

DO WE REALLY KNOW HOW TO CLEAN AND DISINFECT ANIMAL FACILITIES?

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Cleaning and disinfection is imperative to the well being of animals in captivity, this is especially true in modern animal housing, including **kennels**, where continuous use and dense concentration of animals may result in a condition known as “**disease built-up**”.

As disease producing bacteria, viruses, fungi, and parasite eggs accumulate in the environment, and can possibly become immune to disinfectants, disease problems can be transmitted to each group of animals housed. In certain instances where the facilities are never vacated, and have animals coming in and out almost daily, as in most **kennels and animal shelters**, the problem is compounded.

Thorough cleaning and disinfection provide the only successful solution to breaking the disease cycle and controlling the problem.

PRINCIPLES OF CLEANING AND DISINFECTION

Because organic matter, dirt and manure, for the most part, inactivate most disinfectants and protect infective microorganisms from germicidal activity, a **good and thorough** cleaning is a necessary prerequisite for proper disinfection.

There are many ways to properly clean a building and it depends on many factors, some are:

- Size of the building
- Building construction
- Populated or unpopulated
- Time available
- Available equipment
- Type of operation

Large buildings present different problems than smaller buildings. While “**elbow grease**” a brush and detergent are the ideal cleaning methods it is impossible to clean a large building this way. But one may have to, when all factors are considered.

The materials used in constructing the building must be taken into consideration. Is the building made of brick, mortar and cement? Do we have impervious surfaces, such as aluminum, stainless steel or plastics? Do we have an attic crawl space or do we have an open ceiling? All of these factors must be taken into consideration before deciding on how to clean the building.

Can the building be emptied and kept empty for a certain period of time, or do we have to clean the building or parts thereof while being populated as in most **kennels and shelters**? If this is the case certain pieces of equipment such as high pressure guns and “steam jennies” become impractical as they will atomize many of the solids and deposit them all over the building, which is not being disinfected, and one must resort to the time tested “**elbow grease**” method.

Your cleaning procedure will also depend on the time you have available to do the job. If the building is empty, and not going to be populated for say 5 to 10 days, then you have time for a thorough wash and disinfection job of the entire building, as compared to a building which is being used to full capacity, where animals have to be moved from cage to cage or run to run and you only have time to clean and disinfect that particular area.

The available equipment at your disposal, the time to do the job, the type of building, the type of surface, populated or not populated are going to determine what you can and can not use. Do not make the mistake of using the wrong piece of equipment because that is **what you have**. Sit down and examine what each piece of equipment can and can not do and what the end result will be. Can you use a high pressure gun and atomize particles all over the building so that you have to disinfect the whole building?

Kennels and shelters whether public or private need to be treated as major animal facilities. The animal care industry has become so big in size and numbers that it can no longer be treated as a sideline or hobby. It **must incorporate the knowledge and methods used by large commercial animal facilities. Make the change!**

Care must be used in choosing your disinfectants. Not all disinfectants work the same way. They all have drawbacks. Some are better than others. Some cost more than others. Being expensive does not make it better. Read all labels, ask questions. Remember you are not disinfecting kitchen counters or home toilets. **You are disinfecting large animal facilities.** Do not use household disinfectants and expect to have good results.

Do not get into a rut and assume what worked in the past is still the best, things change, change with the times, old recommendations may not be the best, we are always finding new ways to dispense and use chemicals and new chemicals. Make sure that the product you are going to use has EPA approval for what you are going to use it for, and ask for MSDS sheets; you must have these in your establishment for all to see.

There are many ways to properly **disinfect** a facility. As in cleaning, it depends on some of the following factors:

- Size of the facility
- Materials used for construction
- Populated or not populated
- Time available
- Equipment available
- Type of operation

The size of the building will have an effect on what disinfectant and how this disinfectant will be applied. Large buildings are better disinfected by copious amounts of a disinfectant solution usually applied by a high volume medium pressure pump. Smaller buildings need less volume and less pressure.

The building construction will also dictate what disinfectant you can use. Are the surfaces nonporous, such as porcelain or fiberglass, or are they brick, mortar and cement? Can they be wetted and kept wet for long periods of time? Will the surfaces react with the chemicals used, such as acid or caustic solutions?

Whether the building is populated or empty will also have an effect on what chemical to use. Will it release poisonous gases, such as bleach? Are they poisonous to humans and animals such as phenols? Again read the labels, ask for data.

How much time you have to do the job, days, hours or just minutes?

What kind of equipment do you have to disperse the disinfectant? You do not want to apply some disinfectants with high power equipment.

The type of operation will also dictate what kind of disinfectant you use, dairy, hatchery, kennel, pig farm, etc.

TYPES OF DISINFECTANTS

ALKALIES

Alkalies have been used as germicidal agents since ancient times. A pH greater than 9 will inhibit most bacteria, and some viruses. **Long wet contact times are required.**

Lye is a very caustic poison and must be handled with care; it will burn human and animal flesh as well textiles.

Lime (calcium oxide or quick lime) a very inexpensive disinfectant and is reasonable good around livestock. Powdered lime can be scattered around yards and lots with good results.

SURFACTANTS

Surfactants (surface-active agents) a chemical compound that lowers the surface tension of an aqueous solution, promoting wetting.

Soaps in general are mild disinfectants, but of low value when disinfecting animal facilities. Their primary value is in aiding the mechanical removal of contaminated organic material.

Quaternary ammonium compounds (QUATS) generally used to disinfect non porous surfaces such a laminates, plastics and stainless steel in meat and dairy plants. They do not posses substantial

virucidal, fungicidal or sporicidal action and are generally used in final rinses for eating, drinking and dairy equipment after mechanical cleaning.

These compounds are not suitable for disinfection of premises since they are readily inactivated by organic matter, **can form a film under which microorganism will flourish**, are neutralized by soaps, anionic detergents and hard water.

Many are sold as a combination detergent/disinfectant, in which case they serve mainly as surfactants.

Recent studies have shown that Quats are ineffective against Parvo and most viruses

HALOGENS

Halogens such as iodine and chlorine have potent antibacterial effects. In the presence of organic matter iodine is more active than chlorine.

Iodine is a good disinfectant but expensive for every day use in animal facilities. The most common form of iodine is a combination of iodine and solubilizing compounds, usually non ionic, used primarily for the disinfecting of dairy equipment.

Chlorine is a most unusual and versatile chemical since its properties differ so widely in the gaseous, liquid, solid and aqueous states. For this reason, each phase will be treated separately it by far the most controversial and misunderstood of the common disinfectants. It is essential that we understand four simple chemical facts of chlorine when used as a disinfectant.

- **One, that the active compound in chlorine that is a powerful disinfectant is HOCl (hypochlorous acid)**
- **Two, that for HOCl to be able to exist in that solution to be a strong disinfectant, the solution must not have a pH over 8.**
- **Three, that ample time be given to the solution, or that the solution has enough HOCl (ppm) to do the job.**
- **Four, that an ample amount of the solution be used in order to overcome the organic load we are trying to oxidize.**

Chlorine acts rapidly against bacteria, spores, fungi, and viruses. It's activity, however, is substantially reduced by organic matter, so it is essential that one, a good preliminary cleaning job be done, and second, that an ample amount of the solution at the right concentration be used to achieve the task in the least amount of time possible.

We can obtain chlorine from different sources:

Gas chlorine, very dangerous and will not be discussed further, primarily used to disinfect large volumes of water.

Sodium Hypochlorite is made by the reaction of chlorine gas, caustic soda (**lye**) and water, **also known as liquid bleach**, very low in chlorine. It is very unstable. To be able to store and transport it, more **lye** must be added. This raises the pH to levels to where **HOCl** is not present.

Bleach, is overrated and overused, It usually contains 5.25% Sodium Hypochlorite; it is very low in chlorine content and very corrosive, damaging metals, concrete, cloth, human and animal flesh. It can lose half of its chlorine potency in less than 60 days. It is a very poor disinfectant, requiring a long wet time because of the high pH and low chlorine content. The **-OCl** ion it produces is between 80 and 120 time less effective than **HOCl**. **It produces dangerous chloramine gas when mixed with ammonia, (urine) because of its low chlorine content. Most manufacturers recommended it to kill household germs only.**

“CLOROX BLEACH IS NOT CHLORINE, EVEN THOUGH SOME CALL IT “CHLORINE BLEACH”. IT HAS NO MORE CHLORINE THAN COMMON TABLE SALT (SODIUM CHLORIDE)” *copyright 1988, the Clorox Co. All rights reserved*

Calcium hypochlorite is found commercially as a powder or table form usually containing 65 to 70% chlorine. It is a strong chlorine releasing compound usually maintaining a pH of below 8, a strong producer of **HOCl**. It is strong organic oxidizer matter, not very corrosive because of the lower pH levels of the solutions, will not burn animal flesh. Unstable in solutions, **its HOCl content dissipates quickly so a strong (ppm) and ample amounts of the solution should be used.**

There are now in the market cal-hypo dispensers (KLORMAN SANITATION SYSTEMS) that can deliver an ample supply of super chlorinated water to do an excellent disinfecting job. 20 to 100 ppm FAC (free available chlorine) producing high quantities of HOCl @ 17+ gpm.

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MISCELLANEOUS DISINFECTANTS

Coal and wood tar derivatives

Hydrogen peroxide

Formaldehyde solutions

Peracetic acids

Sodium orthophenyphenate

Chlorohexidine

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