Poison Prevention: How to Prevent Contamination of Your Aquarium

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Aquariums are very different when compared to other pets that are commonly kept within the home. With an aquarium, we are responsible for controlling practically every aspect of the environment that is needed to keep the fish, plants, invertebrates, and corals healthy. Unfortunately, because of this, it is very easy to introduce toxins that can corrupt the quality of this environment, which can lead to possible losses of aquarium inhabitants or algae problems. We can reduce the risk of contamination by understanding what the common sources are, as well as what we can do to both prevent them, and remove them if they are introduced.

Evaluate your water source

The first place to start in keeping your aquarium toxin free is evaluating your water source. Municipal or city water is commonly treated with chlorine that inhibits bacterial and algae growth within the water lines. Chlorine is toxic to fish and other aquarium inhabitants. It can also kill bacteria, which will have a negative impact on the biological filtration of the aquarium. In addition to chlorine, chloramines may be present, which are also toxic. When performing water changes using untreated city water, the chlorine will kill off a percentage of the bacteria within the filtration system resulting in an increase in ammonia and nitrites. These two chemicals are extremely toxic to the aquarium, and should always be maintained as close to zero as possible.

Prevention remedies for contaminated water sources

To remedy the problem of chlorine in the water, consider:

- **Chemical conditioners:** There are many available tap water conditioners, such as Stress Coat or AmQuel, which will quickly detoxify chlorine and heavy metals that are within the water.
- **Physical removal:** Another procedure to remove chlorine is to simply aerate the water with an air pump and stone for a few days prior to use. This will dissipate the chlorine into the atmosphere making it safe for aquarium use. However, this method will not remove any heavy metals that are contained within the water, and should only be used with source water that does not contain high concentrations of these metals.
- **Water purification:** The final method of purifying tap water will not only remove toxins from the water, but also other impurities that are contained within the water. This method involves using a water purifier. Many types of water purifiers are commercially available, and they range in both price and efficiency.
    - **DI purification units:** A simple DI (De-Ionization) unit is very economical and will remove chlorine and many other impurities as well as metals from the water. These systems are very inexpensive up front, but the frequency of cartridge changes can make them impractical if treating large amounts of water. The amount of water that can be produced in between cartridge changes will vary on the purity of your source water.
    - **RO purification units:** Reverse Osmosis (RO) units are the most efficient at removing a wide range of impurities from tap water, and can be combined with a DI cartridge to provide water that is over 99% pure. This method of purification is ideal for aquariums that are heavily stocked such as freshwater planted and saltwater reef aquariums. For more information on RO units (see our article Reverse Osmosis: Selecting a Unit).

Please note: Some municipalities within the United States will "shock" the water lines a few times a year in order to combat bacterial and/or algae blooms within the water system. This is typically done in the warmer climates within the southern states. A simple phone call to your municipality will alert you as to what time of year this will occur, as well as the type of chemical that will be used. If you do not use either a DI or RO unit, it is advised to use bottled water during these periods of municipal maintenance.

If you are moving into a newly constructed home, and the water lines are copper, these lines will leach copper into the water for a short period of time until the lines oxidize and become stable. Only use water from this new home if you are treating it with a DI or RO unit for the first few months. A simple water test kit for copper will indicate as to when the water becomes safe for you to use.

Examine physical sources

Toxins that arise in the aquarium from physical sources are the easiest to prevent, but can be some of the most poisonous to the system. Physical means of contamination include:

- Bug sprays, deodorants, lotions, and perfumes on hands and arms when reaching into the aquarium
- Chemicals and medications inadvertently added directly to the aquarium
- Overfeeding and oversupplementing the inhabitants in the aquarium

Prevention remedies for physical toxins

To avoid physical contamination, wash your hands and arms with soap and water prior to placing them into the aquarium. Be sure to rinse very well to remove any soap residue prior to performing aquarium maintenance. Long gloves may be worn, but these, too, should be free of any chemical contaminants. Keep all chemicals, medications, and food out of reach from children. Small children love to see fish eat, and will be tempted to feed the fish whatever they may think the fish will eat. It is wise to make it difficult for the child to enter the aquarium by either placing something heavy on the canopy, or even locking the canopy with a childproof latch.

In the event physical toxins have entered your aquarium, you will need to take immediate action. Water changes of up to 30 to 40% with treated water of the same temperature as the aquarium should be the first step. If the aquarium has been overfed, simply siphon out any uneaten food during the water change. However, if a chemical has been introduced, after the water change, add large amounts of fresh activated carbon to the filtration. Pads designed for chemical removal are also beneficial. For example, a Poly Filter can simply be located in an area of the aquarium's filtration system that receives high water flow. Monitor the health of the aquarium, and continue to perform water changes daily until the condition improves.

Evaluate airborne sources

Airborne contaminants are the most overlooked and underestimated toxin source for an aquarium. They include a wide range of sources from common household cleaners, to remodeling activities, to invasive pest control.

- **Household cleaners**: Common household cleaners and aerosols such as glass, wood, and oven cleaners, as well as deodorants and air fresheners release an airborne mist of tiny droplets of the chemical of which it is made. If these products are used in close proximity to the aquarium, they enter the water and quickly turn into ammonia. This will cause a drop in the water's pH as well as stress on the aquarium's inhabitants. Even in small amounts, this ammonia over time can lead to algae problems, as it provides added nutrients for the various forms of microalgae.
- **Remodeling activities**: Remodeling activities including painting, staining, the production of airborne dust, and any chemical that causes a strong odor, will have the same results as the cleaners and aerosols mentioned above. Airborne dust is less dangerous to the system, but it can be a major contributor to the phosphate level in the aquarium, leading towards even more problems with algae.
- **Pest control**: Fumigating and using bug bombs to rid your house of pests and insects is more of a serious situation, as the chemical used will stay within the air for a longer period of time. It is best in this situation to move the aquarium out of the treated environment. This may not be possible with a larger or heavily stocked aquarium like a saltwater reef aquarium.

Prevention remedies for airborne toxins

The best solution to these airborne contaminants is to avoid using them. When cleaning around the aquarium, do not spray the cleaner into the air. Instead, spray the cleaner into a cloth and wipe it onto the surface. If cleaning in the kitchen, close off the area where you are cleaning, and turn on any exhaust fans that are present.

If the airborne toxins are unavoidable and will remain in the air for only a few hours or less, simply cover the aquarium and the filtration system with plastic sheeting or a plastic wrap to keep the contaminated air out of the system. If remodeling, follow the above, and provide the aquarium with fresh activated carbon.

Pest control using a fumigation procedure is going to present the most problems. Many of these products or services will saturate the air for many hours or even days at a time. If it is not possible to move the aquarium, the only choice that you may have is to completely seal the aquarium with plastic so it is airtight. An aquarium will not survive for very long without oxygen, so an oxygen source is mandatory in this case. One solution to this problem would be to locate an air pump outside of the house, and to pump fresh air into the bubble that you have created around your aquarium. Make sure that the air pump is strong enough to push the air through the amount of tubing that is necessary to reach the aquarium. If using this method, you will also need to run a second airline from the aquarium back outside to provide venting.

Avoid contamination of your aquarium at all costs

Protecting and keeping your aquarium toxin free can be a difficult task, but knowing the common causes and taking the right actions in case of contamination, will greatly reduce or eliminate your losses. Always monitor the health of your aquarium when both performing water changes, and when chemicals are used in its vicinity to determine if your aquarium has been contaminated.