

SLAUGHTER OF POULTRY FOR DISEASE CONTROL PURPOSES

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INTRODUCTION

In emergency disease outbreaks, large numbers of poultry may need to be killed for control, containment or eradication purposes. Live poultry present the major risk of spreading infectious agents, so their slaughter must be completed as humanely (with minimal pain and distress to the poultry) and quickly as possible. Strategies for disease control/eradication will usually involve complete depopulation of flocks, but may extend to depopulation on an area basis.

The method chosen for killing poultry must be safe, humane and efficient.

The slaughter process must be conducted under veterinary supervision and be supported by a sufficient number of adequately trained personnel to ensure all animal welfare aspects are catered for. It is essential to ensure all poultry are dead, as demonstrated by the cessation of cardiac and respiratory movements.

In response to an emergency disease outbreak, many activities will need to be conducted on affected farms, with the killing of infected and other poultry one part of this process. A plan for the slaughter of poultry needs to be developed for each individual farm, and should include consideration of;

1. Minimising *handling* to reduce stress on the poultry
2. *Site* - the poultry should preferably be slaughtered on the affected farm, as close as possible to where they are housed. However, there may be circumstances where the poultry must be moved to another location for destruction. Where possible, slaughter of the poultry should not occur in public view, so as not to unduly distress onlookers
3. The *species, number, age* and *size* of the poultry to be killed
4. *Housing* of the poultry, as different approaches may be needed for cage, litter and free range systems
5. The *availability and effectiveness* of equipment needed for destruction of the birds - all equipment must be in excellent condition
6. The *facilities* available on the premises that will assist with the slaughter process
7. The *health and safety* of personnel conducting the slaughter
8. Any *legal issues* that may be involved, for example where restricted veterinary drugs or poisons may be used, or where the process may impact on the environment
9. The *order for destruction* of the poultry - infected birds should be slaughtered first, followed by birds in-contact with infected birds, and finally the remaining birds in the flock
10. The presence of *other poultry farms in the vicinity* of the affected farm, and
11. The *cost* of various destruction methods.

Options for slaughter of poultry will vary according to the factors described above. In designing a destruction plan it is essential that the method chosen is both reliable and repeatable to ensure that all poultry are humanely and quickly killed.

MECHANISMS FOR CAUSING DEATH

The various mechanisms for causing death act by firstly causing loss of consciousness, followed by cardiac and/or respiratory arrest, leading to complete loss of brain function. The three key mechanisms for causing death are;

1. Hypoxia - causes unconsciousness and depression of the respiratory centre in the central nervous system, followed by complete loss of brain function
2. Depression of neurones necessary for life functions - depression of the central nervous system respiratory centre leading to cardiac arrest
3. Physical disruption of the brain

METHODS FOR KILLING POULTRY

INHALATION AGENTS

Inhalation agents require the use of a sealed chamber or commercial containers, such as commercial waste disposal bins, that can be adequately sealed. The supervising veterinarian must be able to see inside the container to ensure the poultry are killed quickly and effectively. Large containers provide the opportunity to kill large numbers of birds quickly. All equipment used must be in good order.

Where birds are progressively added to large sealed containers, the veterinary supervisor must ensure that all birds are dead before others are added to the container. The use of commercial containers also allows for dead birds to be removed to the disposal site.

Carbon dioxide (CO₂)

CO₂ is generally the method of choice for killing large numbers of poultry. It is a colourless, virtually odourless, non-flammable, non-explosive gas that presents minimal hazards to operators. CO₂ is heavier than oxygen, so it will accumulate in the lower areas of containers where birds are placed. CO₂ kills poultry by depression of the central nervous system leading to death by hypoxia.

CO₂ is relatively cheap and available in compressed gas cylinders. Commercial supplies of carbon dioxide are now available that allow greater capacity than traditional gas cylinders. CO₂ at 30% by volume leads to unconsciousness, and at 70%, causes death. Poultry may be introduced into an atmosphere of 70% CO₂, or alternatively, CO₂ may be decanted into the container after placement of the birds.

Practical experience has shown that if CO₂ is decanted from compressed gas cylinders too quickly, it will lead to freezing of the gas in the cylinders and/or of the regulators. Also, considerably more CO₂ is required for birds with long necks (such as ducks) to ensure sufficient depth of CO₂ in the containers to kill these birds.

Carbon monoxide (CO)

Carbon monoxide is colourless, odourless, non-flammable and non-explosive gas. It causes a fatal hypoxaemia when levels reach 4% to 6%. It can be obtained in compressed gas cylinders, but not as readily available or inexpensive as carbon dioxide.

Carbon monoxide is toxic to humans, so there are significant health and safety issues that need to be considered. CO should only be used after a careful assessment of all hazards, and in a well ventilated area.

Nitrogen and Argon

Nitrogen and argon are colourless, odourless, non-explosive, non-flammable gases that present minimal hazards to operators. Both are available in compressed gas cylinders and are used in some commercial poultry slaughterhouses. They cause death by hypoxia, but are only effective when oxygen levels in the sealed container/chamber are reduced to less than 2%, that must be achieved as quickly as possible.

Hydrogen Cyanide

Hydrogen cyanide is a very quick and effective killing agent. It is reported that poultry may exhibit convulsions prior to death. It acts by causing paralysis of the respiratory centre.

Hydrogen cyanide is very toxic to humans, and should only be used by experienced (and where necessary licensed) commercial operators. The significance health and safety problems associated with the use of hydrogen cyanide make its use inappropriate in most circumstances.

Gaseous anaesthetics

Gaseous anaesthetics can rapidly induce anaesthesia leading to unconsciousness and, when applied at overdose levels, effectively kill birds by fatal depression of the central nervous system respiratory centre.

Examples of gaseous anaesthetics include halothane, methoxyfluorane and isofluorane. They are far more costly than the agents described above. In most situations there are legal considerations regarding their access and use.

As these agents can induce anaesthesia in humans, the health and safety risks must be considered. They are not generally considered suitable for killing large numbers of poultry.

INJECTABLE ANAESTHETICS

Injectable anaesthetics depress the central nervous system leading to loss of consciousness, anaesthesia, apnoea, depression of the respiratory centre and terminal cardiac arrest. As is the case with the gaseous anaesthetics described above, there are legal considerations concerning their access and use. There are a number of agents, the most commonly used are the barbiturate drugs such as sodium pentobarbitol.

They are effective agents when used at overdose levels to humanely kill poultry.

Intravenous application is the preferred method, however in smaller birds (without prominent veins) intraperitoneal application is satisfactory. Intracardiac application must only be attempted when the poultry are fully restrained. Use of injectable anaesthetics must only be conducted by a veterinarian or by appropriately trained persons under the supervision of a veterinarian.

PHYSICAL METHODS

Electrocution

Electrocution is used in many poultry slaughterhouses (water bath stunning systems) to stun birds prior to cutting their neck, which leads to death by exsanguination.

If electrocution is to be used as the method of killing birds in an emergency disease outbreak, there must be sufficient, constant current (amperage) to cause instantaneous and simultaneous destruction of the central nervous system and cardiac arrest. There are some commercial units that could achieve this

However, it needs to be recognised that using equipment to electrocute birds may be hazardous to personnel, so the equipment and technique must be subject to a proper health and safety assessment.

Cervical dislocation

Cervical dislocation can be an effective means of humanely destroying poultry, resulting in the loss of central nervous system stimulation of respiration and heartbeat. However, the technique must be performed correctly so that all birds are effectively and consistently killed rapidly.

This procedure may not be aesthetically pleasing. Cervical dislocation can be performed manually or using mechanical devices, such as a Burdizzo. Where large number of chickens are to be destroyed, this may not be the method of choice, but may be the preferred option for long-necked birds such as ducks.

Decapitation

Decapitation results in a rapid loss of consciousness and blood loss. It is an effective method for killing poultry, but is not aesthetically pleasing. If this method is chosen (especially for small numbers of poultry), it is essential that the procedure is carried out effectively, using sharp instruments.

Maceration

Maceration results in instantaneous death. It has been applied in some sectors of the poultry industry for destruction of young birds, eg. surplus day old male chickens.

This process is not aesthetically pleasing.

If maceration is considered as a method of killing poultry, specially designed equipment must be used and must be in excellent working order, eg. blades must be sharp and kept that way. It should only be used in small birds.