

WATER BULLETIN

Water Quality Program, College of Human Ecology, Cornell University

Disinfection of Drinking Water using UV light

Susan Darling and Ann T. Lemley
Spring 2003

Ultraviolet light (UV) can be used to effectively treat and disinfect drinking water. Many people prefer UV light because they do not have to use chemicals such as chlorine that can leave behind disinfectant byproducts that taste bad and might be cancer-causing. If you own a UV light system or are considering purchasing a UV system for disinfection of drinking water, it is important to follow the proceeding guidelines to ensure proper functioning of the system:

- Drinking water should be treated and filtered before UV exposure to remove solids and chemicals that can block UV light and reduce its effectiveness. For proper disinfection, drinking water should not have suspended solids higher than 10 mg/L, iron higher 0.3 mg/L, turbidity higher than 5 NTU, and manganese higher than 0.05 mg/L. The water should have no color and have a pH between 6.5 and 9.5.
- UV lamps should be replaced every year, and controls should be installed that notify the user when a lamp is malfunctioning. If UV systems are not working properly, water will not be safe for consumption.
- Unlike chlorine, UV light leaves no residuals that can prolong disinfection after treatment. To prevent microbial contamination after UV exposure, UV treatment should be the last water treatment before water use.

More information on the use of UV light systems for drinking water disinfection can be found in our fact sheet entitled "Ultraviolet Radiation for Disinfecting Household Drinking Water" which is posted on the web at <http://www.cce.cornell.edu/factsheets/wq-fact-sheets/index.htm>.

For many years, UV light was considered to be an ineffective treatment for small protozoan cysts like *Cryptosporidium* and *Giardia*.

While it was found to inactivate larger microbes, many researchers thought that extremely high doses of UV light were needed to inactivate these small protozoa. Recent research has shown that UV light can be very effective at smaller doses. NSF International, a non-profit organization that sets standards for drinking water treatment systems, recently revised their standard for UV light systems (NSF Standard 55) to include these research results. The standard now states that certain UV systems can effectively inactivate *Cryptosporidium* and *Giardia*. We will be following up on these new findings. Look for more information about UV and cysts in future newsletters and updates of our fact sheets.

Selected References

- Bukhari, Z., *et al.* 1999. Medium-pressure UV for Oocyst Inactivation. *Journal AWWA* 91(3): 86-94.
- Craik, S. A., *et al.* 2000. Inactivation of *Giardia Muris* Cysts Using Medium-Pressure Ultraviolet Radiation in Filtered Drinking Water. *Water Research* 34 (18):4325-4332.
- Hargy, T. M., *et al.* 2000. Shedding UV Light on the *Cryptosporidium* Threat. *Journal of Environmental Health* 63(1):19-22.
- Wagenet, L. and A. Lemley. 1993. *Ultraviolet Radiation for Disinfecting Household Drinking Water*. Fact Sheet. Ithaca, N.Y.:Cornell Cooperative Extension.

This article was first published in the Housing & Home Environment newsletter (HHE) in Spring 2003



Cornell University
Cooperative Extension

© Cornell Cooperative Extension