Understanding the pH/KH Relationship

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A few years ago, it was common practice among hobbyist to measure their CO2 injection levels based on a pH/KH CO2 Relationship chart. Hobbyists would measure the two variables, pH and KH, look at a chart and tah-dah they figured out they are injecting x amount of CO2 ppms in their aquarium. Sounds too easy to be true? Well it is.

The pH/KH CO2 Relationship

Let's discuss how the pH/KH/CO2 chart works. pH and KH variables operate together in a linear formula that tabulates CO2 levels. Without going to deep into the chemistry, as CO2 dissolves into water, it releases carbonic acid which will drive down the pH of the aquarium. When our tests read a lower pH from the initial without CO2 injection pH value, we have a good indicator that the CO2 is being dispersed into the aquarium. Now, KH refers to carbonic hardness which helps buffer the carbonic acids released during CO2. By measuring each value and applying it into a set mathematical formula, we can derive our CO2 levels.

There are too many variables in aquarium water to use the pH/KH/CO2 chart/calculator. The CO2 pH/KH relationship is a good guideline to get a generally reading of CO2 levels, but it not exactly perfect. It assumes tested aquarium water has perfectly set levels of KH and pH which don’t vary. In reality that’s nearly impossible to have such water. There are phosphates, tannins, organic acids and bases that come from fish waste, decaying plant matter, and nitrifying bacteria that will affect the rising and falling of pH on a daily basis. KH readings can be misread due to dissolving minerals from stones, shells in the substrate, and other hardscape materials. As a result, if you rely on a strict value of KH and pH alone, you may find a false CO2 measurement which, in most instances, indicates that you have more CO2 than you actually have in your aquarium.

pH/KH Chart Results

As I mentioned before, the pH/KH/CO2 Chart can help beginners gain a basic understanding of how much CO2 they are injecting. It’s been a great tool that has taught many hobbyists how the acid affects pH levels, and how buffering KH can prevent pH from falling drastically. But in the end, it can only provide one a general gauge of their CO2 levels.

A CO2 drop checker is one of the best way to monitor your CO2 level. We will discuss this further in future articles.

Reference: http://www.csd.net/~cgadd/aqua/art_plant_co2chart.htm

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