfaces. Disinfection can be done using

1. Heat - Surface temperature should rise to 700 C and above. But organic debris if any should be first removed to prevent coagulation of protein leading to layer build up.
2. Hot water - Equipment parts and utensils are immersed in hot water at 800C.
3. Steam - for tanks, pipes and other parts which are not easily reachable. Steam may damage plastic machine parts. Condensation of water after steaming can become a bacterial growth medium in pipes and tanks. Hence steam disinfection has to be repeated.
4. Chemical Disinfection:- The most important are

(a) Chlorine and products liberating chlorine

They are the superior chemical disinfectant commercial products have 100-120 gm. chlorine per litre. Lower prices and wider range of action are their attraction. Working solutions should have 200-250 mg of active chlorine /kg. Disadvantages are environmental concern and corrosiveness. Also it turns inactive with organic debts.

(b) Iodophores

They need a short contact time and a broad spectrum of activity. Working solution should have 25 to 50mg / ltr of active iodine using pH < 4 and hence may be used in combination with acid cleaning agents. When active iodine is present, the colour is yellow and is colourless when activity loses. Corrosiveness demands flushing away with clean water.

(c) Quaternary Ammonium compounds

They are less corrosive, non toxic and are good cleaning

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