What You Need to Know About Tannins & Their Role in Paludariums

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If you're familiar with building vivariums, you may want to try your hand at something new with a paludarium. *Paludariums* are a combination of a vivarium and aquarium, and can be ideal for housing semi-aquatic species of amphibians and reptiles!

Two different styles of enclosure makes this kind of setup twice as complicated, but also twice as rewarding and twice as beautiful. The aquatic portion of a paludarium is about more than just water straight from your sink with a few plants and some fish — it means you're going to have to get familiar with aquascaping and aquarium maintenance.

One aspect of maintaining an aquarium is getting familiar with tannins. This is somewhat optional with a standard aquarium, but for a paludarium, tannins are a fact of life.

What are tannins?

Tannins, a.k.a. tannic acid, is a natural, yellow-brown compound that leaches from wood or leaves when they are added to water. Tannins are the same thing that makes coffee and tea so notorious for staining your teeth! And similarly, tannins can turn the water in your paludarium to a tea-like color.

Tannins may seem unattractive to you, but they actually perform some important roles within an aquatic environment.

Why are tannins important to your paludarium?

Tannins can be an essential part of replicating your pet's native habitat. In the wild, many of those tropical fish you see at the pet store are actually native to bodies of water with plenty of tannins. Pertaining to amphibians, which are notoriously sensitive to their environment, they're not quite as delicate as fish, but water quality and pH should still be considered. According to the American Association of Zoos & Aquariums' "Amphibian Husbandry Resource Guide":

> *"Many amphibians prefer a pH that is slightly basic. However, as pH requirements vary by species, a pH of 7 is recommended as a good starting point if the optimal pH is unknown. Some amphibians prefer slightly acidic water, such as aquatic caecilians and peat bog-breeding species such as Pine Barrens treefrogs (*Hyla andersonii*). Salamanders that dwell in limestone aquifers, such as the Barton Springs salamander (*Eurycea sosorum*), require a slightly alkaline (basic) environment." (p.24)*

> *"Some species of frogs are adapted to living in tannic environments, such as in puddles of water on the floor of a tropical rainforest. These species can be reared in dilute tadpole 'tea' that is brewed to mimic these tannic conditions and are thought to have natural antibacterial properties to prevent the water from becoming fouled… Indian almond leaves also are attractive and can be used on the floor of a tropical frog enclosure either crushed or whole to provide antimicrobial tannins to the enclosure. These have been particularly effective with mossy frogs (*Theloderma corticale*)." (p.43)*

Reptiles generally aren't very sensitive to tannins or water pH as long as extremes are avoided, although it's worth taking into consideration if you have a turtle.

In addition to their antimicrobial properties, according to "Tannins: the new natural antioxidants?" by Ryszard Amarowicz, it's possible that they may have antioxidant properties as well. This would improve health and lifespan overall by encouraging growth and strengthening immunity.

Tannins also soften water. Given that some fish have preferences between soft or hard water, if you live in an area with hard water, this is can be very convenient if you want a way to naturally soften the water.

Some say that tannins help inhibit algae growth. While algae is certainly annoying in any aquatic context, the bad news is that tannins don't actually directly affect algae. The good news, however, is that because tannins make the water darker, lack of available light can make it harder for algae to grow and therefore result in less algae.

Can tannins be harmful?

Tannins can be harmful if you're trying to keep a species of fish or amphibian that prefers alkaline or hard water conditions. In a paludarium context, it's likely to be most practical not to attempt a paludarium for an alkaline amphibian. There are ways to neutralize and harden and/or alkalize the water, but this will take more effort.

The presence of tannins does not guarantee acidic water conditions. In fact, if the Carbonate Hardness (KH) of your tap water is more than 5, then tannins are unlikely to change your water's pH. This is because the dissolved minerals in particularly hard water neutralize tannic acid. This is good news is you're trying to keep an alkaline species, but bad news if you want to keep acidic species.

Another downside is that tannic acid-stained water can be unattractive if you were hoping for crystal-clear water in your paludarium.

How to introduce tannins

It's easy to add tannins to your paludarium's water feature! Most woods and dried leaves will add tannins if they're in contact with or submerged in the water. However, if you need a lot of tannins for one reason or another, particularly potent sources of tannins include:

- Alder cones
- Indian casuarina cones
- Birch cones
- Catappa leaves/bark
- Coconut husk
- Mopani wood

It's good practice to check the pH and KH of the paludarium's water regularly, and adjust as need to keep your animals healthy. Peat moss in the filter, rooibos tea, and black water extract are all ways to increase acidity or soften the water.

How to remove tannins

If you would rather remove tannins than encourage them, that's possible, too!

The easiest way to decrease tannins in your water is to use activated carbon in your water filter (this must be replaced monthly to remain effective). If you need a little more tannin-fighting power, there are commercial aquarium products available specifically formulated for absorbing tannins.

You can also prepare the driftwood you're planning to use in your paludarium by forcing it to release most of its tannins before it gets installed. The easiest way is to soak it in a dechlorinated tank or tub of water for a couple of weeks, then boil it and continually change out the water until it is no longer discolored. This is a time-consuming process, but will go a long way toward helping keep your water clear.

And of course, more frequent water changes will also dilute the concentration of tannins in your paludarium.

Conclusion

It's ideal to house tannin-friendly species in a paludarium, but even if that isn't the case, there are ways to fight tannins and rebalance your aquatic environment. Test the water regularly to make sure it stays within range, and keep up on your filter maintenance. At the end of the day, just like any other enclosure, design and maintain your paludarium to function in the way that is best for your animals' health.