

# Appendix C

## Water quality & how to adjust

There are four main tests that can be done easily, pH, Ammonia, Nitrite and Nitrate.

### pH

Ideally, in an Aquaponics system the pH should be in a range from 6.8 to 7.2. It is not uncommon for the pH in a new system to be at 7.5 or even higher. Once a system has completely cycled, the pH then should gradually drift downwards (become more acid).

Adjusting pH in your Aquaponics system needs to be done in small increments. Large or rapid changes can be detrimental to your fish health and in some cases, lead to fish deaths. Very low pH, say 5.5 can be very detrimental to the health of your fish. Fish have a mucous all over their body which is part of their health defence system. In low pH conditions this protective membrane can be damaged or destroyed. This will result in sick or dead fish. I view a pH of 6.0 as the very lower limit for my systems. Ideally, I try to keep the pH in the range of 6.6 to 7.2.

In a mature Aquaponics system, the pH tends to drift down over time. This is as a result of the acid by product of the action of the beneficial bacteria in the AP system. It is a natural part of the process. Therefore, expect pH to gradually move down.

I have observed pH to drop from 6.8 down to 5.8 in less than a month due to this natural process.

If your new system reads at, say, 7.5 or higher, then perhaps a little help to bring the pH down would be in order.

### Adjusting pH down

The easiest and safest way is to use the juice of a lemon. It will depend on the total litres or gallons of water in your AP system as to how many lemons will be needed.

In a system of 1000 L (250 gallons) the juice of half a lemon would be added initially. Wait for 24 hours then measure the pH. If a small fall is observed then repeat the process until you have the system down to just below 7.0 in the ideal range.

I have also used lemon juice concentrate from the supermarket. In my Aquaponics system there is a total of 500L of water in the system. I added 200 ml of the lemon concentrate per day for 4 days. This reduced the pH from 7.5 on day one to a reading of 6.8 on day 5. The system has drifted up a little to 7.0 on day 6, but appears to be holding at 7.0 for now. As the system gets more age I expect to see the pH slowly come down further all by itself.

### Adjusting pH upwards

The tendency is for pH to continue to drift down so regular pH readings should be taken, say, once a week.

Aquaponics systems tend to be low on 3 compounds, Iron, Calcium and Potassium.

It just so happens that Calcium and Potassium can be supplied to your system in the form of very convenient pH adjusters.