

WATER QUALITY

Testing ammonia, nitrites, and nitrates tells you about the health of a biological filter. As stated before, ammonia is formed by decaying organic material and is broken down into nitrites and nitrates by the biological filter. If there are healthy bacteria in the biological filter, then ammonia should be zero or very close to zero. Any rise in ammonia is a concern, especially with amphibians. Consult your experienced reptile/amphibian veterinarian immediately if you see a significant rise in ammonia. Nitrites should also be very low. This value should also be near zero. For some animals, a value of 1 ppm (parts per million) can be toxic. Nitrates are less toxic, but should still be kept between 20-40 ppm by performing regular water changes. This is especially important for fully aquatic amphibians such as axolotls and African clawed frogs, but may be difficult to maintain with slider turtles or other animals that have more heavy diets and more fecal output.

Alkalinity and pH go together very well to assess the acid/base status of the water. The acid/base is measured by pH, with 7.0 being neutral, less than 7.0 acidic, and greater than 7.0 basic (alkaline). Most aquatic reptiles and amphibians will do best in water near a neutral pH (6.8-7.2) but these needs will vary by species. You must learn the individual requirements for the pet that you are caring for. Maintaining a stable pH is extremely important, sometimes even more important than maintaining a specific pH. Frequent variation in the pH can be very stressful and can affect the health of your pet. Testing pH frequently and varying the time of day that you test can help ensure that it is remaining stable. Testing alkalinity also helps to evaluate for pH stability. Alkalinity measures the level of compounds present that contribute to the ability of the water to resist changes in pH. Low alkalinity can result in drastic pH changes that can be stressful or even fatal for animals living in an aquarium or pond.



Most aquatic reptiles and amphibians kept as pets live in freshwater; not sea water. However, there are times when a low level of salt is maintained in the aquarium for health reasons, either for good electrolyte balance or for parasite control. If salt will be maintained in the water, you should ideally be able to test the salinity on a very small scale. Salinity much above 0.3% (3 parts per thousand) can be stressful and create health concerns in most commonly kept aquatic reptiles and amphibians. Some refractometers and hydrometers are capable of measuring salinity at this level, but most are not sensitive, so finding a reliable salinity monitor is required.

SUMMARY

Proper water quality, regular water testing, proper filtration, and regular water changes will help create a healthy habitat for your aquatic reptile or amphibian. A healthy habitat is the first important step to a healthy pet that will have a long, happy life.

Regular visits to your amphibian/reptile veterinarian should be scheduled to check for parasites and other early signs of disease and to promote a long, satisfying relationship with your reptile or amphibian. For help in finding a reptile/amphibian veterinarian in your area, contact the Association of Reptile and Amphibian Veterinarians (www.ARAV.org) or contact the American Board of Veterinary Practitioners (www.ABVP.com/diplomate).

ADDITIONAL READING/REFERENCES

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IMPORTANT NOTE: Most, if not all, reptiles and amphibians carry Salmonella bacteria in their intestinal tract and intermittently or continuously shed these bacteria in their feces, so they are unsuitable pets for very young children and those with compromised immune systems. Good hygiene must always be practiced around all reptiles and amphibians, including aquatic reptiles and amphibians. For more information, please see the handout, Salmonella Information for Reptile Owners at <http://arav.org/salmonella-bacteria-reptiles>.

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Contributor

Mike Corcoran, DVM, DABVP (Reptile and Amphibian), CertAqV



WHY IS WATER QUALITY IMPORTANT FOR MY PET?

If you have an aquatic reptile or amphibian, water is the location for eating, swimming, resting, urinating, defecating, and often breathing. In the wild, most animals are in very large bodies of water with currents or tides that help flush out impurities, but in captivity they live in much smaller, closed water systems that must be kept clean with filtration. The filtration, temperature, and acidity of the water all need to be in a narrow range to help keep your pet healthy, just as your living area requires good air circulation, ventilation, and an air filter in your HVAC to keep your air quality good and prevent respiratory concerns.



UNDERSTANDING FILTRATION

The first important thing to know about water filtration for your reptile or amphibian is that they are much messier than fish. This means that you must have a filter specifically designed for reptile use. If you must use a fish filter, then it should be rated for 2-3 times the volume of water that you have for housing your pet (example: a filter designed for a 20-30 gallon fish tank is needed for a 10 gallon tank with a reptile or amphibian).

There are three (3) components to a good filtration system:

1. Mechanical Filtration
2. Biological Filtration
3. Chemical Filtration

Not all systems require all three types, but they complement each other well and utilizing more than one type is beneficial. If a canister type of filter is used, all three may be present inside the canister.

Mechanical Filtration

Mechanical filtration removes large particles from the water, including plant material, food, and feces. There are many different types, including felt pads, felt "socks," sand, and thick cotton. This part of the filter usually needs to be rinsed or cleaned periodically. When doing so, clean water should be used for the process. Detergents and soaps are not usually required. If detergent or soap is used, the filter must be thoroughly rinsed before placing it back into the system.

Biological Filtration

The biological filter is the portion that has beneficial bacteria used to break down waste products. This part of the filter may appear as brushes, a wheel, sponges, bio-balls, or rocks. These provide a surface

area on which the beneficial bacteria can grow and live. The size of the biological filter needed depends on the size of the tank, feeding schedule, and number of animals housed in the tank. Consult with your experienced reptile/amphibian veterinarian for proper sizing of biological filters for your pet. Water testing can monitor the health and effectiveness of the biological filter and it will be discussed later:

When any organic material (food, feces, scales, etc.) breaks down in the water, it forms ammonia. Ammonia in the water can be irritating to the skin or even toxic to the animal. The bacteria in the biological filter break down that ammonia first into nitrites, then into nitrates, each requiring a different species of bacteria in the filter. At each stage in this process, the product formed (nitrites and nitrates) is less irritating and less toxic to your pet. The nitrates are ultimately removed from the water by regular water changes, though a small amount will naturally become nitrogen gas and escape harmlessly into the atmosphere.

The components of the biological filter should not be cleaned, as this can remove the beneficial bacteria and destroy that part of the filter. Any time medication is used in the tank water, you should consult with your experienced reptile/amphibian veterinarian first to ensure that the medication will not hurt the bacteria in the biological filter. Over-the-counter medications are not recommended for your pet. These medications can harm the bacterial filter, compromise your pet's health, compromise the water quality, and typically have poor quality control standards.

It's also important to know that the biological filter takes time to establish in a new tank, so setting up a tank and immediately placing your pet in the system can be dangerous to the pet's health. See additional publications on establishing a biological filter in an aquarium or pond.

Chemical Filtration



Chemical filtration is the use of different chemicals to remove impurities in water. The most common type of chemical filtration in home filtration systems is activated charcoal. This is present in most canister filters. The charcoal will bind chemicals so that they can be removed from the system. It may also interfere with water-based medication and may need to be removed if those treatments are prescribed by your veterinarian. Activated charcoal should be changed periodically; the frequency depends on many factors, but on average every 6 months.

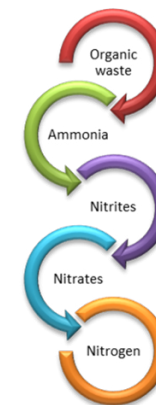
Salt water systems may also have a protein skimmer (foam fractionator) that uses the chemical properties of proteins in water to remove impurities. Ozone generators are another form of chemical filtration, but they are rarely required in home aquariums.

WATER CHANGES

As previously mentioned, regular water changes remove the nitrates from the water. A weekly 25-50% water change is an important part of maintaining good water quality. Circulating pumps should be turned off for the water change to avoid getting air into the pump and causing damage. Remove 25-50% of the water and replace the volume with fresh, clean water. See the section on water quality testing for more information on timing. Water changes should be more frequent if any elevations in ammonia, nitrites, or nitrates are shown in testing.

The replacement water should be a similar temperature and pH. It should also be dechlorinated using a chemical dechlorinator. Historically, it was thought that keeping water out for 24 hours would allow chlorine to "off gas", however, municipal water systems are more commonly utilizing chloramine, which has a different chemical composition than chlorine. It is far more stable, so water treatments are required for removal. Alternatively, you can use reverse osmosis water. This is a good idea for amphibians, who are far more sensitive to any impurities in the water. The temperature and pH should still be a close match with reverse osmosis treated water. A low level of salt may need to be added to the water, depending on the species. Become familiar with the needs of the individual species you are caring for. If there is salt in the water, realize that the salt will not evaporate with water, so you may need to keep some water without salt to replace the water lost by evaporation between water changes. If a mechanical filter is in use, this is a good time to clean this filter.

WATER QUALITY TESTING



Regular testing of the water is very important. Water quality should be tested weekly at the time of the water change, and only requires a few minutes of time. There are a variety of water testing kits available. You should look for one that tests ammonia, nitrates, nitrites, and pH at a minimum. It is also wise to test alkalinity in your system. In addition to the testing kit, you should invest in a thermometer that remains in the water for monitoring the temperature. Sometimes salinity testing may be required, and will be discussed but may not apply to all systems. You should expect to invest around \$30-40 USD

to get a good quality testing kit. Colorimetric kits are generally the best balance of cost and accuracy. These kits use color changes in test tubes to show ranges and values for each component tested for. Test strips are cheaper, but also far less accurate.