

Reptile Cage Cleaning and Disinfecting.

Q. What might be recommended for a clean/disinfectant agent to cleaning snake and other reptile cages?

When we are discussing cleaning, let's clarify some of the terms that are commonly used:

Disinfect: to free from infectious agents (bacteria) by chemical or physical means.

Disinfectant: an agent that will destroy many of the disease-causing microorganisms present on the surface of an inanimate object. These agents may or may not be effective against some viruses, Mycobacteria, protozoa or heat-resistant bacterial spores.

Sterilant: an agent that destroys all microbial organisms including heat-resistant bacterial spores. Sterilization can be achieved by boiling, autoclaving or exposure to toxic chemicals. Solutions that contain chlorine or glutaraldehyde are frequently labeled as chemical sterilants.

Germicide: an agent that when used as directed, will kill a specific group of organisms listed on the label.

Sanitizer: an agent that reduces microbial contamination on the surface of an object to an acceptable level. Sanitizers must not leave a harmful residue.

Antiseptic: an agent that can be used as directed to reduce the microbial population found on the skin.

Basically, a disinfected person or item is free of bacterial contamination, and something that is sterile should have no organisms, spores, bacteria, fungi or viruses present.

It should be noted that few disinfectants are able to work effectively when large amounts of organic material, which includes fecal material, foodstuffs, plants and other debris of that nature are present. You should also be aware that there is not one perfect, safe disinfectant for use in every situation.

Flaming and steaming are extremely effective for cleaning the surfaces of durable objects. Porous objects (such as wood, fiber and rope) are virtually impossible to clean and disinfect. Even surfaces that are considered to be smooth, such as plastics and metal have irregularities in which virus particles can accumulate.

Any disinfectants that can inactivate viruses are toxic, and care should be taken to prevent unnecessary exposure to residues and fumes by humans and pets.

Bleach (Examples: Clorox, Purex, Bleach)

Bleach is available in liquid and powder forms. It is a powerful oxidizer that can destroy many if not most microorganisms, including bacteria and viruses, but it has limited activity against spores of some bacteria and fungi. The presence of organic debris severely reduces the efficacy of oxidizing disinfectants. Ultraviolet light will also inactivate bleach solutions, as will evaporation and extremes in pH. Bleach solutions are widely used for disinfecting durable surfaces because they are easy to obtain, inexpensive and have a wide antimicrobial activity and low residual toxicity. One half cup of bleach to one gallon of water is effective in inactivating many infectious agents.

As you know, the strong odor can be quite irritating to humans and animals and the solution and fumes are toxic to living tissue, including skin, eyes and lungs. Bleach is also corrosive to metals and produces carcinogenic (cancer-causing) by-products. All disinfectants should be used in an area with adequate ventilation, especially when dealing with bleach. As with all disinfectants, after cleaning, surfaces should be rinsed thoroughly and allowed to dry before being placed in contact with herps.

Stabilized Chlorine Dioxide (Examples: Dent-A-Gene, Oxyfresh)

This is considered safe and is used by many municipalities as the principle agent for eliminating potential pathogens from drinking water. Unlike bleach, it does not form carcinogenic compounds. Stabilized chlorine dioxide is rapidly inactivated by organic debris and exposure to sunlight.

Chlorhexidine Gluconates (Examples: Nolvasan, Virosan)

These compounds are often used as disinfectants for inanimate objects and as antiseptics for cleaning skin and wounds. These are relatively nontoxic to the skin. Some Chlorhexidine products also contain alcohol, and these are superior to those just containing Chlorhexidine. These are also noncorrosive and are safe if they come in contact with skin. They have good activity against many bacteria, yeast and some enveloped viruses. They also have limited activity against some bacteria, including *Pseudomonas* sp., spores produced by the bacteria causing tuberculosis (TB) and non-enveloped viruses. It is also not very effective in the presence of organic material and it is not considered to be that stable, so it must be made fresh at least once per day. It is suggested that hexachlorophene (PhisoHex) is a potent carcinogen (cancer-causing agent).

Glutaraldehydes (Examples: Cidex, Wavecide, Sporicide, Sterol)

These chemicals have the ability to rapidly inactivate many microbial agents, including most bacteria (including *Mycobacteria*, which cause TB), many viruses and *Chlamydomyces*. They are effective against many viruses, even in the presence of organic material, and once made up into a solution, they are stable for two to four weeks. While these chemicals are very effective, they are not frequently used because of the widespread side effects, which may cause eye irritation, respiratory tract irritation and skin lesions (including cracking, peeling and bleeding) in both humans and animals. Some glutaraldehydes are corrosive, others are not.

Iodines (Examples: Betadyne, Povidone iodine, Prepodine, Virac)

Iodines are oxidizing agents that are usually used as antiseptics for cleaning wounds and skin. Many of the compounds used for pets and humans are called "tamed" iodines, meaning that they are iodines mixed with a detergent, making them iodophors.

Iodine-containing disinfectants generally do not produce much in the way of toxic vapors, they are available mixed with detergents for both cleaning and disinfecting, and are effective against many bacteria, some viruses and fungi. They are generally considered to be more expensive than other products, and often must be used full-strength, are toxic if ingested and may cause drying and cracking of the skin. They are not effective against all strains of *Pseudomonas* and some viruses. Many are inactivated by the presence of organic material, so items to be disinfected must be thoroughly cleaned first.

Phenols (Examples: Avinol-3, Lysol, Environ, One Stroke, Staphene)

Sodium orthophenol is the active ingredient in most phenol-containing disinfectants. Phenols can inactivate many bacteria, including *Pseudomonas* and the bacteria responsible for causing TB, fungi and some viruses. Organic material can affect the activity of phenols, as can the temperature, pH and concentration of the disinfecting solution. Phenols are inexpensive and rinse off easily, so that they don't leave much of a toxic residue. However, they are toxic to many tissues; irritating to the skin, eyes and respiratory tract; and are especially toxic to felines and

reptiles, so it is important to rinse phenols off well from anything that may come in contact with herps.

Quaternary Ammonium Compounds (Quats) (Examples: Barquat, Omega, Parvosol, Roccal, Zephiran, Quintacide)

Quats are organic compounds combined with ammonia. Because of their chemical composition, these agents may function as a detergent and help to remove organic debris from contaminated objects. Quats are inexpensive, are relatively safe and inactivate many types of bacteria, some viruses and Chlamydomphila. Soap and organic debris may inactivate Quats. They should not be used for removing spores, Mycobacteria (the organisms causing TB), fungi, many nonenveloped viruses and Pseudomonas. Quats are difficult to rinse off and may leave a slimy residue. Ingestion of quats and possibly inhalation can cause respiratory paralysis and even death! These agents are not recommended for objects that will be in direct contact with herps.

Alcohols:

Seventy percent ethanol (alcohol) inactivates many bacteria and viruses; however, this usually requires a long contact time of at least 20 minutes. Alcohols perform best in the presence of moisture. Some viruses are resistant to inactivation by alcohol. Alcohols will dissolve some plastics, rubber and glues, and must be used cautiously around those items. Alcohol fumes can be irritating to the eyes and mucus membranes.

Formalin and Formaldehyde:

These are extremely dangerous and toxic compounds, and should not be used routinely for disinfection.

Soaps and Detergents:

These are divided into two groups: anionic soaps (with a negative charge) and synthetic detergents (positively charged). Soaps and detergents work by reducing the attraction of greases and dirt to an object. In some cases, specific chemical disinfectants are combined with a soap or detergent. These agents are primarily used to clean and disinfect areas or objects that are contaminated with large quantities of organic debris. Household detergents are great for cleaning bowls, dishes, enclosures, rocks and hide boxes, and as with all cleaning agents, items should be rinsed well and dried thoroughly before being replaced in the cage.

Steam and Heat:

Commercially available units are now available that release steam that can be used to clean, remove debris and disinfect surfaces. I have a steamer for cleaning cages, and it is easy to use, is safe and very effective in removing many harmful organisms and debris. Of course, be very careful to not burn or melt plastics, and never steam clean with the herps in the enclosures, as severe burns can occur. I use a steam cleaner routinely to clean my cages and cage equipment, and I recommend them highly.

So, now you have a basic understanding of the principles of cleaning, disinfecting and sanitizing. Now, you can choose the agents and equipment that should be right in your situation for keeping your herps healthy. Also, because of the risk of salmonellosis, other bacteria and parasites that could potentially be transmitted to humans, you should never clean herp equipment in your kitchen sink or in areas where human food is prepared. If you use a tub or shower that is also used by humans, make sure you adequately disinfect those areas after cleaning herp stuff.