Organic Grow: Teas

by Rick Weller, Founder of Organically Done Plant Products

Compost teas are very popular among growers. Companies offer tea brewers ranging in price from hundreds to thousands of dollars. A google search will find numerous recipes, books, CD's, supplies and ideas available for purchase but I would caution you to invest wisely.

Two types of teas are commonly mentioned for use in a plant growing environment. The first, commonly known as 'compost tea', is created by placing ***compost*** in a bucket of water, letting it sit for a period of time, filtering out the ***compost*** remains and applying the resulting liquid as a soil drench or foliar spray. The ***compost*** used for this type of tea ranges broadly and includes vegetative compost, manure, fish remains, etc. This process essentially 'liquifies' the ***compost*** material, making it easier to apply and breakdown into plant-available nutrients.

The second type of tea, known as actively aerated compost tea (AACT), is similar to the first but with a different goal. With AACT, the goal is to rapidly multiply the number of beneficial microorganisms found in your compost material, not to create a fertilizer. An active microbial population enhances many plant uptake and health processes.

So, compost teas are used to fertilize your plant. While this may be a great way to utilize waste if you have these compost materials available, commercial organic fertilizers are far more effective. AACT is used to increase microbial activity in your plant environment. The remainder of this article will focus on AACT.

Actively Aerated Compost Tea (AACT)

AACT is not a fertilizer or a fertilizer substitute. As a nutrient source, AACT has very limited (if any) value. Unlike microbes, nutrients do not multiply during the brewing process so what you've added as a microbial food source is all that will be present when your tea is ready for application. The nutrients may be a bit more available to the plant because of the nutrient-cycling process that occurs during brewing.

Should you brew your own or purchase bottled AACT? Here are a few facts:

- Aerobic biology (the good stuff) in a liquid environment will continue to consume food and oxygen until it is no longer available
- Aerobic processes will become anaerobic when oxygen levels are too low
- In order to inhibit aerobic/anaerobic activity, biology must be made dormant or destroyed
- Modifying a solution's pH will destroy some microbes, inhibit growth of some microbes and promote growth of other microbes

I have yet to find a commercially-packaged product that has a diverse microbial population when put under a microscope.

AACT is fairly easy to make, very inexpensive (once you have your equipment) and can provide value in both chemical and organic growing environments. AACT is not a magic elixir and should only be one of the tools in your toolbox.

Making Tea – a Few Highlights

Dissolved Oxygen(DO). The base concept of AACT is that high DO levels (the volume of oxygen contained in water) along with microbial food supplies promote the rapid growth of microbial populations. DO has a maximum saturation level defined by the physical properties of pressure, salinity and temperature. DO is raised in the brewing process through the water-air interface. Brewer designs use various devices to increase the size of this water-air interface including air stones, bubblers, blowers, mechanical paddles and vortex columns. Water temperature for DO is conversely related to the

temperature for microbial growth, i.e., DO capacity goes up as water temperature goes done, microbial population growth goes up as water temperature goes up (to a point). A good common point is 65-68 degrees F.

Water. Ideally your choice is chemical-free water. If you do not have a rain barrel and your local water supply is chlorinated, filling your brewer and letting it sit for 24 hours will gas off the majority of chlorine. Most municipalities have replaced chlorine with chloramine which does not gas off as easily. Personally, I have used a number of water sources and have seen very little impact on the quality of the final tea.

Brewing Time. Commercial brewer manufacturers will have recommended brewing times but these are highly dependent on a your compost, food source and brewing parameters. A good rule of thumb is 24-30 hours to get a good batch of tea. You can keep the brewer going as long as you want assuming you are maintaining oxygen levels and microbial food supplies.

Cleaning. After you have finished making your tea, make sure you drain all your lines and clean your equipment. The scum that is created during processing is difficult to remove once it has dried and will build up quickly. Depending on your equipment, this can plug critical components over time. If you do continuous brewing, it is a good idea to shut down once a week or so for cleaning.

The Brewing Process

Equipment. A wide variety of equipment can be used to make compost tea, from the very simple (and inexpensive) to the complex (and expensive). I will not attempt to describe the designs that can be found on many blogs and the websites of companies selling brewers but here is a simple setup for discussion: 5 gallon bucket, 800 mesh bag, 1 CFM air pump. Five gallons of quality tea will easily cover 2,000 – 3,000 square feet of growing environment.

The container itself is not particularly important as long as its 1) large enough for the volume of tea desired, 2) easy to clean and 3) compatible with your aeration system which we'll explain below.

The mesh bag may be used to either filter your tea after the brewing process or to hold your compost and food components during the brewing process. Holding your components in a fixed device (the mesh bag in this case) during brewing produces much higher quality results if done correctly.

The air pump (or aeration system you select) is the critical piece of your design and plays three distinct roles. The first is to raise/maintain dissolved oxygen levels during brewing. The beneficial microbes that you are nurturing and growing in your tea consume oxygen. If this oxygen is not replaced continuously throughout the process you will either limit this aerobic microbial growth, promote anaerobic microbial growth (you do not want these microbes), or both.

Secondly, your aeration system is responsible for keep your tea consistently mixed. The more evenly your solution is mixed, the greater the total dissolved oxygen and the greater your microbial growth. Dead spots or locations that are not well mixed may be identified by adding a bit of food coloring to your running brewer and observing its dispersion.

And finally, your aeration system is typically responsible for ensuring that all biology and nutrients are extracted from your compost holding device. This is often done by blowing air or agitating the holding device (mesh bag in this example).

Preparation. Depending on your source of biology, it may be advantageous to do some work ahead of time. Moisten your compost mix thoroughly, place in a bucket, cover with a couple layers of newspaper and store in a warm, dark location a week prior to brewing your tea. Keep the newspaper moist by occasionally misting with water. This preparation step creates an environment conducive to microbial growth and ensures that you have an active population for the brewing process.

You can promote fungal growth by mixing baby oatmeal and/or forest debris/soil into your mix prior to wetting. Not only will this provide a food source for your microorganisms but it also gives you the opportunity to promote bacterial or fungal growth by selecting the appropriate food source.

AACT Recipes. There are two important objectives to creating a recipe for your tea brewing process. The first is to provide a source of diverse microbiology. The second is to provide a food source for the microbiology.

Quality vegetative compost (homemade is best) is a great source of diverse soil biology. Quality worm castings (homemade are best) are a great source of soil biology and is often bacterial dominated. I have tested many commercially-packaged composts and casting and they often have very limited biological populations. Packaged biology typically contains a very narrow range of microbe species. Remember, the brewing process expands biological population, it does not create biology so your tea can only be as good as your starting supply.

Common microbial food sources we have had success with include fish hydrolysate, humic acids, liquid kelp and blackstrap molasses. Oatmeal helps promote fungal growth in preparatory steps but has little value during the brewing process.

Recipe (approximate quantities for 5 gal brewer)

- 2 cups compost or worm castings
- 0.5 ounce fish hydrolysate
- 0.3 cup kelp meal
- 1 tsp liquid humic acid
- 0.5 cup unsulphured black strap molasses

***Brewing*.** As discussed earlier, brewing for 24-30 hours is a good rule of thumb if you do not have product instructions. However, even with manufacturer recommendations, there are many variables in the process that will impact your brewing. Brewing longer does no harm if you maintain both oxygen and food supplies throughout.

***Application*.** Important biological activity occurs in both the soil and on the plant itself in a healthy growing environment. Teas should be applied as both a soil drench and a foliar spray.

Once your brewing is complete you should apply your tea – microbes will begin to die soon after the process is stopped. You can dilute your solution if you desire but there is really no need other than to make it go further. It is almost impossible to over apply AACT. Remember, all you are really doing is increasing the microbial activity in your growing environment and the microbiology will self-regulate its population. So, additional applications of AACT while perhaps unnecessary, will not harm your plants.

Did you make a good tea? Without a few pieces of equipment this is a question that cannot be answered. A large percentage of teas brewed by both individuals and retail stores has no more value than plain water, i.e., the desired microbial population is limited or non-existent. This is the result of one or more of these factors, listed in order of priority:

- poor quality of starting microbial source (compost, castings)
- inadequate supply of microbial food
- inadequate oxygen supply

First, obtain (borrow, buy used, buy cheap) a microscope capable of 40x magnification. This is sufficient to see microbial activity in your source compost, in your teas and in your growing soil. If you have a good starting source but are not seeing much activity in your tea, a dissolved oxygen meter/probe allows you to monitor your oxygen supply in your brewer.

Coming next: **Plant Growth Hormones**

Organically Done *(www.organicallydone.com) is a Michigan manufacturer of organic fertilizers and soil amendments. Our mission is to produce high-quality truly organic products that provide what your plants need while being free of potential contaminating sources that are found in many of today's "organic" alternative – NOT ALL ORGANICS ARE CREATED EQUAL.*