



## Water Quality and the Nitrogen Cycle

### Introduction

One of the most important parts of axolotl husbandry is maintaining good water quality and the nitrogen cycle within the tank. Poor water quality and incorrect water temperature are the most common causes of illness in pet axolotls. Regular water changes and monitoring of water quality is required to ensure that your pet is not swimming in water that is full of waste products. Clear water is not necessarily clean and free from wastes and harmful chemicals.

### Water Temperature

Axolotls require water temperature to be maintained between 14 and 19°C, year round. This often necessitates a water chiller in the warmer months, especially in Queensland. If temperatures rise above this, it will cause significant stress to your axolotl and can result in disease.

### The Nitrogen Cycle

Axolotl waste products, leftover food and decomposing plant material release ammonia into the water. Ammonia is a toxic chemical. Denitrifying bacteria then convert this into nitrite and then nitrate which are less toxic chemicals. Nitrate is removed from the tank with small, regular water changes by the owner or absorbed by plants living in the tank. The denitrifying bacteria live in the filter, substrate and plants and cannot be seen with the naked eye.

### Setting up an Axolotl tank

It takes about 6 weeks for the denitrifying bacteria to completely establish within a new tank. The tank should be set up and left with the filter running for about 6 weeks before introducing your turtle. Plants and other organic matter should be added slowly during this time to 'feed' the bacteria. Water quality parameters should be tested two to three times a week during this time, to ensure that the nitrogen cycle is established and then maintained.

### Weekly water changes

Once your tank is established, between 10% and 20% of the water from the aquarium should be removed and replaced once a week. These small water changes will remove excess levels of ammonia, nitrite and nitrate but not affect the pH of the tank water or the good bacteria.

This water can be removed from the tank with a gravel vacuum/siphon, thereby cleaning the substrate at the same time. It is important to also only clean between 10% and 20% of the substrate each week. Cleaning more than this can result in releasing large amounts of toxic ammonia into the water as well as removing too many of the good, denitrifying bacteria living in the substrate. A different section of the substrate should be cleaned each week.

Leftover food and faeces can also be removed from the tank daily, but ensure the substrate is not disturbed during this time.

The pH of any incoming water should be tested, and adjusted to the same pH of the water in the tank before it is added. For this reason it is easiest to fill large buckets of water, test and treat them, and then siphon them into the tank.

### Water conditioner

Treat all water before it enters the tank with a water conditioner. This removes any chlorine and other toxic chemicals from the water which could harm your turtle and the denitrifying bacteria. We recommend a product called Prime, made by Seachem.

### Filter Cleaning

This should be done regularly enough to ensure that the contents of the filter are minimally dirty. It should be done at a time separate to the weekly water changes. The filter media should be cleaned in a bucket of water from the aquarium, never with tap water, as this will kill the good bacteria living in the filter. Sponges can be squeezed out in this bucket of aquarium water. Filter media does not have to be spotless.

### Water Quality Testing

As you cannot see the toxic chemicals building up in the tank water until there are very large amounts present, it is best to test the following factors at least once a week. This should be done prior to any water changes.

Parameter	Range
Potential Hydrogen (pH)	7.0 – 8.0
Ammonia (NH <sub>3</sub> )	0 ppm
Nitrite (NO <sub>2</sub> )	0 – 0.2 ppm
Nitrate (NO <sub>3</sub> )	0 – 20 ppm

