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Simplifying Cleaning and Sanitizing For Home brewers

By Steve Bader

Homebrewing is all about having fun. Having fun while making our beer, and while drinking our beer. Then there is even more fun when we are talking about beer with someone at yet another school fundraiser you are attending while you were wishing you could be at home evaluating your latest beer.

When we get together to talk about beer, there are a thousand beers to talk about, how you made them, and what they taste like. Yet the one subject rarely talked about, is the most important subject: Cleaning and sanitizing your home brewery equipment.

Why? That question is easy to answer. Cleaning and Sanitizing is the boring, dull part of the process. Never mind that this is the most important part of homebrewing. Cleaning and Sanitizing is a lot like work, and this hobby is all about having fun!

In this article I will give you my thoughts on how to clean and sanitize your brewing equipment, minimizing the focus on the chemistry part of the process. I have condensed my findings to give you an overview of the most commonly found chemicals available to home brewers today, how well they work, how much to use, advantages and disadvantages, which I like best, and you can make the decision what to use from the information present. I have listed the web sites at the end of the article from some of the manufacturers, for you to look into the chemicals in more depth if you wish.

As homebrewers today, we have more and better choices of sanitizing chemicals than ever. Only 6 or 7 years ago, the only cleaning and sanitizing chemicals available to homebrewers were what you could find the local grocery or hardware store.

Many commercial brewers use other chemicals besides what I discuss in this article. These chemicals are not typically suggested for home users, because either they potentially more dangerous for the homebrewer to use, or are not easily available in small quantities for home use.

Lets define cleaning, sanitizing, and sterilizing, since they are entirely different processes, which should not be confused.

Cleaning your equipment means that you have removed all of the visible dirt and residue on your equipment, but not living organisms.

Sanitizing means you have treated your equipment with a chemical solution (or heat) that will eliminate virtually all spoilage organisms (molds, wild yeasts, bacteria). You **MUST** clean your equipment before sanitizing the equipment, since it is difficult to properly sanitize equipment with visible residue on it.

Sterilizing is the complete elimination of spoilage organisms, and is not realistic in the home brewing environment.

Time to clean up

So, it's been a few months (or longer) since you made your last batch of beer. Your carboy, airlock and hoses all have some stains on them, and when you inspect closer, some dirt and residue from your last Porter are visible upon close inspection. Where do you start? Well, first you need to clean your fermenter, airlock, hoses, siphon, and any other pieces of equipment that is going to come in contact with your beer. This can also include things like spoons, funnels, etc that are easy to overlook. It would be easy (and tempting) to just hose them out and start making beer, but you know deep down that that is likely exposing your beer to bacterial infections, and you would hate to have a ruined batch after all the time and effort that you go through to finally get that pint of beer in your glass.

In teaching brewing classes over the past 12 years, I often refer to the false sense of over-confidence that new brewers get from the first few good batches of beer that they have made, which leads the brewer to think that since the past few beers were so good, that they can back off on their cleaning and sanitation schedule. Of course the problem with this false sense of over-confidence is that these new brewers have started with new equipment, and have followed cleaning and sanitizing instructions closely for the first few batches. But now, just as your equipment has been used for about 5 batches of beer and gradually gotten dirtier and less sanitary with each batch of beer, your over-confidence causes you to think that a lower level of cleaning and sanitation will still do the job. That is when you brew your first "bad" batch of beer! This event normally "teaches" the homebrew that cleaning and sanitation must be at a high level for you to make good beer.

There are two methods of cleaning your equipment. Either you use a cleaning solution and scrub your equipment, which takes less time but more elbow grease, or you use a chemical and water and allow the chemical cleaner and time to soak your equipment clean.

I normally use a combination of the two methods, since I often am too impatient to wait for the chemical to work by itself, and am too lazy to scrub everything for hours. I soak my equipment for about 20 minutes with a cleaning solution, then scrub lightly to make sure I have gotten rid of all the residue and dirt. For hoses, airlocks, and siphons that you can't scrub, a good cleaning chemical and patience is the best bet, and since these pieces of equipment are inexpensive, you should simply replace them periodically.

When scrubbing any plastic equipment that you are using, I would suggest using a sponge or soft cloth towels to avoid scratching. For glass and stainless steel, more abrasive scrubbers like carboy brushes are acceptable, but even for stainless steel it is possible to scratch the surface, so the softer your scrubber the better.

Most household cleaners should be avoided, since either they are unsafe for human consumption (like bathroom and oven cleaners) or they are too mild (like dishwashing detergents) to effectively clean your brewery.

Many kinds of cleaners

Percarbonates are a relatively new group of cleaning chemicals that have become available to homebrewers. *Percarbonates* are a combination of sodium carbonate and hydrogen peroxide, (and

other secret ingredients, which is basically what separates them from each other) and they effectively remove dirt and deposits from all types of brewing equipment. Percarbonates work with active oxygen and a mild alkali to help lift the grime. The hydrogen peroxide does provide some degree of sanitization, but it is better to rely on them only as cleaners. One of the best properties of the percarbonate family is that they are environmentally and septic system friendly.

P.B.W. (Powder Brewery Wash) - P.B.W. is a percarbonate that is the highest strength of the Percarbonates listed. This is my favorite cleaner of all, since it is very effective in dissolving stubborn stains in hard to reach places. It works well to clean hoses, airlocks, fermenters, all plastic and all metals, with a 30-minute soak. P.B.W. works well to clean the interior of your Cornie kegs. P.B.W. works well in hot, warm and cool water. For stubborn stains, an overnight soak is necessary. The solution can be used for more than one piece of equipment. A normal dosage is 1 tablespoon per gallon. Heavy duty cleaning can be up to 2 tablespoons per gallon. Rinse twice with warm water after using.

PBW is commonly used as a clean-in-place (CIP) chemical in commercial breweries where it is difficult to gain access to the surface the brewer is cleaning.

Straight A, One Step and B Brite - These are also percarbonates that are similar to PBW, but are not as strong as PBW, at about 1/3 the cost. While they clean about as well as P.B.W. for most cleaning jobs, they don't work as well for the really tough jobs. These percarbonates also do not dissolve easily in cold water. Straight A and B Brite are stronger than One Step, which suggests that it can be used as a sanitizer. I do not recommend using these as both a cleaner and a sanitizer, even though the directions may suggest that they can be used for both. These cleaners also work well to remove labels from commercial wine bottles. Use at a rate of 1 Tablespoon per gallon of warm to hot water, rise after cleaning.

Sparkle Brite - (available in Canada, also called Diversol). Sparkle Brite is a cleaner that contains TSP (Tri-sodium-phosphate) and potassium bromide. This is a corrosive chemical that requires great care when using. While these works well, there are other chemicals that are easier to use, less dangerous to use, and more environmentally friendly. Use at a rate of 1 teaspoon per liter of water (1 tablespoon per gallon) for cleaning.

Pro-Zyme - (available in Canada) This is an enzyme-enhanced detergent, which is effective in removing protein buildup from beer and wine making equipment. Use at a rate of 7 grams per liter of hot water. Pro-Zyme is a mild irritant, much like laundry detergent. Leftover residue of this chemical may cause your beer to lose foam retention.

Chlorine - Chlorine bleach is a good cleaner for glass, but of limited usage for plastic, since it can be absorbed by the plastic, leading to off flavors in your beer, and should never be used for stainless steel, since it can actual eat holes through the stainless steel if given a long enough contact time. For cleaning glass, use at a rate of about 2 ½ tablespoons per 5 gallons of water, let the solution soak for about 30 minutes, then scrub to remove stubborn deposits. You **MUST** rinse heavily to remove the excess chlorine smell. Chlorine is not very effective on beer stone and some other brewing residues, so I would suggest avoiding it's use.

Dishwashing detergents - Standard household dishwashing detergents can be used for light duty cleaning on boiling pots, spoons, funnels, strainers, etc. I would recommend one without any perfumes that could eventually be transferred to your beer. A mild, unscented dishwashing

detergent like Ivory brand should work for your routine cleaning needs. I would not use dishwashing detergents for fermenters, airlocks, beer bottles and caps.

Lets Sanitize!!

Now that your equipment is clean, the hard part is over. It is now time to sanitize your equipment, so that you can get to the fun part of brewing. All of the sanitizers listed below are added to water, and then you use the solution to soak your equipment for 2 to 30 minutes. Bleach and Sparkle Brite must be rinsed with water, the others you can just turn the stuff upside down and let it drip dry for 5 minutes.

Star-San Star San is a flavorless, odorless, no-rinse food grade sanitizer from the makers of P.B.W. Star San is an acidic sanitizer developed for the brewing industry. When used according to directions Star San will completely eliminate all microorganisms that it comes into contact with. Star San acts quickly (under 5 minutes), and foams to sanitize cracks, crevices and other 'impossible' places in your equipment. Star San will leave a microscopic film on sanitized items that will continue to protect your bottles and equipment even after they have dried. This residue will not affect the quality, flavor, clarity or color of your beer.

Star San can be mixed at a rate of one fluid ounce per 5 gallons, and then put in a spray bottle, and used as a spray-on sanitizer, reducing the quantity used. Star San is effective as long as the PH is less than 3.5, at which time it will turn cloudy to signify its lack of ability to sanitize. Star San is environmentally friendly, biodegradable, and will not harm the 'helpful' bacteria in a septic system.

While Star San is the most expensive sanitizer per ounce, it also is the most effective chemical sanitizer readily available to homebrewers, requires the least amount of time to sanitize, and is cost effective when used in the spray-bottle form.

Iodophor - Iodophor has been the homebrewers most commonly used sanitizer the past 7 years or so. Iodophor is used by the food service industry and medical industry to sanitize equipment. Iodophor is an iodine detergent, germicide and sanitizer. I have used Iodophor for a number of years in my brewing, and love it, because it is a no rinse sanitizer, and very easy to use. A 12.5 PPM (part per million) solution takes approximately 10 minutes to sanitize your equipment. I like to make a solution up at a rate of 1 tablespoon per 5 gallons, and soak or spray my equipment, then allow to drip dry for at least 10 minutes. No rinsing is necessary at this concentration. You can re-use the solution as long as the original orange-amber color is still apparent. The solution will hold its color for up to a week in a sealed container. The concentrated Iodophor solution will stain fabric, so you need to be a bit careful when pouring to make your solution.

Sparkle Brite - Sparkle Brite (or Diversol) is a sanitizing detergent, used in Canada primarily for beer making. This is an effective sanitizer, but it must have a minimum 20-minute contact time to sanitize. This is a corrosive chemical that requires great care when using. While it works well, there are other chemicals that are easier to use, less dangerous to use, and more environmentally friendly.

Heat - The only effective method of using heat in a homebrewery is boiling your wort, which we all use, or using the oven and a dry heat to sanitize bottles and other heat resistant equipment. Immersing your wort chiller in your boiling wort for the last 15 minutes of the boil is an effective method to sanitize immersion wort chillers. If you make yeast starters, you can sanitize your wort in

glass canning bottles and metal lids by using the standard canning methods of 180 degree water for 20 minutes, and gradually cooling to room temperature to avoid breaking the jars.

Using your oven to sanitize heat resistant bottles and such is effective, but does take extra time, since the bottles must be both heated and cooled slowly, and normally the stress of heating and cooling will weaken the bottles, potentially reducing the life of the bottles. While dishwashers have also been used and suggested for this task, the risk of bacterial contamination is fairly high due to food residue in the dishwashers, and is generally not recommended

Chlorine - Chlorine bleach is a good glass equipment sanitizer, but of limited usage for plastic, since the chlorine can be absorbed by the plastic, leading to off flavors in your beer. For sanitizing, use at a rate of about 2 ½ tablespoons per 5 gallons of water, let the solution soak for about 5 minutes. You **MUST** rinse heavily to remove the excess chlorine (smell), and if you are rinsing with well water you are possibly re-contaminating. If your tap water is heavily chlorinated, it is impossible to totally remove the chlorine, unless you have filtered the water with a carbon filter. Chlorines biggest disadvantage is that it can kill yeast cells in even the lowest concentrations, so any breakdown in rinsing can lead to fermentation problems. I see no good reason to use chlorine in your home brewery unless you do not have access to Star San or Iodophor.

My Recommendations

If I had easy access to all of these cleaning and sanitizing chemicals, what would I do? My cleaner of choice is easily the percarbonate P.B.W. It is strong, works effectively, requires a minimum of effort, and is environmentally friendly. Cost is about \$10 to \$12 a pound, which should get you through about 12 to 15 five-gallon batches of beer. While this cost is slightly higher than the other cleaners, it is worth the few extra dollars in time saved, and the peace of mind of having cleaner equipment. As a compromise, you could use a combination of Straight-A for your routine cleanings, and P.B.W. for your more aggressive cleanings. Standard dishwashing detergent could be used for your equipment that comes in contact with your beer prior to boiling.

After I have cleaned my equipment, I would suggest using Star San and the spray bottle method of coating the surfaces. For the inside of glass carboys, you can remove the spray nozzle and pour in a few tablespoons of the solution and turn the carboy to coat the entire interior surface.

Using P.B.W. and Star San will make cleaning and sanitizing a simple task, so that you can get on to the more important job of opening your latest bottle of homebrew to share with your friends!!

References:

How to Brew

Book and web site

By John Palmer

<http://howtobrew.com>

Logic Inc.

(Manufacturers of

Straight A & One Step)

<http://www.ecologiccleansers.com/>

5 Star Affiliates

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<http://www.fivestarchemicals.com/>

National Chemicals, inc

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<http://www.natlchem.com/index.html>