

Hygiene in Animal Housing



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Common disinfectants used in animal shelters are

1. Quaternary ammonium compound
2. Bleach (Sodium hypochlorite)
3. Potassium peroxymonosulfate
4. Alcohol (usually in hand sanitizer)
5. Chlorhexidine
6. Phenolic disinfectants



A cow with laminitis as a result of dampness in animal house

Methods of application of disinfectant

Mopping:

Mopping or wiping on disinfectant using a rag or paper towel is generally less efficient than spraying, but may be the only practical option in some circumstances, such as in rooms without drains.

Spraying

Spraying as a method of application offers the advantage that disinfectant does not get contaminated by organic material as it would in a mop bucket. It also tends to be faster than mop bucket application, and commercial sprayers can be set to automatically supply the correct dilution. Hose-end or high-pressure sprayers coat the area to be cleaned more effectively than hand-held spray bottles.

Cleaning of utensils used in animal house

Use of clean and neat utensils during animal feeding help to maintain animal health. The containers used in collection of food products from animal such as milk, eggs must be hygienic. To maintain the animal house utensils clean following protocol can be used.

1. Prewash the utensils with clean, cold water. This removes much of the dirt and should be carried out immediately after the product has been removed. After washing with cold water, wash the equipment with warm water (50°C) to remove fatty material. If the equipment is washed thoroughly with water, much less detergent is required in later stages.
2. Wash the equipment with a detergent solution, following the manufacturer's instructions. The equipment should be cleaned thoroughly at this stage to ensure that it is chemically clean. If the equipment is cleaned by hand it should be scrubbed thoroughly using the detergent solution. Detergent cleaning also reduces bacterial numbers on the equipment.

3. Drain the detergent solution. It may be retained for washing other items of equipment, provided its strength is maintained. After draining the solution, rinse the equipment at least three times with cold water to remove all traces of the detergent. Once washed and rinsed the equipment should be stored in a clean, dry, dust-free area.

Cleanliness and quality feed enhance animal growth

Quality of feed is becoming lower due to inappropriate storage practices. During storage certain physical, chemical and biological changes occur because of some biochemicals and enzymes by itself and some enzymes produced by an insect, pest, and microbes. These changes will deteriorate the food grains. Feeding with such feed will harm the animal health. To avoid this make sure that the feed quality is acceptable and storage places must be hygienic, dry and no access to rodent, insect, and pest.

Recycling of farm surplus/ wastes

The farm wastes may be solid, semisolid or liquid. As stated earlier, some wastes may be treated primarily as sewage and the residues emanating from the digestion tank serve as manure. The sludge from the primary sedimentation tank could be disposed by land bury or by composting while the liquid effluent after the separation of activated sludge in the secondary sedimentation tank is disposed to courses. Besides, the sludge may also be disposed in the sea spread over land or used as compost.

The effluent from secondary settling tank (of sewage), that is disposed into water courses such as rivers and streams should be diluted at least 8:1 (water : effluent) in manner that it should not contain more than 10 mg/litre of suspended solids and 10 mg/litre of BOD. Since people may use the course waters, the effluents needs essentially to be rendered pathogen-free by chlorination. If chemicals are not removed from the water it could prove toxic to man, fish, agriculture and limit its use for other purpose.

Manure and waste management in animal house

Animal manure and animal waste may create problem of water pollution and air pollution if it is not managed correctly. Manure and waste products of animal house can be helpful in a number of ways. Manure management refers to capture, storage, treatment, and utilization of animal manures in an environmentally sustainable manner. It can be retained in various holding facilities. Animal manure can occur in a liquid, slurry, or solid form that we can use for composting and biogas production.

Composting

Composting is the process of decomposing organic matter in manure, crop residue or farm waste, by a mixed microbial population in a warm, moist aerobic environment. The organic matter is decomposed by the successive action of bacteria, fungi and actinomycetes. In the final stages of decomposition, redworms (or manure worms) assist in the production of stable humus which is useful as organic fertilizer.

Biogas production

Biogas is produced by the anaerobic digestion or fermentation of biodegradable materials from animal house like manure and animal waste. Biogas comprises primarily of methane (CH₄) and carbon dioxide (CO₂) which can be used for cooking and lighting.

General precautions while maintaining animal house clean

- ☆ Provide clean food and water to animals; put the drinking bowls and hay racks so high up that dung and urine cannot fall into the food and water.
- ☆ Remove feces from animal enclosures frequently (at least once a day).
- ☆ Do not keep animals overcrowded.
- ☆ Vaccinate animals against the important diseases prevalent in the region. Consult your veterinarian about this.
- ☆ Be careful with carcasses; bury or burn the dead animals. When an animal suddenly dies, always suspect anthrax.
- ☆ Keep animals in clean, dry places. Move enclosures and stables regularly and keep them clean, to avoid build up of diseases in one place.
- ☆ Make sure that the air in the stables is well ventilated. Ventilation removes the dampness. Many microbes need dampness to survive in the environment and to grow and multiply.
- ☆ Do not mix healthy animals with animals that are not healthy. If you purchase a new animal and you are not sure if it is healthy, keep it separate from the herd for a few weeks and check the animal for diseases.

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Hygiene in Animal Housing

Good housing is an integral part of human and animal welfare. Scientific housing of animals is essential for obtaining maximum benefits from livestock and birds in respect of their productivity and services to the mankind. Housing is an important activity of all modern animal welfare programmes. A clean shelter also adds the benefits of increasing the comfort level of animal and presenting positive impacts on the health of the animal. Proper hygienic condition helps to avoid bacterial, viral, and parasitic infection and related illness in animals. Considering the kind of weather conditions and harsh climate, it is all the more important that animals must be in hygienic conditions as possible.

Salmonella, *Campylobacter*, some *E. coli* and *Giardia* are more likely to cause diarrhea in humans and can be spread from infected animals to farm workers' hands and then from hand to mouth. *Salmonella* causes pronounced diarrhea in animals, so it is fairly easy for a farm worker to be exposed. If a dairy herd is infected, the bacteria may also be passed into the milk. Drinking raw milk infected with just a few *Salmonella* organisms can result in significant human infection with fever and prolonged diarrhea. Food products which are procured from infected animal also help to spread disease in humans. To avoid disease spread in animals and humans good hygiene practices are necessary in animal housing.

Location of Animal House

The location of farmstead is selected giving due consideration to the supply of potable water, adequate sun exposure and efficient drainage. Other factors like uninterrupted power supply, topography and road, transport and market facilities also contribute to the selection of site. The aspects of drainage in animal houses must receive utmost attention. The soil should be porous and the slope in the land gentle so that water accumulation or logging is prevented and the farm premises remain dry. Well drained sites maintain the animals in good health. Housing of livestock also provides facilities for feeding, rearing of offsprings, production of milk and meat; ventilation, lighting and store/ stack yard. It must ensure protection against rains, driving winds, excessive heat, cold and dampness. In general, the animal housing shall be located at a raised, cool, dry place having sufficient sunlight.

Sanitation of animal houses

The dictionary meaning of the word sanitation is the science of safeguarding health. According to the World Health Organization environmental sanitation embraces the control of all those factors in man's (in our context animals) physical environment which exercise a deleterious effect on the physical development (to productivity), health and survival. The physical environment encompasses the non-living objects and physical factors affecting the animals, viz., air, ventilation, lighting, noise, climate and water. In fact, the term sanitation covers the whole field of controlling the environment of animals with a view to prevent disease and promote health.

The basic problems encountered during the maintenance of sanitation in animal houses include the lack of awareness and ignorance of nearly 80% of our population about the role of environmental

sanitation in the protection and promotion of their own health and safety and in the alleviation of their poverty. The task remains to eliminate other factors of environment which are harmful to human and animal health.

Pathogens and livestock housing

Livestock are exposed to the challenge of potential pathogens in their sheds, pens, parlours and brooders. The pathogens are brought from outside by wind (viral agents can travel a great distance through air, dust (Q fever, brucellosis, tuberculosis), vectors (mosquitoes, lice, ticks, fleas, etc.). The infective agents voided by diseased animals serve as source of infection to healthy stock by contact (leptospirosis), ingestion (salmonellosis, parasitosis, New Castle disease, brucellosis and H. S., etc.), inhalation (tuberculosis, brooder pneumonia, and foot and mouth disease) to site a few instances. Numerous direct vector transmitted infections are spread through vectors (lice, ticks, fleas) that develop within the farm houses. A major approach to reduce this challenge relates to cleaning the buildings by rubbing, scrubbing, dusting, washing and disinfection between batches of animals to the house.

Ventilation

Ventilation in animal houses is required for removing stale air and to replace it by fresh air. Very little ventilation or too much of it is injurious to the health of animals and their attendants. In improperly ventilated animal houses, the stagnant air becomes warmer and more humid. Condensation of water on the surface, bedding and floors makes them wet and animals become uncomfortable. It eventually leads to concentration of animals at places (uneven distribution of animals) causing accumulation of excreta and expired air in pockets. All these factors also lead to concentration of dust, particulate matter, ammonia, other gases and pathogenic microorganisms carried by animals facilitating exacerbation of respiratory and enteric diseases, mastitis and other illnesses. High humidity with low temperature during the winter months are favourable for the spread of various infections. Further, the gases arising from slurry pits or channels beneath the animals also expose the animals to intoxication.

Disposal of sewage and farm refuge

Farm yard refuge has long been used as fertilizer in agricultural farms. This is contributed by

- ❑ The animals as excreta-faeces and urine, and minute amounts of coughing and body secretions;
- ❑ Left over food, feeds and beddings
- ❑ Water used for drinking and washing of animals and floors.

Sometimes, however, these unwanted waste-products become difficult to dispose off. Solid farm yard manure is usually difficult to remove satisfactorily. A mixture of faeces and urine is suspended in water occasionally with bedding to have semi-liquid slurry. It is allowed to flow through the gutter to tanks, ponds below grounds or lakes and artificially excavated depressions on the ground. These lead to pollution of water sources, farm ditches, streams, river etc. Liberation of foul smell and risk of disease dissemination allow thinking unusing of waste disposal through sewage.

Farmstead environment and health

Human and animal health is adversely affected by polluted environment. Disease producing agents namely, bacteria, viruses, fungi and (ecto- and endo-) parasites are widely distributed in the environment. Arthropods developed in certain environments act as vectors for many disease causing agents. Stagnant water in the farm premises and animal houses allows the development of mosquitoes which may transmit many diseases to animals and man. Vectors transmit infections mechanically or biologically. Fleas, flies, ticks and mites which develop rapidly under warm and humid conditions and in areas with organic matter and sandy soil can disseminate many infective agents like spirochetes, rickettsia, viruses and parasites. Some of the pathogenic organisms which may be transmitted to man and animals through sewage and farm refuge/surplus are enlisted in Table 1.

Table 1. Pathogenic agents that may be present in sewage and farm refuge.

Bacteria		Viruses
<i>Salmonella sp.</i>	<i>Pseudomonas spp.</i>	Foot and mouth disease
<i>Staphylococcus aureus</i>	<i>Proteus spp.</i> <i>Klebsiella spp.</i>	Poliovirus
<i>Yersinia enterocolitica</i>	<i>Vibrio cholerae</i>	Orf
<i>Erysipelothrix rhusopathiae</i>	<i>Brucella spp</i>	Enteroviruses
<i>Francisella tularensis</i>	<i>Clostridium spp.</i>	Rotavirus
<i>Pasteurella spp.</i>	<i>Bacillus anthracis</i>	Reovirus
<i>Corynebacterium spp.</i>	<i>Aeromonas hydrophila</i>	Adenovirus
<i>Campylobacter spp.</i>	<i>Leptospira icterohaemorrhagiae</i>	Reovirus
<i>Listeria monocytogenes</i>	<i>Shigella spp.</i>	Poxviruses
<i>Mycobacterium paratuberculosis</i>	<i>Mycobacterium tuberculosis</i>	Swine fever
Parasites		Blue Tounge
<i>Giardia lamblia</i>	<i>Entamoeba histolytica</i>	Equine influenza
<i>Ascaris sp. .</i>	<i>Schistosoma spp.</i>	New Castle Disease
<i>Fasciola spp.</i>		Japanese encephalitis

Major sources of contamination in animal house

Domesticated animals are normally prone to disease. Bacteria, virus, parasites may interfere in animal health and food product obtained from them. To avoid this, it is essential to find the sources of contamination and preventive measures.

Water: drinking water will be contaminated with number of pathogens and will be source of contamination and illness in animals. Clean, chlorinated water will help to reduce pathogenic load. Water which is used for cleaning the animal and shelter is also treated with appropriate disinfectant to maintain sanitation.

Feed: feed provides direct entry of pathogenic entities into the animal body and is the potential source of disease. Putrefied feed also creates problems in digestion so proper feeding is obligatory.

Personnel: during animal handling a load of pathogens can transfer from humans to animal bacteria such as *E. coli*, *Shigella*, *Salmonella* will cause infection to animal, or it may contaminate food products (milk). To avoid this, personal hygiene is necessary and some precaution has to be taken like washing hands with warm and soapy water before entry in farm. Avoid entry of Infected and carrier individual in a shelter.

Insects and pests: lots of diseases are spread because of insect and pests that are present in animal shelter like a mosquito, house fly, ticks, rats, mites, etc. Proper pest control protocols help to reduce insect and pest and related diseases.

Protocols for animal house hygiene

Cleaning of animals and their environment:

- Physical cleaning includes removal of urine, fecal matter and organic material from the animal body and the environment.
- Cleaning should be result in visible clean surface with clean, warm and soapy water.
- Daily cleaning of animals and farm help to avoid a number of diseases and it can also reduce the objectionable odor in shelters and the environment.
- For killing of harmful pathogens sanitation using potential disinfectant agent uses after cleaning which can remove harmful biological entities from the environment.
- Effective sanitation requires applying a germicidal agent to a basically clean surface. This requires use of both detergent and disinfectant products. Detergents in themselves do nothing to kill germs.
- Virtually all disinfectants used in shelters are inactivated by organic material such as feces, kitty litter, saliva, sneeze marks and plain old dirt to some extent, so if they are not applied to a clean surface, they simply will not work.
- Periodically, a stronger degreaser should be used to deal with body oils and other grunge that builds up in kennels over time and can render disinfectants ineffective.

There is no single perfect disinfectant for use in all circumstances. It is important to consider the surface to be cleaned and the harmful microorganisms most likely to be present. Most disinfectants are effective against most bacteria, enveloped viruses and fungi.

A clear understanding of the definition and function of different cleaning products is important to design an effective cleaning protocol. Three types of product are generally used for environmental cleaning:

- **Soap/detergent:** Cleaning agent which works by suspending dirt and grease. Does not kill harmful microorganisms.
- **Disinfectant:** Chemical agent which kills harmful microorganisms. Does not necessarily remove dirt or grease.
- **Degreaser:** More powerful soap/detergent specially formulated to penetrate layers of dried on body oils and other greasy debris.