

Report on the Primary Industries Standing Committee
(PISC) National Cadmium Workshop, Werribee,
14th February 2002

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Attendees

See attached list.

Discussion notes

The NCMC requested that this meeting be convened as cadmium inputs from all sources have to be considered in agricultural production systems if food quality is to be protected now and in the future.

At present, cadmium concentrations in fertilisers are regulated, and uniformity exists (or is currently being effected) between the Australian States.

Some guidelines are available for biosolids, but these vary between States. Biosolids, given their low analysis, and the rates at which they are applied, are unlikely to be traded across State borders, as fertilisers are. Quality of organic wastes/fertilisers are also not controlled to the same extent as inorganic fertilisers or biosolids, and significant loading of Cd to soil may therefore result (e.g. Sydney basin study of Jinadasa et al. 1997).

Guidelines are not available for organic wastes, so the guidelines for biosolids are often applied, though these are not always appropriate. At present a draft standard for composts and soil conditioners was being redrafted by Standards Australia, and this includes recommendations that Cd concentrations not exceed National biosolids guidelines. However, there is no necessity for producers to comply with the Australian Standard. A major concern is that high rates of application of fertiliser complying with National biosolids guidelines results in large Cd additions to soil.

Agreement was reached that the individual States should set loading limits for cadmium in biosolids. Each State will review its standards. Proposed guidelines are:

Biosolids should not be applied to agricultural land with cadmium concentrations above 0.5 or 1.0 mg/kg Cd, unless local data indicates lower limits should be applied. The critical values may be related to soil pH, the lower limit applying to acid or saline soils.

The maximum annual cadmium loading for agricultural soils to be set at 30g/ha/yr Cd, averaged over 5 years, i.e. a total of 150 g/ha Cd over 5 years. 30 g/ha/yr Cd is the amount of cadmium that would be applied in an inorganic fertiliser containing 300 mg Cd/kg P (the maximum permissible under current legislation) at 100 kg/ha P (a rate which is used on intensive dairy pastures and in vegetables when grown on soils with a high phosphorus fixation capacity).

Violations of food standards for Cd may occur on soils low in Cd, e.g. wheat in parts of southern Australia, and peanuts on sandy soils in Queensland at soil concentrations as low as 0.2 mg/kg Cd.

It was agreed that 30 g/ha/yr Cd was not sustainable in the long term, but it allows Cd inputs to be capped, as an interim measure, pending further investigation.

While Cd is a major concern to us in the fertiliser industry, it is unlikely to be the driver in all cases for setting maximum rates at which biosolids can be applied. The frequency and rate at which biosolids are applied is normally dictated by other factors, i.e. nutrients (nitrogen and

phosphorus) or copper in South Australia. However, some treatment works with high Cd biosolids may still have agricultural reuse limited by Cd.

In South Australia, biosolids cannot be used on irrigated soils. Salinity is common in irrigated areas, and chloride (Cl) has been shown to mobilise cadmium (Cd), increasing its availability for plant root uptake.

By paying attention to industrial sites/disposal of trade wastes, Cd concentrations in biosolids have been reduced considerably over the past decade or so, e.g. in some treatment works from above 10 mg/kg Cd down to 1 - 3 mg/kg Cd at the present time in biosolids derived primarily from domestic sources. The scope for further reductions below these levels may be restricted. However, some treatment works with mainly domestic origin waste are still producing biosolids above these levels. Apart from human excrement (i.e. cadmium derived from the food we consume in our diets), other sources of Cd are (possibly) toothpaste, soap and shampoos. Traceback of sources of Cd in biosolids would be beneficial to indicate where trade waste policies need to be altered. The issue of data quality assurance in relation to analytical accuracy is important at low Cd concentrations, and the Australasian Soil and Plant Analysis Council will be encouraged to establish an analytical quality assurance program for organic wastes.

While loading of soils with Cd from biosolids application can be controlled through State guidelines, there is still a need to consider how Cd additions in other organic wastes/fertilisers can be minimised.

Other issues with biosolids and organic wastes are odours and pathogens.

Agreement and recommendations

The meeting agreed that cadmium in wastes/biosolids should be controlled as follows (action for States, NCMC and industry to consider):

- Controls at source (i.e. trade waste policies). Traceback of Cd in biosolids in treatment works with high Cd concentrations to determine where additional controls are needed on influent concentrations;
- Maximum annual loading rate of 30g/ha/yr averaged over 5 years (150g/ha/5yr);
- Maximum soil concentration 1.0 mg/kg, unless local data indicate lower limit;
- Biosolid cadmium grading – national guideline to be adopted (when finalised);
- Research to suggest soil/biosolid bioavailability index & sustainability system;
- An analytical quality assurance program be encouraged through the Australasian Soil and Plant Analysis Council; and
- Controls on Cd in wastes other than biosolids to be considered e.g. other animal and urban wastes and composts.

References

Jinadasa KBPN, Milham PJ, Hawkins CA, Cornish PS, Williams PA, Kaldor CJ, Conroy JP (1997) Survey of cadmium concentrations in vegetables and soils of Greater Sydney, Australia. *Journal of Environmental Quality* **26**, 924-933.

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