# HYGIENIC SLAUGHTER – RED MEAT

*There is no one step, process or treatment to ensure that a carcass is free from harmful bacteria. Meat safety is a multi-step process. It is important that effective good manufacturing practices are employed throughout slaughter and dressing processes to ensure that carcasses are as clean, both visibly and microbiologically, as possible prior to the application of an approved carcass wash intervention.*

The following are a few key areas to focus efforts in reducing the risk of carcass contamination in red meat slaughter. Each operation should consider its own plant and process and any potential areas of concern.

**Facility**

Assess the slaughter facility to ensure that the design, construction, and overall operation contribute to the production of safe and wholesome products. Consider separation of 'hide-on vs. hide-off' or 'clean vs. dirty' by adding physical barriers, proper design of air flow, and proper flow of the operation and personnel.

Control the movement of air so that the flow moves from 'clean' areas out through 'dirty' areas to control airborne contamination, which can be significant. Consider the air-flow throughout the plant – coolers, cut floor, kill floor and receiving barns – to ensure that air is not carrying contamination onto exposed product.

In addition to the direction of air flow the heating/cooling/ventilation system should minimize humidity and protect meat products from temperature abuse.

Rail height must be sufficient to preclude carcass contamination from the floor or splashing during dressing and further handling.

Ensure that the facility is equipped with sufficient sanitizing stations, tools, gloves, equipment, etc., to allow the employees to perform their job in a clean and hygienic manner.

## Process

**Receiving**

Live animals are the primary source of pathogens such as E. coli 0157:H7 and Salmonella that infect humans. Incoming animals with visible mud or fecal contamination on the hide may prove to be an increased risk for contamination during de-hiding. Processors should consider implementing a mud/dust scoring system that will help them to identify problem livestock and allow for adjustment to the slaughter process, such as line speed, to minimize or prevent contamination.

**Hide Removal**

Contamination of carcasses occurs during slaughter and dressing procedures, especially during the de-hairing /de-hiding and evisceration processes. Hygienic hide removal and evisceration techniques are critical to the prevention of direct and indirect contamination from the hide and ingesta onto the exposed carcasses and to other exposed carcasses in the processing area. Many process steps are involved in the effective and hygienic removal of the hide and viscera.

Initial opening of the exterior of the hide should be on as clean of an area as possible of the carcass. This can require removing visible contamination with a dedicated knife, vacuuming the cut line, etc., to reduce contamination. Clean and sanitized equipment should be used at all times through dressing to prevent contamination of the carcass surfaces. The outer side of the hide must never touch the skinned surface of the carcass. Employees must not touch the skinned surface with the hand that was in contact with the hide. The employees must follow procedures for hand washing, cleaning of arms, gloves, scabbards and aprons to prevent contamination. If contamination occurs, it should be removed as soon as possible. Mesh gloves are important for employee safety however because of their design are good at harbouring bacteria so they need to be thoroughly washed after contact with hide.

**Evisceration**

Evisceration procedures must be developed and implemented for proper sanitary dressing, including proper weasand removal and bunging. It is recommended that the bung be bagged to prevent contamination during the evisceration process. If contamination occurs the carcass should be identified and handled appropriately to remove the contamination.

The actual removal of the viscera from the carcass is a critical phase of the dressing operation. Contamination must be trimmed from the midline before opening the abdominal cavity. Care should be taken to avoid cutting or breaking the paunch and intestines. If carcass tissues become contaminated from visceral contents, they must be removed by trimming not rinsing. Tools and equipment used to split the brisket or to open the abdominal cavity must be cleaned before being used. They shall be adequately rinsed and sanitized between each carcass.

**Trimming**

Should a carcass or its parts become contaminated at any time during the dressing process, the plant employee performing the procedure that resulted in the contamination shall immediately identify and mark (or designate for marking) the affected carcass for trimming correction. All employees must be properly trained to conduct trimming of visible contamination. Equipment (hooks and knives) should be sanitized between each use to reduce cross-contamination between areas and/or carcasses.

**Carcass Wash**

The carcass washing procedure is designed to remove incidental contamination (blood, bone dust, hair, etc.). The washing should proceed from the top of the carcass in a downward direction to prevent re-contaminating an area.

Washing should be completed before shrouding, if applicable. Carcass wash areas, hoses and equipment should be maintained in a clean and sanitary condition.

**Training**

Training programs should be in place to ensure that employees know, understand, and can fully execute appropriate tasks for their specific position. These tasks include but are not limited to:

- Prevention of visible contamination from the hide or viscera to the carcass surface
- Sanitizing of hand tools
- Washing/sanitizing of equipment
- Necessary actions in the event of visible contamination

However, no matter how carefully a plant dresses carcasses, it is inevitable that bacteria will contaminate the carcass. Therefore, applying "interventions" to carcasses during and after the dressing procedure to effectively remove or inactivate bacterial contamination and improve meat safety is important.

## Interventions

**Hot Water Washing**

The use of hot water (>180°F) to wash carcasses is an effective way to reduce pathogens. Hot water can be applied during slaughter in a number of different forms; either as a whole carcass wash, or to specific areas of the carcass. Application can be by spray (high or low pressure, manual or automatic), by deluge in a cascade or by immersion (more applicable to poultry or small cuts of meat). Care must be taken to ensure that water remains hot when it reaches the carcass surface.

**Steam Pasteurization**

Steam pasteurization is an option to reduce pathogens on carcasses. Carcasses enter an in-line steam-pasteurizing chamber where they are sprayed with steam. This raises the surface temperature to approximately 200°F thereby killing pathogens with the high temperature. Although a more expensive application, steam pasteurization is an effective method of reducing bacterial contamination.

**Steam Vacuum**

Steam vacuuming has the combined effect of removing and/or inactivating surface contamination. The hand-held device includes a vacuum wand with a hot-water spray nozzle, which delivers water at approximately 180°F to 190°F to the carcass surface, as well as the vacuum unit. Steam vacuuming is an effective tool for spot decontamination on the slaughter floor prior to final inspection and chilling.

**Peroxyacetic Acid (PAA)**

Peroxyacetic acid (sometimes called peracetic acid) is a compound formed by combining acetic acid with hydrogen peroxide. PAA is used as a spray and is an environmentally friendly choice since it breaks down eventually into carbon dioxide, oxygen and water.

**Lactic Acid Rinse**

Lactic acid is naturally present in meat, naturally produced by fermentation, and is safe and easy to apply. Its ability to reduce pathogens or other organism of fecal origin has been studied extensively showing that lactic acid have a strong antibacterial effect. Besides the antimicrobial effect, the studies reviewed show that the use of lactic acid as a meat sanitizer does not have a significant impact on sensory and/or physic-chemical characteristics.

**Chlorine and Chlorine Compounds**

The most common source is of chlorine is sodium hypochorite. Hypochlorites were popular because they are readily available and perceived as inexpensive. However, the ability to kill bacteria depends on the ability to disassociate into hypochlorous acid which is the lethal compound. This only happens if the pH of the solution is in the 5 to 7 range. Since the hypochorites are alkaline, it is necessary to acidify as well. Chlorine compounds are also corrosive and they form nasty by-products in the presence of organic matter. Compounds such as chloramines and others may be carcinogenic.

**Chlorine Dioxide (ClO2)**

This is listed separately from chlorine since it has different characteristics. It is usually generated on-site in a variety of methods. ClO2 is not as affected by organic compounds as chlorine, it is not pH dependent and it does not form chloramines. It is much more soluble in water than chlorine and it is more effective so it can be used at lower levels. Precautions are necessary in handling ClO2 since it is in gaseous form. Acidified sodium chlorite is another name for one of the methods to generate ClO2 which is sold under the trade name Sanova.

For any anti-microbial or intervention, it is important to consult with your chemical supplier to find the best solution for your application. Using antimicrobials to treat carcasses is beneficial in extending the shelf life of meat products and helping to assure food safety because of reduced pathogen loads.

**For more information, resources, or help with your program please contact:**

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