

Biosolids and Bioaerosols

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Scientists at the University of Arizona have recently completed extensive research on the potential for people to get sick when they either work with Class B biosolids or live near a site where they are being applied. Class B biosolids have been treated to kill 99% of the fecal coliform bacteria and 10% of the Salmonella. The focus of this research was to determine if any disease causing organisms could be carried by air (bioaerosols) from biosolids application sites. If it isn't possible to get sick from airborne organisms, the only way that people can get sick from disease causing organisms in biosolids is to eat the biosolids or contact it directly.

It should be noted that it is also possible for people to get sick if they eat food that has come into direct contact with Class B biosolids or any other type of material that contains animal wastes that has not been fully treated to kill pathogenic organisms. This was first understood at the end of the 19th century, and this understanding resulted in the ban of land application of untreated human wastes (Gerba and Smith, 2005). That is why Class B biosolids are not permitted to be used on any type of garden vegetable or fruit. There have been no documented cases of people getting sick as a result of land applied biosolids (National Academy of Sciences, 2002). It is also why people need to exercise caution when using animal manures as fertilizers. Currently, manures don't have to be treated to reduce pathogens before they are used as fertilizers. There have been many documented cases of pathogens from animal manures making people sick and even killing them (Gerba and Smith, 2005).

To carry out research on bioaerosols from biosolids, scientists from U of AZ set up air samplers at a range of different biosolids application sites where Class B biosolids with different solids contents were being applied. They looked at two sites in Washington State; one where biosolids are flung onto forest lands and another where biosolids are applied using a side cast spreader to wheat fields and hops ground. In total they collected samples from sites in Virginia, Arizona, Texas, and California, in addition to those in Washington. The research was carried out to answer the following questions:

1. How many microorganisms are aerosolized?
2. What is the duration of exposure?
3. What is the nature of the plume coming from the biosolids application site?
4. Does the application method influence the potential spread of pathogens?
5. What happens to any pathogens that are aerosolized, and how long do they survive?



For the people that work with biosolids, the scientists used the following assumptions:

1. 8 hour work day
2. 251 days of work per year
3. Tractor cab air filter working at 50% efficiency
4. Operator will be downwind of the biosolids 50% of the time
5. Once in the air, the microbes will stay alive and potent

The results of their research suggest that , for workers that apply biosolids, the risks of getting sick are under 1 in 10,000 for Salmonella and about 1-2 in 100 for a viral infection. If you just live near an application site (near was considered to be within 100 feet of the application site), the chances of getting infected by Salmonella were found to be 1 in 10,000,000. For a viral infection, the risk was 1 in 1,000,000. Based on the published, peer-reviewed papers from these studies, the authors believe bioaerosols from biosolids do not represent a major concern on the safety of this practice.

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