Chloramine & Chloramine Removal

for Ferments & Cultures

Many public water systems add chemical disinfectants to their water. The standard used to be chlorine, but the water companies found it too unstable (it evaporates easily, which was great for removal since you could boil it off or simply let the water sit out for a few hours), so they switched to chloramine, which is chlorine and ammonia bonded. Both EBMUD and SFWater use chloramine as a disinfectant. Small amounts of chlorine, chloramine and ammonia are supposedly safe for human consumption:

> "If chloramines were to enter the blood stream, they would be toxic; however, the digestive process neutralizes chloramines in water before they reach the blood stream. Therefore, chloraminated water is safe to use for cooking and drinking. Populations including pregnant women, infants and children, people on low-sodium diets, people with diabetes, kidney dialysis patients, and others can safely consume chloraminated water. People who are overly sensitive to chemicals should check with their physicians if they are concerned" http://www.p2pays.org/ref/20/19737.htm

However others claim it to be unsafe (http://chloramine.org/chloraminefacts.htm), impacting a multitude of health issues from digestion to skin reactions, problems for immune impaired people as well as negative environmental impacts.

Aside from this larger debate, one thing for certain is that chloramine kills bacteria in our tap water, so it will also kill or dramatically injure cultures which we use to ferment (yeasts, lacto-bacilli and kombucha cultures all). It is also unsafe for aquatic life (fish & plants) as they don't have a fancy digestive system to neutralize the compounds. Fish absorb oxygen and nutrients directly into their bloodstream as water passes through their gills. Treated tap water is deadly for them, which is why products are made available for removing chlorine & chloramine from water for fish tanks.

The best information I have found about chloramine and chloramine removal for human purposes comes from the SF water department:

> "Chloramine is not a persistent disinfectant and decomposes easily from a chemistry point of view (Valentine et al, 1998) but for water supply purposes chloramine is stable and it takes days to dissipate in the absence of substances exerting chloramine demand (Wilczak et al., 2003b). Therefore, it is not practical to remove chloramine by letting an open container of water stand because it may take days for chloramine to dissipate. However, chloramine is very easily and almost instantaneously removed by preparing a cup of tea or coffee, preparing food (e.g., making a soup with a chicken stock). Adding fruit to a water pitcher (e.g., slicing peeled orange into a 1-gal water pitcher) will neutralize chloramine within 30 minutes. If desired, chloramine and ammonia can be completely removed from the water by boiling; however, it will take 20 minutes of gentle boil to do that. Just a short boil of water to prepare tea or coffee removed about 30% of chloramine.... If desired, both chlorine and chloramine can be removed for drinking water purposes by an activated carbon filter point of use device that can be installed on a kitchen faucet. If desired, both chlorine and chloramine can be removed for bathing purposes by dissolving Vitamin C in the bath water (1000 mg Vitamin C tablet will neutralize chloramine in an average bathtub)" http://sfwater.org/Files/FAQs/removal.pdf

For making ferments here are some options for clean pure water without chlorine, chloramine or ammonia:

1. Use spring or distilled water. Make sure you know where the water is from and that it is not just bottled tap water from another state. Of course unless you have a source to refill the container, this can mean big expense over time in terms of both money and the embedded cost of the plastic containers to the environment.

2. Boil for 20 minutes or more. Please note, however, that the anti-chloramine folks refute this: "Chloramine cannot be removed by boiling, distilling, or by standing uncovered."

3. Add a peeled lemon or orange to the water and let sit for 30 minutes (however as the SFWater site says, this will actually add more ammonia to the tap water than it previously had to begin with).

4. Neutralize the Chloramine with a removal product. This is the quickest method. These products work instantly and only a few drops are required. They are intended for use in fish tanks and ponds to protect aquatic life and can be purchased in the garden pond section of a hardware store or in the fish section of a pet store. For the most part they do not include information on their toxicity to humans. However since fish are more sensitive to most toxins than we are, and since the chemical ingredients in the products neutralize when they bind with the chlorine and ammonias, I consider them relatively safe. Although it takes a bit longer to work than the others (5 minutes instead of instantly), I recommend AmQuel as it specifically says it is non-toxic to humans: (http://aquabaz.tripod.com/amquel.htm and http://aquabaz.tripod.com/amquel1.htm) Amquel is available at PetClub and PetSmart. Prior to doing this research I used other brands, even ones with label warnings with no ill effect. My deduction is that the warning means one should not drink the product or smear it all over ones body undiluted. The chemicals change when they bond with the chloramine, breaking into harmless parts (otherwise they would be unsafe for fish, see above). The active ingredient in AmQuel is sodium hydroxymethanesulfonate. The chemical used in most similar products is sodium thiosulfate

> "Chemical Dechlorinators....These all include Sodium Thiosulfate, which reacts with the chlorine (or the chlorine portion of the chloramine) to form harmless chloride ions. The chlorine is completely and totally removed. This reaction happens instantly. The tap water doesn't need to be mixed with the dechlorinator for any amount of time before adding it to the tank. It's safe to just add the dechlorinator as you add the water into the tank.
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> There is one potential problem if your water is treated with chloramine. As stated above, the dechlorinator reacts with the chlorine portion of the chloramine. The chlorine is eliminated, leaving the ammonia free in the water. As you hopefully know, ammonia is toxic to fish, even in low levels. So, if you use a simple dechlorinator that only contains sodium thiosulfate, you are solving one problem (chlorine) and creating a new problem (ammonia).
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> Lucky for us aquarists, our aquarium product companies have a solution. Many of the dechlorinator water conditioners include chemicals to convert the ammonia into harmless ammonium. Look at a few labels.. If the label doesn't specifically mention that it neutralizes ammonia, then don't depend on it to safely treat water containing chloramines. http://www.csd.net/~cgadd/aqua/art_chlorine.htm

5. Filter the water. Some activated carbon filters can work, but you must have a very high-end filter. Multi-pure claims to reduce chloramine levels (but not remove completely) and other information speaks to the difficulty in using filters to remove chloramine:

> "Very few carbon filters can remove chloramine. The chlorine-ammonia bond prevents standard carbon from removing the chlorine. Some new carbon filter units are now using a special "Catalytic" Activated Carbon. This catalytic carbon can break the chlorine-ammonia bond, and absorb the chlorine. BUT! They leave the ammonia free, which we've already said is a bad thing. I've seen one tap-water filter that added a special ammonia absorbing compound (zeolite) in addition to the carbon. But zeolite has a fairly small ammonia absorbing capacity so it needs frequent replacement, and it isn't found in any common tap-water filters. Without the additional ammonia absorbing compounds, you must use some other treatment to remove the ammonia."
> http://www.csd.net/~cgadd/aqua/art_chlorine.htm

5. Add Sodium Metabisulfite or Potassium Metabisulfite. The latter is preferred, as the former can leave off flavors. Potassium metabisulfite is available to homebrewes as Campden tablets. One tablet is enough to neutralize 20 gallons of tap water, so ¼ tablet or less will be enough for most fermentation projects. However campden tablets do contain

sulfite, so there will be a minute amount of residual sulfite in your finished product. After adding the crushed campden tablet, wait five minutes for it to work.

6. Add ascorbic acid (vitamin C). 1000 milligrams is enough for 30-50 gallons of water. Instead of crushing a tablet I would suggest adding a tiny amount of powdered vitamin C to the water. The sites I saw only suggest this for removing chloramine from bath water. Not sure why. They also don't say how long it takes for the chloramine to neutralize using this method. Lastly, the ascorbic acid in vitamin C will lower the ph of your water slightly. I do not know what effect this will have on your cultures.