

Alka – What – Ity?



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“What’s your alkalinity?”
“Oh, my pH is good.”
“That’s nice, but the question was what’s your alkalinity?”

Alkalinity is not the same as pH, and pH is not the same as alkalinity. I’ve been told the two aren’t even related, although I believe they are somewhat distantly related. Let me explain. pH is the logarithm (base 10) of the reciprocal of the hydrogen ion activity. HUH?!! In English, it’s an expression of the intensity of the basic or acidic condition of a liquid. Alkalinity is the capacity of water to neutralize acids, expressed as milligrams per liter (mg/L) of equivalent calcium carbonate.

So, what does all this mumbo jumbo really mean? Simply put, pH is just a number to reference how acidic, basic or neutral the water is. Alkalinity is a measurement of the water’s ability to neutralize acids. pH is, alkalinity does.

If you remember back to basic operations, the section on anaerobic digesters, you will remember being taught pH is a poor way to operate your digester. By the time you see a drop in pH, it’s too late. Why is that? pH changes slowly, much slower than alkalinity. There can be a significant drop in alkalinity before you see a change in pH. That’s why it is recommended you monitor the volatile acids to alkalinity ratio for anaerobic digester operation. You need to have sufficient alkalinity available to neutralize the acids and maintain the proper pH.

Now I’m getting boring. Facts. Facts. Facts. Want some fries to go along with them facts? How about a story instead? OK. Back when I was running a plant, I had all sorts of test kits. I ran tests every day. I had no idea what the results meant, but I recorded them anyway. I even ran alkalinities. I left one Friday afternoon with an effluent pH of 6.5, about normal, I thought, for my plant. On Monday I had 5.8. VIOLATION! Panic set in. My effluent was very turbid, the clarifier looked like, well, you know. The mixed liquor didn’t settle. What’s going on? I knew the low pH indicated an acidic condition, and when you have a sour stomach you take bi-carb. But how much? I called a very respected member of DEC’s FOAS. The conversation went like this:

HIM: “I don’t suppose you know what your alkalinity is?”

ME: “Yes, as a matter of fact I do. 12.”

There was dead silence.

ME: “Is that bad?”

HIM: “YUP.”

He proceeded to explain that most of my alkalinity, the ability to absorb acids, was used up. This was most likely due to uncontrolled nitrification. The solution was quite simple. Add supplemental alkalinity. I followed his advice and within a few days was back to normal.

The moral of this story is don’t rely on pH alone. Alkalinity affects pH, and alkalinity is controllable. That’s why I think the two are related. If you have any questions or problems, please don’t hesitate to call me at (518) 828-3155 x18. I have purposely left out the formula for supplemental alkalinity addition for job security reasons. No, seriously, there are many different supplements, each with their own addition rates. I would rather talk to you first to find out what will be the best supplement.

Remember, pH is, alkalinity does. ●