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**The Myth of Compost Tea Revisited:
"Aerobically-brewed compost tea suppresses disease"**

The Myth

It's been over two years since I first addressed the use of compost tea as a disease suppressor (this column can be accessed through the archives at the website below). At that time, I was concerned about the lack of scientific data documenting the success of compost teas, especially aerobic teas, in disease control. As this topic continues to generate more inquiries than any of my other columns, I thought it was time to look at the literature to see what's been added since April 2001, and also to summarize the results of our pilot study performed that same year.

The popular press and the internet have exploded with kudos for aerated compost tea as a disease control agent. There are well over 4000 dot-com hits on the Google search engine, compared with only 1900 two years ago. Numerous magazine and newspaper articles have featured compost teas as environmentally-friendly alternatives to chemical pesticides, claiming reduced run-off into aquatic systems among other benefits.

The Reality

Once again I searched the scientific literature using various combinations of the words "compost", "tea", "leachate", "extract" and "disease". The UW search engine I use contains all the life science-related databases such as Agricola, Water Resources, Biosis, etc.

I limited my review to scientific journals, and books published through scientific organizations and academic publishers. I excluded the 13 articles in *Biocycle*, *Arbor Age*, and *IPM Practitioner*; they, like *B&B* and other trade journals, are not scientifically reviewed. There were published abstracts from scientific meetings which I did not include for the same reason. Peer review is critical to the scientific community, as it allows other researchers in the field to examine manuscripts before they are published. When an article appears in a peer-reviewed journal, it means the methods, results, and conclusions were found to be scientifically viable by objective outside scientists.

Compost: Eighteen articles discussed disease suppressing properties of composts (especially those containing bark); researchers have found them effective in suppressing soil diseases such as *Colletotrichum orbiculare* (anthracnose), *Fusarium oxysporum* (wilt) and *F. solani*, *Phytophthora cinnamomi* and *P. cactorum*, *Plasmodiophora brassicae* (clubroot), *Pseudomonas syringae*, *Pythium ultimum* and *P. aphanidermatum* (damping-off disease), *Sclerotinia minor*, *Sclerotium rolfsii* (southern blight), *Sepedonium* spp. and *Verticillium fungicola*. Beneficial microorganisms colonizing the compost, inhibition from passive leaching through the compost on site, and reduced splash dispersal of pathogens from mulch compared to bare soil were identified respectively as the biological, chemical, and/or physical mechanisms responsible for disease suppression. (Just searching for "compost" and "disease suppression" through these databases netted 100 or so articles. It's clear that compost used as mulch has documented abilities to suppress soil-borne disease organisms.)

Non-aerated compost tea (NCT): Over a dozen articles looked at the effects of non-aerated compost extracts. Work in Germany in the 1980's reported success in controlling *Plasmopara viticola*, *Uncinula necator*, and *Pseudopeziza tracheiphila* on grape; *Phytophthora infestans* on potato and tomato; *Erysiphe* spp. on barley and sugar beet; *Sphaerotheca fuliginea* on cucumber; and *Botrytis cinerea* on strawberry

and bean, but these results have apparently not been repeated elsewhere. (Unfortunately, much of this work was published as annual reports, which are not reviewed by the scientific community. In contrast, a later paper found no significant reduction in *Plasmopara viticola* in grape after treatment with compost extracts.) Four articles by another lab group discuss the inhibition of disease using spent mushroom compost extract: prevention of *Venturia inaequalis* (apple scab) was successful in the lab and had mixed success the field. Still another group used leachates from composted bark to inhibit five *Phytophthora* spp. in the lab with variable success. A final paper reports that compost extracts were variable in their effectiveness in reducing *Colletotrichum orbiculare* in cucumber and *Pseudomonas syringae* in *Arabidopsis*. (It should be mentioned that the use of non-aerated, or anaerobic, compost teas does not cause your plant or landscape to become anaerobic. Anaerobic soil environments occur due to poor drainage, overwatering, soil compaction, or high clay content.)

Aerated compost tea (ACT): In my search, I found only two published, controlled studies using aerated compost teas. One paper reported that aeration of non-aerated compost teas decreased their efficacy in controlling pathogens, but efficacy could be recovered if the teas were allowed to incubate and become anaerobic again. The second paper reported that aerated compost tea “was not effective in preventing scab infection and in some cases appeared to enhance apple scab.”

Why is there so little published data on aerated compost tea? Part of the reason is that each microbe in compost tea needs to be isolated and identified, then tested in a scientifically acceptable method before it is deemed an effective colonizer and competitor. Each batch of compost tea contains a variety of microbes at varying concentrations. How do these microbes interact? Do combinations of microbes have the same, better, or worse effects than those isolated examples? The potential for variability is enormous, and this leads to inconclusive results during testing.

Other concerns: Six articles from my search considered the potential of compost leachates to contribute to water pollution through excessive releases of nitrogen, phosphorus and other nutrients. This continues to be an area of concern, especially when teas are used as fertilizers. Any overapplication of chemicals, whether from synthetic or natural sources, is potentially harmful to terrestrial and aquatic ecosystems. To assume that “natural” means “safe” is erroneous and environmentally irresponsible.

Our UW compost tea trials: In the spring of 2001 we compared the efficacy of compost tea in controlling cherry blossom brown rot (*Monilinia fructicola*) at the Washington Park Arboretum. Phil Renfrow of the City of Seattle’s Department of Parks and Recreation brewed our compost tea in a Growing Solutions 12 gallon microbe brewer. He used a high quality aerobic compost which was analyzed and approved by Soil Food Web. Fresh tea was sprayed every week on half the trees; the others were sprayed with water. Brown rot damage to the blossoms was ranked on a scale from 1 (no damage) to 5 (complete infection). In comparing the matched pairs of eight *Prunus* spp., the compost tea extract was not significantly different from the water application for any of the eight cultivars tested. In fact, for some trees it made the problem worse. These trees have since been removed from the arboretum so we have not been able to repeat this study. However, our results are very much in agreement with another unpublished study in Massachusetts, which found no difference between compost tea and water in preventing *Alternaria* blight or *Septoria* leaf spot in tomatoes.

I have a home landscape with many trees, shrubs, and groundcovers. I don't use pesticides except for an occasional shot of Roundup; I don't use fertilizers, unless I can determine a deficiency (most commonly nitrogen, which I add as fish meal only to plants that need it); I don't add anything else to the landscape except wood chips as an organic mulch. I don't have disease problems, I don't have insect pests, I have a healthy, organic landscape. This tells me that compost tea is not crucial for landscape health. If a landscape has serious soil or plant health problems, it is not likely that compost tea is going to solve the problem. Often in urban areas the problems are soil compaction, overuse of fertilizers (especially

phosphate), overuse of pesticides (especially fungicides which harm soil health), etc. Poor plant quality, improper plant siting and installation, and lack of proper aftercare also increase plant health problems. Adding compost tea will not solve these problems.

The Bottom Line

- Composted mulch has been documented to suppress disease through a variety of methods
- Non-aerated compost teas may be useful in suppressing some pathogens on some plants
- Aerated compost teas have no scientifically documented effect as pathogen suppressors
- Overuse and runoff of compost teas could conceivably contribute to water pollution
- There is no “silver bullet” for plant health problems caused by poor soil health and improper plant selection and management

For more information, please visit Dr. Chalker-Scott’s web page at <http://www.theinformedgardener.com>.