



Submitted photo

To remove almost all the microbes from salad vegetables, follow this sequence: (1) Spray all surfaces with hydrogen peroxide, (2) spin almost dry, (3) spray all surfaces with vinegar (4) spin dry, and (optional) (5) rinse with clean water and spin dry. Do not combine the hydrogen peroxide and vinegar into one spray.

Manure tea, just like Grandpop used to make

By Arthur O. Tucker

My grandparents on both sides of the family had large, glorious gardens.

My paternal grandfather used to raise prize dahlias and gladiolus for exhibition. His main source of fertilizer was the Allentown sewage plant. He never had to plant tomatoes but had the most diverse tomatoes I have ever seen (tomato seeds pass through the gut and germinate readily after their travels).

His other source of fertilizer was "manure tea." Grandpop used to suspend a mesh bag of cow manure in the rain barrel and used this "tea" to both water and fertilize his plants. Ah, those were the days when we didn't have to worry so much about pathogenic strains of *E. coli*, *Salmonella*, MRSA, and assorted viruses! Today, in 2011, I notice that even the commercial suppliers have taken dehydrated cow manure off the market for fear of health problems and potential lawsuits.

Yet, in spite of the potential risks, manure has its use for natural control of plant pathogens. One of the leading plant diseases on the peninsula is phytophthora sudden wilt. Phytophthora attacks woody materials, such as azaleas and rhododendrons, or any plant with a woody caudex, such as alfalfa and lavender. Cow, horse, and pig manures will encourage phytophthora but chicken manure will inhibit it.

Within the past few decades we finally have the tools to properly identify the biota of the soil and realize that many microscopic organisms in the soil establish

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beneficial relationships with plants. Most noticeably, many fungi will form a mantle around roots or even penetrate the roots to both aid in absorption of nutrients and also to ward off pathogenic fungi; these are called mycorrhizal fungi.

Thus, we have realized that chicken manure will actually promote the growth of fungi antagonistic to many wilt fungi, such as phytophthora, thereby indirectly inhibiting it. Other wilt fungi that gardeners might be familiar with include fusarium, verticillium, and rhizoctonia.

The former two produce wilts in many vegetables, while rhizoctonia is responsible for brown thatch in lawns starting around June. Evidence has accumulated that mycorrhizal fungi may also inhibit these pathogenic fungi by promoting beneficial fungi, thus obviating the need for toxic fungicides (that are often teratogenic, carcinogenic, etc.).

Several brands of both beneficial fungi and bacteria have appeared on the market and are available online or from catalogs (search "mycorrhizal products" online for a sampling). One of the most easily accessible products is produced by Espoma and sold at many of the local garden centers, Bio-tone Starter Plus. On a base of hydrolyzed feather and pasteurized poultry manure, Espoma Bio-tone Starter Plus con-

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tains beneficial bacteria and mycorrhizal fungi.

I have used this to establish my tomato seedlings, "rejuvenate" my large pots of vegetables, "activate" my compost, and prevent further brown thatch on my lawn. Espoma also sells a 4-2-2 "Garden Manure" based on poultry manure that I use for my own manure tea.

If you are an organic gardener who uses organic fertilizers or purchase organic produce at the markets, you should be con-

cerned about pathogenic bacteria today.

Fortunately, there is a solution. Susan Sumner, a food scientist at Virginia Polytechnic Institute and State University, has found that two sanitizing sprays are very effective in dislodging and killing infectious microbes on produce.

Firstly, a 3 percent hydrogen peroxide solution (the same strength available at drug stores for disinfecting wounds or gargling) is squirted on the vegetables or herbs. Then, this is followed with a mist of mild acetic acid (household vinegar). Actually, the sequence of hydrogen peroxide or acetic acid solutions is not critical, and a common household sprayer for damp-

ening clothing before ironing may be used (do NOT combine the vinegar with the hydrogen peroxide into one spray). If you use a salad spinner, you can also spin off the excess with each rinse and finally wash with clean water, if you like.

For further reading, here are the original journal citations:

Bell, K. Y., et al. 1997. Reduction of food borne microorganisms on beef carcass tissue using acetic acid, sodium bicarbonate, and hydrogen peroxide spray washes. "Food Microbiology" 14: 439-448.

Richards, K., et al. 2000. Survival and growth of *E. coli* O157:H7 on broccoli, cucumbers and green peppers. "Dairy, Food,

and Environmental Sanitation" 20: 24-28.

Wright, J.R., et al. 2000. Reduction of *Escherichia coli* O157:H7 on apples using wash and chemical sanitizers. "Dairy, Food and Environmental Sanitation" 20: 120-126.

On the campus of Delaware State University, the Claude E. Phillips Herbarium is Delaware's center for research, education, and outreach about plant identifications, locations, and uses. Call 302-857-6452 (Dr. Susan Yost) to arrange a tour of the herbarium, and call 302-857-6408 (Dr. Arthur Tucker) for more information about this article.