UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

FEB 3 - 2009

Mr. Jim Bynum
Byn.Jam@aol.com

OFFICE OF WATER

Dear Mr. Bynum:

Your email to US EPA Administrator Stephen Johnson of January 20, 2009, in which you inquire about the fecal coliform method for use in sewage sludge has been forwarded to me for reply. Our branch has the responsibility to develop and support methods for use in Clean Water Act programs. In this email, I have answered the six questions in your January email about the fecal coliform method.

1. Are you aware that fecal coliform is the name of the test, with no actual relationship to fecal material?
The term "fecal coliform" refers to a group of microorganisms (gram negative, facultative anaerobic, non-sporulating bacilli that ferment lactose with gas and acid formation within 24-48h at 44.5°C). The term "fecal coliform" has a direct relationship to "fecal material" because this group of organisms occurs in 96-100% of human feces (Olivieri 1982) at densities of 10^6-10^9 (cells/gram of wet weight feces, Feachem *et al.* 1983). These organisms also occur in a number of animals, including farm animals (cow, pig, sheep, horse, duck, chicken, turkey), common pet animals (cat, dog), and wild animals (mice, rabbits, chipmunk) (Olivieri 1982).

2. Are you aware [sic] the fecal coliform test inactivates most bacteria that make up the coliform group?
Fecal coliforms are a subset of the more general coliform group (gram negative, facultative anaerobic, non-sporulating bacilli that ferment lactose with gas and acid formation within 24-48h at 35°C). They are distinguished from the coliform group by their ability to grow at the elevated temperature of 44.5°C. Thus, "inactivation" is by design so as to eliminate those organisms that are unable to grow at 44.5°C.

3. Are you aware that only a minor group of the coliform are thermotolerant and show up at 112.1 degree F?
Please see response to (2) above, as "thermotolerant" refers to the ability to grow at the elevated temperature of 44.5°C (112.1°F).

4. Are you aware [sic] optimum temperature for coliform growth is between 77 and 104 degrees F.?
The optimum temperature for coliform growth is 35°C, which is within the range of 77°F and 104°F (25°C and 40°C, respectively).

5. Are you aware that most of the gram negative colifrom [sic] bacteria are in fact disease causing pathogens?
The coliform bacterial group belongs to the family *Enterobacteriaceae*, which includes *Escherichia coli*, and various members of the genera *Enterobacter*, *Klebsiella* and *Citrobacter*. For sludge monitoring, the fecal coliform group, previously defined [see (2) above] is used. This group of bacteria is usually not harmful to humans, and is thus used to indicate the presence of fecal waste which may contain pathogens (US EPA 1999).

6. If you are, why would EPA claim fecal coliform are indicators of fecal contamination?
Fecal coliforms are used as useful indicators of fecal contamination because they are commonly found in feces.

References:
Feachem, R.G. *et al.* 1983. Detection, Survival, and Removal of Pathogens in the Environment, *in Sanitation and Disease Health Aspects of Excreta and Wastewater Management*, R.G. Feachem, D.J. Bradley, H. Garelick, D. Duncan Mara. John Wiley & Sons, Chichester.
Olivieri V.P. 1982. Bacterial Indicators of Pollution, *in Bacterial Indicators of Pollution*, Pipes W.O., ed. CRC Press, Boca Raton.
U.S. EPA. 1999. Environmental Regulations and Technology: Control of Pathogens and Vector Attraction in Sewage Sludge. EPA 625-R-92-013, revised October 1999.

Thank you for sharing your thoughts and concerns. If you have additional questions regarding the fecal coliform method, please contact me at reding.richard@epa.gov, or Dr. Robin K. Oshiro, at oshiro.robin@epa.gov.

Sincerely,

Richard Reding, Ph.D., Chief
Engineering and Analytical Support Branch