

## **Selected Peer-reviewed Sludge Research Published since 1997:**

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4. Hale,R.C. 2001. Persistent pollutants in land-applied sludges. *Nature* vol 412.
5. \_\_\_\_\_. 2001. Flame retardants: persistent pollutants in land applied sludges *Nature* 412.
6. \_\_\_\_\_. Alkylphenol ethoxylate degradation products in land applied sewage sludges (biosolids). 2002. *Environmental Science and Technology*.
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8. Howard,V. 1997. Synergistic effects of chemical mixtures: can we rely on traditional toxicology? *The Ecologist*, vol. 7, no. 25.
9. Jones, K.C. et al. 1997. Dioxins and furans in sewage sludges. *Critical Reviews in Environmental Science and Technology* 27(1) 1-85.
10. Basta, N.T.;J.J. Sloan. 1999. Bioavailablility of heavy metals in strongly acidic soils treated with exceptional quality biosolids. *Journal of Environmental Quality* 28:
11. Camobreco,V.J.; B.K Richards, et al. 1997. Movement of heavy metals through undisturbed and homogenized soil columns. *Soil Science* 161: 740-750
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14. Giller, K.E.; Witter, S.P. et al. 1998. Toxicity of heavy metals to microorganisms and microbial processes in agricultural soils: a review. *Soil Biology and Biochemistry* vol 30, no. 10-11.
15. Harrison, E.Z.; McBride, M.B. et al. 1999. Land application of sewage sludges: an appraisal of the US regulations. *Int. J. Environment and Pollution*, vol 11, no. 1.
16. US EPA/USDA. 2000. Guide for field storage of biosolids.
17. McBride, M.B.; Richards, B.K. et al. 1999. Long-Term Leaching of Trace Elements in a heavily sludge-amended silty clay loam soil. *Soil Science*, vol. 164, no. 9
18. \_\_\_\_\_.1998. Molybdenum uptake by forage crops grown in sewage sludge-amended soils in field and greenhouse. *Journal of Environmental Quality*, vol. 29, no. 3.
19. \_\_\_\_\_. 2002. Toxic metals in sewage sludge-amended soils: has promotion of beneficial use discounted the risks? *Advances in Environmental Research*
20. Sitaula, B.K.; Almas, et al. 1999. Assessment of heavy metals associated with bacteria in soil. *Soil Science and Biochemistry* 31.
21. McBride, M.B. 2001. Cupric Ion Activity in Peat Soil as a Toxicity Indicator for Maize. *Journal of Environmental Quality*, vol 30, no.1.
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Pages 252-253, pre-publication copy:

*“It is important to note that, even if a summary index of an adverse response to mixtures was available, it would not necessarily reflect the total hazard of exposure to biosolids because of the inability to identify all of its hazardous constituents and their potential for interaction in vivo. Moreover, the composition of biosolids is susceptible to unanticipated changes from time to time and place to place. Thus, it is not possible to conduct a risk assessment for biosolids at this time ( or perhaps ever) that will lead to risk-management strategies that will provide adequate health protection without some form of ongoing monitoring and surveillance. There is a degree of uncertainty that, when exceeded in the risk assessment process, requires some form of active health and environmental tracking to ensure against unanticipated outcomes.*

*This situation led the committee to conclude that although the Part 503 agent-specific risk assessment process can be improved with new risk assessment methodology, the remaining uncertainty for complex mixtures of chemicals and biological agents is sufficient to preclude the development of risk-management procedures based on these agent-specific analyses that can reliably result in acceptable levels of risk.”*

- 23.\_\_\_\_\_. Summary of Research Recommendations. (2002). Report Brief.
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25. Lewis, D.L.; D. K. Gattie. 2002. Pathogen Risks from Applying Sewage Sludge to Land. *Environmental Science & Technology*.
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27. Lewis, D.L. and D.K. Gattie. 2003. Comment on “Evidence for the Absence of *Staphylococcus aureus* in the the Land Applied Biosolids.” *Environmental Science & Technology*.
- 27b,\_\_\_\_\_.(2002) Interactions of pathogens and irritant chemicals in land-applied sewage sludges (biosolids). *BMC Public Health* 2:1
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34. Silva, E; et al. Something from “Nothing”—Eight Weak Estrogenic Chemicals Combined at Concentrations below NOECs Produce Significant Mixture Effects (2002) *Environmental Science and Technology* vol 36 no.

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37. Jensen, J. (1999) Fate and effects of linear alkylbenzene sulphonates (LAS) in the terrestrial environment. *Science of the Total Environment* 226 ( 2-3).
38. Khan, S.J. and J.E. Ongerth. (2002). Estimation of pharmaceutical residues in primary and secondary sludge based on quantities of use and fugacity modeling. *Water Science and Technology* 46(3)
39. Dizer, H. et al. (2002). Estrogenic effect of leachates and soil extracts from lysimeters spiked with sewage sludge and reference endocrine disrupters. *Environmental Toxicology*, 17 (2).
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- 51 Smit L>A>A>; Spaan S; et al (2005) Endotoxin exposure and symptoms in wastewater treatment workers. *American Journal of Industrial Medicine* 48: 3039
52. Gans J. Wolinsky M. et al (2005) Computational improvements reveal great bacterial diversity and high metal toxicity in soil. *Science* vol. 309, issue 5739, 1387-1390.
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## **Unpublished Research in Northern New England on Stockpiles and Groundwater Contamination:**

. NH groundwater nitrate research by UNH Professor McDowell et al.

. Estes, G.O. J. Shao; T. Ballestero. 1995. Release of Nitrate-Nitrogen and Heavy Metals from Land Applied Biosolids in Northern Areas. New Hampshire Water Resource Center.

. Stockpile research done by the Mitchell Center in Maine. (2003) (limited data)

Mobilization of arsenic research done by Richard Behr DEP Maine. (2001) (limited data)

Little River Turf Farm research done in Lisbon, Maine. USDA NRCS. (limited data)

Compiled for Citizens for Sludge-Free Land. [www.sludgefacts.org](http://www.sludgefacts.org) April 29, 2008.