Keeping It Clean: Cleaning and Disinfecting Your Reptile or Amphibian's Enclosure

By Eric Roscoe and Erica Mede

One commonly requested subject when it comes to the captive care and maintenance of reptiles and amphibians is that of proper cleaning and disinfection. Which products or solutions are out there and available that are commonly used? How should it be properly done to best ensure the health and safety of both you, the pet owner or hobbyist and the animal(s) being maintained? What are some of the general do's and don'ts surrounding the use of any of these chemicals, techniques, and proper cleaning and disinfection procedures? Many people do not think about or make the distinction between cleaning and disinfection, but when it comes to proper reptile and amphibian care and health, knowing the differences and doing both are important in ensuring your animal's enclosure remains clean, and them happy and healthy. While the cleaning and disinfecting agents and procedures used can depend largely on the species of animals being maintained, as well as the enclosure and its material, the desired purpose or type of infection to be prevented (parasites, bacterial, fungal, viral, or other infection), substrate being used, and/or even individual preference, this article will serve as an organized and concise guide and resource on the subject which may be used and referred to by novice to experienced reptile and amphibian pet owners, hobbyists, or keepers alike.

Cleaning Vs. Disinfecting: The Differences

When it comes to cleaning your reptile or amphibian's enclosure, this largely entails the general removal and disposal of any solid or organic and physical debris left in the enclosure by you or your animal. Some examples of such can include any uneaten food, feces, urates, infertile eggs or "slugs", blood, or any other bodily secretions, wastes, or other organic matter. It is important to remove these forms of debris as soon as possible in order to prevent the further buildup and proliferation of any bacterial or other disease growth. This is commonly referred to as "spot cleaning", and the more vigilant one is during this stage of cleaning, the easier they are to remove and to better ensure that further cleaning and disinfecting methods will work effectively. If, however, the substrate used is a non-particulate or artificial, it must be disposed of and replaced entirely or rotated to allow thorough enough cleaning, disinfection, and drying of the pieces being used.

Begin further cleaning and disinfecting by removing and adequately securing any and all animals, substrate, furnishings, food and water, and other décor. Cleaning can oftentimes be best done by using clean, hot, and soapy water to assist in loosening up and dissolving any remaining surface debris or wastes, and then rinsing with clean water to remove and flush any unwanted debris away. If an enclosure cannot easily be taken to a sink, tub, or hose, additional cleaning materials such as sponges, wash cloths, scrapers, disposable gloves, and/or paper towels may be required to thoroughly clean and rinse the area. Nearly any liquid dishwashing or diluted other household antibacterial soaps or detergents will work well for cleaning purposes, but should not be used in place of further, proper disinfectants to be discussed next.

Disinfecting on the other hand, kills or removes most micro-organisms present upon the surface being cleaned that can potentially lead to further disease or infection by preventing or inhibiting their growth. Disinfection may not be a suitable means of removing or eliminating all types of parasitic infections, but it can often be an effective means against many types of bacterial, viral, and fungal infections. Different distinctive agents and solutions can often have different levels of strength, functions, or time required to be left in contact with the surface to be effective, although many typically kill such mico-organisms by damaging or denaturing their cellular walls, lipids, or proteins, or sometimes damaging their DNA and other nucleic acids. Bactericides are disinfectants which kill bacteria, while fungicides are disinfectants which kill fungi, and virucides kill viruses. Furthermore, to sanitize is to reduce the amount of micro-organisms to a safe and manageable level, while sterilization is to effectively kill all such mico-organisms.

In order to effectively disinfect, first ensure that the enclosure or surface has been thoroughly and properly cleaned. This is to ensure that any disinfectants, chemicals, or sanitizers and sterilization solutions will not be denatured by organic wastes, debris, or prior cleaning agents used. To begin disinfecting and object or surface, the agent or solution should be generously applied using a saturated wash cloth, sponge, or spray bottle. If the object is small enough, it can be allowed to soak in a container of the solution as well. The time required for the solution to sit and become effective depends on the product or solution and its strength, as well as the types of infections or pathogens intended to be killed. Solutions should be allowed to sit anywhere from 30 seconds to 30 minutes or more depending on these factors. Some products will then require thorough rinsing or further cleaning after application to prevent potentially harmful residues from affecting you or your animals, while others can be allowed to remain on the surface or object for continued infection protection and prevention.

Common Disinfective Agents and Solutions

There are many different products and solutions available which can be used relatively safely in cleaning, disinfecting, sanitizing, and/or sterilizing your reptile or amphibian's enclosure. As previously mentioned, each of these may have differing levels of strength, functions, types of infections they can prevent, and time required to be left in contact with a surface to be effective. No matter the solution or sterilization agent used, always be sure to use caution when using and applying any of the following solutions as even the most relatively safe or benign solutions can be potentially harmful if used improperly or if prolonged exposure is allowed.

Chlorine Bleach: Also known as household bleach, liquid bleach, or by the brand name of Chlorox, this is

a solution consisting of sodium hypochlorite and sodium hydroxide and water. Bleach is a very commonly utilized anti-microbial solution which can kill a wide range of micro-organisms. It should be used with caution, however as this solution can cause skin, eye, and mucuous membrane irritation upon contact, and fumes can also be potentially harmful, especially if allowed to react with other substances. This can lead to unintentionally creating volatile organic compounds commonly present in stronger and more harmful household chemicals such as paints. A general guideline for disinfecting with bleach is to typically use no more than a 10% solution. Chlorine bleach should be thoroughly rinsed after use in disinfecting. Some other chlorine solutions, such as stabilized chlorine dioxide, or by the brand name of Oxyfresh, can also be used if in smaller percentage solutions of 0.5% or less.

Hydrogen Peroxide: Hydrogen peroxide is another form of oxidizing bleach that works with oxygen rather than chlorine. It is often considered a relatively safer option for disinfecting, but is often less effective without the assistance of other agents. If mixed with certain other chemicals, however, such as vinegar, it can become highly caustic and volatile, and as with other chlorine bleach solutions, caution should be used when working with it and around its fumes. Hydrogen peroxide is typically available at a 3 % solution, although stronger solutions are also available, but should be used with even further caution. Any hydrogen peroxide solutions must also be rinsed thoroughly after use.

Vinegar: Also known as acetic acid, vinegar is a solution which makes for a suitable cleaning solution, particularly on glass, but is typically a less effective disinfectant. Vinegar may be used at full strength, of mixed in a 50-50% solution with water for cleaning purposes.

F10 Veterinary Disinfectants: F10 Veterinary disinfectants are a relatively new formula solution approved by the U.S. EPA (Environmental Protection Agency), and has been widely used in veterinary practice elsewhere around the world. Consisting of a quaternary ammonium (Benzalkonium Chloride) and a biguanide compound, Polyhexamethylene Biguanide (or PHMB), this added boost in solution can be highly effective for killing a wide variety of viruses, bacteria, and other micro-organisms, and may need to be rinsed to prevent its residue afterwards or can be safely left depending on the formula. Although fairly expensive, it is also non-irritating, non-damaging to surfaces and equipment, and an effective solution recommended for use. Two formulas are currently available in the U.S. for surface cleaning and disinfecting and long lasting protection. One formula, due to it being concentrated, and potentially irritating, must be diluted to a recommended ratio of 1:500, although for higher levels of disinfection, a ratio of up to 1:125 can be used.

Alcohols: Alcohols, such as isopropanol rubbing alcohol, are solutions which can often be strong and effective at killing a wide variety of viruses, bacteria, and fungi, but is often not recommended as a surface disinfectant since it can evaporate quickly and is also highly flammable. For enclosure furnishings and other smaller objects, alcohol may be used at full strength, although for household use, it is typically either diluted to a 70% solution of mixed in a 50-50% solution with water. Contact with mucous membranes should also be avoided when using alcohol.

Ammonia: Ammonia is a solution compound consisting of highly caustic nitrogen and hydrogen. While not generally considered an effective disinfectant, this solution can kill some parasites and micro-organisms when in high concentrations. Ammonia has a highly pungent odor, however, and contact with

skin and mucous membranes should be avoided, and it should also be rinsed after use.

Chlorohexidine: Chlorohexidine is a multi-purpose disinfectant which may be used to treat and disinfect a wide variety of surfaces, as well as skin and skin wounds at lower concentrations. This solution comes in many forms, although the most common for veterinary and cleaning uses are chlorohexidine diacetate (or Nolvasan), and chlorohexidine gluconate, or generic solutions. It should be diluted to about 10% prior to use, and rinsing afterwards is usually not necessary. Chlorohexidine can be ineffective against some micro-organisms, however.

Iodines: Iodines are oxidizing agents that are often used as antiseptics for wound and skin care as well. Many that are for household use are "tamed", meaning they are mixed with a detergent, making them iodophers. Iodines are typically relatively safe to use as disinfectants as they produce little to no harmful fumes, are available for both cleaning and disinfecting, and are effective at killing many types of micro-organisms. Iodines can be relatively expensive, however, often must be used at full strength, and may be toxic to ingest and/or irritating to skin. They also may not be effective against all microbes.

Other Non-Chemical Sterilization Methods: Several other, non-chemical disinfecting and sterilization methods are also available, but may have varying degrees of success and effectiveness depending on the duration of treatment, the pathogens, and/or surfaces being disinfected. High heat settings and exposure at or above 120 degrees Celsius, or about 250 degrees Farenheit, can kill many parasites and micro-organisms, but not all in every case. Many household steam cleaners can reach these temperatures, but using them for sufficient time and duration for the purposes of disinfecting is not typically recommended in most cases. High heat can also melt or warp plastic and many other surfaces and furnishings, but can be effective in disinfecting woods, rock, or other natural furnishings. Boiling and baking at 350 to 400 degrees Farenheit using an oven are also options, but may also be limited in effectiveness depending on the object's porousness, material and surfaces as well and safety procedures should be followed to prevent any fires. Natural UV and sunlight radiation are further options which can also kill many micro-organisms. However, these methods typically require long exposure times, have no reliable guidelines for usage, and can also damage or degrade surfaces or furnishings.

Summary and Do's and Don'ts of Cleaning and Disinfecting

-Do learn and become familiar with the differences between cleaning, sterilization, and disinfecting, and establish a regular, routine procedure for practicing all of these procedures.

-Do identify, select, and use a proper strength and concentration of sterilization or disinfecting solution for the type of infection or micro-organisms to be targeted (parasites, viral, bacterial, and/or fungal) for best effectiveness.

-Do use caution when using any sterilization or disinfecting agents or solutions, and be sure to read and follow all product labels and instructions regarding their usage and storage. Be sure that any area in which disinfectants are used are adequately ventilated to avoid exposure to potentially harmful fumes.

-Do always practice and establish safe and proper preventative quarantine and cleaning measures for

any and all newly acquired animals. Also do always thoroughly clean, sanitize, and disinfect or dispose of any and all cleaning and disinfecting materials, utensils, and supplies between animals or enclosures to reduce the possibility of cross-contamination.

-Do always use additional care and caution when using any cleaning and disinfecting solutions around any amphibians, or other sensitive skinned or health compromised animals.

-Don't mix chemical solutions or agents unless otherwise instructed to do so. Doing so may be in violation of the U.S. EPA and other local, state, and federal agencies regarding their regulation of usage.

-Don't use or allow direct or indirect contact between any chemical sterilization or disinfecting solutions and yourself or your animal(s) unless otherwise instructed. Many of these sterilization and disincentive agents and solutions mentioned above possess properties and characteristics which can be harmful to potentially harmful to non-target organisms as well.

-Most of the commercially available reptile sprays or disinfectants can be used quite safely, and can kill some of the more common bacteria and micro-organisms, but are typically very low strength and contain mostly inert ingredients.

-Don't forget to always clean and disinfect enclosures and furnishings away from any areas where food may be prepared and/or consumed whenever possible to reduce the likelihood of contracting salmonella or other zoonotic diseases from animals.

-Do avoid using some other disinfecting solutions not mentioned above such as formaldehyde, formalin, and other aldehydes and "scented" products such as Pine-Sol, Lysol, and other phenols (or Sodium orthophenol). These are highly toxic to reptiles and amphibians as well as some other animals. If phenols are to be used, they must be rinsed thoroughly afterward.

-Do always spend further time in person at local herpetological society and other seminars in which proper cleaning and sterilization and disinfecting methods may be discussed or presented as a lecture or presentation topic and to learn more and gain hands on knowledge and experience in practicing cleaning and disinfecting measures.

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