

## Writers' Supplement to *EDN* 108

We often come across interesting material related to articles in *EDN* that could not fit into the available space in the issue. We share the most relevant of those here. For more information on the following, click on the article name:

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## Composting Toilets

Here are a few photos of ways urine can be automatically separated from solid waste in an outhouse. For more information, see [ECHO's Technical Note about composting toilets](#).



*Figure: A composting toilet at ECHO. The photo on the left shows a urinal with a hose (visible underneath) that goes to the catchment tank (outside of the outhouse; shown in the middle photo). Far right: A toilet seat with the funnel (see arrow) in the front to divert urine (again, a hose attached to the bottom goes to a separate chamber). With this system, there might be a slightly higher risk of enteric (intestinal) diseases entering the urine.*

## Questions and Concerns about the Use of Urine as a Fertilizer

**Alkalinity of Urine.** Urine in storage can reach a pH of 9.0. Although 9.0 would be too basic for most crops, urine would only raise the pH of soil very slightly, since the soil buffers its effect. The addition of urine might even benefit soil pH, since many soils (especially in the humid tropics) tend towards acidity. The change in pH would be most dramatic in sandy soils with low amounts of organic matter.

**HIV/AIDS.** A person reading a draft of the urine article asked whether HIV/AIDS would be a concern with the use of urine as a fertilizer, since presumably the virus could be in semen that might mix with urine. So I looked for information on a few specific questions: How long does the HIV virus survive without finding a host? Can the HIV virus survive in soil and infect someone who eats the vegetables later?

I was reassured by some information from the website [www.avert.org](http://www.avert.org), an international AIDS charity. The HIV virus dies quickly once exposed to air (i.e. within a few hours). Besides, the fluids would have to get into a person's bloodstream in order to infect them. In answer to a question on the site, I read, "HIV is not an airborne, water-borne or food-borne virus, and does not survive for very long outside the human body."

**Controlling the Odor of Urine.** Rick Burnette, director of ECHO's Southeast Asia regional office, shared an idea for controlling the odor of urine. Dr. Arnat Tancho of Thailand's Mae Jo University is testing and promoting a recipe related to Asian Natural Farming (more on Natural Farming will come in a future *EDN* issue). "Dr. Arnat Tancho recommends mixing a small amount (exact amount not given—an illustration suggests approximately 1 cup) of microbial solution (similar to EM/Effective Microorganisms) or earthworm leachate [the liquid that drains from a vermiculture container] in a liquid fertilizer solution of 1 part urine and 2 parts water. The urine-based solution is left to ferment in a sealed container for one week before being watered into garden soil. The microbial solution or earthworm leachate additive are reportedly used to control odor. Dr. Arnat recommends applying the urine solution two times per week until crops begin to flower, and then reducing applications."

**Applying Urine.** One source quoted in the urine article recommended against stirring the urine before applying it as a fertilizer. However, for the urine trial at ECHO, Scott and Andrew did stir the urine mixture before application, so that 1) it would mix equally with the water and 2) suspended solids (possibly precipitated phosphorus compounds?) would be mixed in. To decrease volatilization after application, they recommend washing the urine into the soil—but not with too much irrigation, because you don't want to leach away nutrients.

**Urea Toxicity.** I asked Dr. Edward Berkelaar (a plant scientist and former Research Director at ECHO) how common urea toxicity is for plants. He commented that it is not very common, because most people know that too much urea will burn plants. Most 'burning' is actually from osmotic stress; if the concentration (of fertilizer) is too high, water is pulled from plant cells and the plant will get dried out. Problems are most likely to occur in new transplants that are fertilized with undiluted urine. In the trial at ECHO,

even though the urine was diluted, it may still have been too concentrated and burned the pak choi plants in pots.

**Age of Urine in ECHO Trial.** The ‘age’ of the urine was not a factor in the trial at ECHO. The urine that was used was up to two months old. Each time urine was applied, a fresh dilution was made from a ‘master batch’ so that each treatment came from the same urine mixture. After applying the urine mixture, it was ‘watered in’ by pouring from a watering can for about three seconds, as was suggested in an article that Scott and Andrew read.

**Micronutrients in Soluble Fertilizer used in ECHO Trial.** The 16-3-16 soluble synthetic fertilizer used in the trial at ECHO contained calcium, magnesium, boron, zinc, iron, molybdenum, copper and manganese.

**Tomatoes and Nitrogen.** Several people agreed with Mark Hare’s assessment regarding the poor production of tomatoes that were given urine as a fertilizer. Dr. Martin Price commented, “It is common to add too much nitrogen to tomatoes resulting in lots of lush, dark green leaves but little or no fruit set.. I’m pretty sure that is the culprit. So it might be true for tomato’s cousin, pepper.” Dr. Edward Berkelaar also commented that excess nitrogen is not great for tomatoes, causing tomatoes to split.

**Plant Availability of Phosphorus.** The majority of phosphorus in soils is tied up with other minerals and is unavailable to plants, especially in acidic soils. Phosphorus availability increases as pH increases.

## Chickpea Nomenclature

Rick Burnette commented that there may be some confusion about the nomenclature associated with dal, dahl or dhal. According to the multilingual list website, <[http://en.wikipedia.org/wiki/Multilingual\\_list\\_of\\_Indian\\_Vegetables,\\_spices\\_%26\\_grains](http://en.wikipedia.org/wiki/Multilingual_list_of_Indian_Vegetables,_spices_%26_grains)>, pulses and split beans in general are known as daal or dali. Dahl is also the name of the south Asian stew of dehulled split pulses.

## More Information about Chickpea.

For more information about chickpea, check out the following websites:

<http://www.hort.purdue.edu/newcrop/cropfactsheets/Chickpea.html>

<http://www.icarda.org/Publications/Cook/Chickpea/Chickpea.html>

<http://www.icarda.org/Publications/Cook/Cook%20Book.htm>

<http://www.fao.org/docrep/t0646e/T0646E0s.htm>