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Specialists in Soil Chemistry, Agronomy
and Contamination Assessments

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Biosolids – cause for concern?

In an [article](#) published in the *Sunday Telegraph* on 8 May 2011, Dr Kerry Phelps (former head of the Australian Medical Association) raises concern about the use of biosolids in Australian agriculture and the potential for the transmission of diseases. She is right to be concerned. When we introduce human wastes into agriculture, we create the potential for the transmission of diseases through foods. But what is the evidence – either way?



Photo: US EPA.

What are biosolids?

Dr Phelps refers to "the euphemistically labelled 'Biosolids program'." Well, yes and no. The term "biosolids" was coined to distinguish the *treated* product from the *untreated* "sewage sludge". There is a difference. Sludge is about 99% water, and it contains all manner of pathogens and other bacteria. Biosolids have less water and so handle as a solid. And they have been treated by various means to kill *most* microorganisms. And yes, the term also usefully avoids the baggage-laden term "sludge".

Biosolids program

Sydney Water created the biosolids program in the early 1990s to provide a solution to the century of pollution of Sydney's beaches through the disposal of raw sewage off the rocks at North Head, Bondi and Malabar. Even when the deep ocean outfalls were dug to move the waste offshore, the microorganisms returned via winds and tides. But since all of the solids in the sewage have been trapped and removed, Sydney's beaches have returned to their former glory. That's the good part.

Sydney Water needed to do something with the solids. One solution was to burn them. This certainly removes all but the ash, but it also wastes a valuable resource. Biosolids provide an excellent source of organic matter and plant nutrients which, in the normally impoverished Australian soils, are critical to sustained agricultural production. So Sydney Water began a series of farm trials to test the feasibility of using this resource for benefit. And it works. The soil's capacity to hold moisture increases, the nutrient content increases and yields increase. That's the good part too.

SESL has to acknowledge a vested interest here: We have been involved in soil and plant testing from the start of the biosolids program. And our results have all confirmed that provided the published guidelines are followed closely, there is no heavy metal contamination of soils, there is no uptake of

contaminants by crops, and crop yields are still higher than average several years later.

It is important to know that all biosolids are used in accordance with the *Environmental guidelines – use and disposal of biosolids products* (a scanned copy of which can be downloaded from [here](#)). As Sydney Water controls all biosolids uses, the biosolids are never applied to food crops from which they could pass to humans.

Not on vegetable crops

A key component of the biosolids program is that the biosolids are not applied to vegetable crops. In agriculture, they are applied only to grain crops and pastures. Vegetable crops may not be grown for between 18 months and 5 years (depending on use) after biosolids application. So the cases that Dr Phelps mentions in her article are unlikely to have originated with the application of biosolids to crops and pastures.

Mystery origins

Nevertheless, some people have managed to pick up Third World diseases without having visited Third World countries. What are the possible sources?

- As Dr Phelps suggests, biosolids offer one possible route of exposure. But until a causal chain has been established – pathogens identified in raw sewage, *and* in processed biosolids, *and* in fields, *and* on crops, *and* in final food products – this has to remain conjecture. In particular, *Dientamoeba fragilis* is a waterborne parasite and does not survive long outside the body. It is very unlikely to survive exposure to ultraviolet light in a field for several months to years.
- Fresh vegetables imported from South-East Asia.
- Childcare facilities. Their popularity (and necessity) makes it easy for families to pick up diseases. The transmission of head lice show how easy this is.

As they stand, the biosolids guidelines are designed to prevent microbiological transmission. However, until there is proper evidence of causal links, a tightening of the rules may only make the barriers to this important recycling more difficult without benefit to public health.

On the basis of what we know, the use of biosolids in agriculture as currently practised poses little risk to our health. However, as our population continues to grow, water becomes more scarce and food security becomes less assured, we are going to need every bit of ingenuity in growing enough food. Biosolids capture and use in agriculture will continue to grow, and we will benefit from it. But this increasing reliance on biosolids (and wastewater reuse) creates the need for laws rather than guidelines, and a much broader attention to pathogen control.

Rational responses

Until proper scientific analysis supports the existence of causal links, Dr Phelps's call for a comprehensive review of safety through all stages of biosolids capture and use would seem premature and expensive.

We despair, however, at the *Sunday Telegraph's* [companion article](#), which is clearly designed to sell copies by mangling fact and half-truths. It mixes emotive language (“a break-out of Third World parasites” with no context of background levels), hyperbole (“Doctors fear” – all two of them), evidence against the article's premise (1 in 5 samples of *untreated* sewage contained *D. fragilis*, but no mention of *treated* sewage), anecdotal evidence (an increase of pathogens in people who have not travelled overseas, but no alternative explanation), overseas bans (but no reason why), correlation but not causation (a higher incidence of illness in people living near biosolids use, but perhaps they contaminated the fields?), irrelevant facts (the poisoning of cows in the USA ... by heavy metals) and support for the safety of biosolids (by quoting sections from the guidelines that ensure that the diseases cannot be transmitted in foods).

Dr Phelps is premature in calling for a comprehensive inquiry. The *Sunday Telegraph's* scare-mongering is not evidence, and it detracts from her concerns and muddies the waters.

Glossary

Sewage: the material in the waste pipes
Sewer: the network of waste pipes
Sewerage: the service that removes the wastes
Sludge: the organic gunk that settles to the bottom

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