

What You Should Know About Sewage Sludge and Food Safety

What is sewage sludge?

John Stauber and Sheldon Rampton's 1995 book, *Toxic Sludge Is Good for You: Lies, Damn Lies and the Public Relations Industry* chronicled the name change of this material that remains after wastewater treatment. In 1992, the Harper-Collins Dictionary of Environmental Science defined sewage sludge as "viscous, semisolid mixture of bacteria- and virus-laden organic matter, toxic metals, synthetic organic chemicals, and settled solids removed from domestic and industrial waste water at a sewage treatment plant." One year earlier, in 1991, a "Name Change Task Force" at a water industry trade group had coined the term "biosolids" to use in place of "sewage sludge," and they then defined the material as the "nutrient-rich organic byproduct of the nation's wastewater treatment process." Whatever one wants to call it, Americans produce about 5.6 million tons of the stuff annually. In fact, each individual in your home produces 47 dry pounds of sewage sludge from the disposal of human waste each year. (NRC 2002) That does not include other materials such as cleaners, disinfectants, and solvents that get flushed down the toilet or dumped down the drain, which may include all sorts of toxic chemicals and heavy metals. This makes for a toxic "stew" that needs to go somewhere. About 60 percent, or more than 3.4 million dry tons, of the sewage sludge produced annually is land-applied or publicly distributed as fertilizer. (NRC 2002) The concerns raised around the potential uptake of pollutants by plants and grazing animals and the possible pathogen contamination of food products grown with sludge make this an issue to be carefully considered by anyone who eats.

Isn't the Use of Sludge Just Like Using Animal Manure as Fertilizer?

No. The residues of unabsorbed medications that are excreted, personal care products and cleaners used in homes pass largely untreated through the average publicly owned treatment works (POTW). In addition, there may be hundreds of industrial companies discharging to one POTW, meaning that, in the aggregate, "small" amounts of toxic chemicals released by individual businesses add up to tons of pollution.

The primary and secondary treatment utilized by most treatment plants involve bacteria to digest organic wastes and are in no way intended, or able, to handle heavy metals or synthetic chemicals. Thus, many of those compounds pass through the treatment plant largely intact and remain in the sludge. (Harrison, et al 1999) For example, the Cornell Waste Management Institute estimates that 90 percent of the dioxins in wastewater entering a POTW will be retained in the sludge. (Harrison, et al 1997) When that sludge is applied to farm fields, the crops may absorb the toxic pollutants.

Why Should I Worry about Sewage Sludge Being Used to Grow Food?

Potential health risks related to eating food grown in sewage sludge-fertilized soils fall into two main categories: toxic chemicals, such as heavy metals or dioxin; and pathogens (e.g., *Salmonella* or *Listeria*). With toxic chemicals, there is the concern that crops will "take up" or absorb the pollutants. With pathogens, the concern is that the germs will stick to the plants and not wash off easily, making people sick if the food is not thoroughly washed or cooked.

Some Known Toxins Found in Sewage Sludge

Pollutant	Potential Health Impact
Arsenic	Associated with lung and skin cancers; affects enzyme reactions throughout the body

Cadmium	Lung & kidney damage
Dioxin	Known human carcinogen, linked to birth defects, infertility, learning disabilities, immune system dysfunction, hormone disruption
Lead	Affects the brain, children's ability to learn; behavioral effects (aggression)
Mercury	Neurotoxin; affects ability to think, speak, move, see, hear, taste; particularly hazardous to young children and the developing fetus
Alkyl phenol ethoxylates (APEs)	Known to break down to more toxic compounds through wastewater treatment processes; suspected hormone disrupter (estrogen-like effects)

NRC 2002

Sludge and Infectious Disease

Sewage treatment plants receive an enormous volume of human waste. The treatment methods used to treat the wastewater and sludge do not kill all of the bacteria, viruses and other germs that come from sick people. Animal waste from household pets may also be discharged to the sewer system and bring with it additional pathogens. The Environmental Protection Agency (EPA) acknowledges that not all of the pathogens will be killed in the treatment process, and in fact, the regulation of types of sludge products is based, in part, on pathogen content. There is evidence that some pathogens survive much longer than previously thought, and planting crops in sludge-amended soil could lead to contamination of the food crops with germs that could make people sick.

Some Pathogens Found in Class B Sludge & Their Health Effects

<input type="checkbox"/> Bacteria such as <i>Campylobacter</i> , <i>E. coli</i> , <i>Listeria</i> and <i>Salmonella</i>	<input type="checkbox"/> Fever, chills, nausea, severe abdominal pain, diarrhea, bloody stools, respiratory and sinus congestion, thick/colored mucus, rashes
<input type="checkbox"/> Viruses , including hepatitis A, Norwalk, rotaviruses	<input type="checkbox"/> Fever, chills, nausea, abdominal pain, diarrhea, severe headaches, congestion, respiratory distress, jaundice, paralysis, rashes
<input type="checkbox"/> Protozoa such as <i>Cryptosporidium</i> and <i>Giardia</i>	<input type="checkbox"/> Intermittent diarrhea/constipation, abdominal pain/cramps, bloody stools, nausea, weight loss, dehydration
<input type="checkbox"/> Intestinal worms (helminths)	<input type="checkbox"/> Fever, chest pain, bronchitis, diarrhea, vomiting, nutritional deficiencies, neurological problems, anorexia, weight loss, muscle aches

Based upon Lewis and Gattie 2002.

A number of studies have found that sewage treatment plant workers have higher rates of diarrhea, gastroenteritis, nasal irritation and tiredness. (NRC 2002) A study by microbiologist and U.S. Environmental Protection Agency (EPA) whistleblower David Lewis found that people who lived near sludge application sites had a 25 percent higher risk of getting infected with *Staphylococcus aureus*, and that one in four of those experiencing symptoms needed treatment for staph infection. (Lewis, et al) (In serious cases, staph infections can lead to Toxic Shock Syndrome, pneumonia, or infections of the bone, blood or heart.) Lewis believes that a "properly managed biosolids program that merges the expertise of the CDC [Centers for Disease Control and Prevention] with the regulatory authority of the EPA may be the best way to ensure that public health and the environment are adequately protected ... " because of EPA's lack of experience in dealing with pathogens. (Lewis and Gattie)

The Cornell Waste Management Institute in Ithaca, New York has also been following alleged sludge-related health incidents. Cornell researchers have identified 40 incidents, affecting over 360 people, as of February 2003. (Harrison, et al 1997) Respiratory and gastrointestinal symptoms are most common, but nosebleeds, flu-like symptoms, fatigue, and burning eyes, throat, and nose have also been reported. (Renner)

Are There Any Regulations on Sewage Sludge?

Yes. In 1993, EPA issued "Standards for the Use or Disposal of Sewage Sludge" (Code of Federal Regulations Title 40, Part 503). These rules – generally referred to as "Part 503" -- set pollutant limits for ten heavy metals (one was later removed from the list), operating standards to control pathogens and vermin (rats, gulls, etc.), "management practices, and other provisions intended to protect public health and the environment from any reasonably anticipated adverse effects from chemical pollutants and pathogenic organisms." (NRC 2002)

Treated sludge is divided into three main classes under the law: "Exceptional Quality" (EQ); Class A, and Class B. A very arcane system determines how a treatment plant's sludge is classified, but basically, Class A and Class B are both approved for agricultural use. Class A sludge is assumed under the rules to have been sufficiently treated to allow immediate contact with people, animals or crops. However, most land-applied sludge is Class B (Lewis and Gattie 2002), which is only required to achieve a certain reduction in the level of pathogens, depending on the intended use. This puts farmers and rural residents particularly at risk. Concerns about these risks are not unfounded. In July 2002, the National Academy of Sciences reviewed the Part 503 rules and raised a number of issues.

- ❑ Rules lack exposure and health information on exposed populations.
- ❑ EPA has relied on outdated risk-assessment methods.
- ❑ EPA has relied on outdated characterization of sewage sludges.
- ❑ EPA does not have adequate programs to ensure compliance with biosolids regulation.
- ❑ The agency lacks adequate resources devoted to its biosolids program.

(NRC 2002)

It should also be noted that a 1996 National Resource Council report had previously criticized U.S. EPA's reliance on only one study, the 1988-89 National Sewage Sludge Survey (NSSS), to identify which chemicals to regulate and which to exempt. The NRC noted that the NSSS had inconsistent findings and urged that another study be done. (NRC 1996) Six years later, the situation has not changed.

Other Problems with the Part 503 Rules:

- ❑ There is no labeling requirement for crops grown in soil that has been fertilized with sludge or for livestock that have grazed on pastures where sludge has been applied. This means consumers who would prefer to avoid such foods must buy organic, which is not always an option.
- ❑ The rule assumes that it is acceptable to contaminate farms and other lands up to a certain point, a point not determined by the farmer, local community or even the general public.
- ❑ The rule does not account for additional heavy metals and pollutants that can come from commercial micronutrient fertilizers that contain hazardous industrial waste.
- ❑ The waiting periods for planting crops or grazing animals on land where sludge has been applied are based on estimated pathogen survival. Dioxins or heavy metals present in the sludge do not degrade and will still be there (unless they are absorbed into the crops).
- ❑ The rule does not address many other pollutants found in sludge, such as prescription drugs, hormones (from birth control pills and hormone replacement therapy), and antibiotics.

- "Exceptional Quality" sludge has the most stringent limits for nine heavy metals and pathogens, the strictest measures for "vector control" (insects, birds, rodents, etc.), and is approved for use on home gardens, parks and agricultural land. Yet unlike for Classes A and B, there are no permit, notification or record keeping requirements, and no restrictions on the amount applied. This means that if researchers were to identify a new chemical or pathogen of concern that can survive the EQ treatment process, there would be no way of knowing which areas could be affected.

What Can I Do about Sewage Sludge and Food Safety?

Shop carefully! Think about the eventual fate of personal care products, household cleaners and other things you send down the drain. Choose items that are labeled "biodegradable."

Find out what your community does with its sewage sludge, and which industries (if any) discharge to it. Municipal sewage treatment plants generally have only primary and secondary treatment, which are designed for human waste. Tertiary treatment, which can deal with *some* of the toxic chemicals, is very expensive. If industries want to use the POTW, they should be required to pay for installation and maintenance of tertiary treatment.

Buy organic foods when you can. Organic standards do not allow the use of sewage sludge.

Use composting toilets in your home or cabin. One source for information on composting toilets is:

The ReSource Institute
179 Boylston Street, 4th Floor
Jamaica Plain, Boston, MA 02130 USA
Phone: 617 524 7258
fax 617 522 0690
email: resource@riles.org

Learn more about sewage sludge and its potential threats to human health and the environment:

- Center for Media and Democracy, www.prwatch.org Also read *Toxic Sludge is Good For You: Lies, Damn Lies and the Public Relations Industry*, (Common Courage Press 1995) by the Center's directors, Sheldon Rampton and John Stauber.
- Cornell Waste Management Institute, www.cfe.cornell.edu/wmi/Sludge.html
- EPA has attempted to explain its sludge rules in Chapter Two of *A Plain English Guide to EPA Part 503 Biosolids Rule*, www.epa.gov/owm/mtb/biosolids/503pe/503pe_2.pdf.
- National Sludge Alliance, www.ejnet.org/sludge/

For more information, contact Jackie Hunt Christensen at 612-870-3424 or jchristensen@iatp.org, or visit the Food and Health Program web site: www.iatp.org/foodandhealth

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