

Earthworms soak up heavy metal

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Earthworms could be used to extract toxic heavy metals, including cadmium and lead, from solid waste from domestic refuse collection and waste from vegetable and flower markets, according to researchers writing in the *International Journal of Environment and Waste Management*.

Swati Pattnaik and M. Vikram Reddy of the Department of Ecology and Environmental Sciences, at Pondicherry University, in Puducherry, India, explain how three species of earthworm, *Eudrilus eugeniae*, *Eisenia fetida* and *Perionyx excavates* can be used to assist in the composting of [urban waste](#) and to extract heavy metals, cadmium, copper, lead, manganese, zinc, prior to subsequent processing.

With rapid increases in urban populations particularly in the developing world, there is a growing problem of how to manage organic waste and to find alternatives to landfill disposal particularly for domestic [food waste](#) and that from vegetable markets. According to the research team, it is an unfortunate fact of life that much of this waste is currently dumped on the outskirts of many towns and cities and is causing serious pollution, disease risk and general [ecological harm](#). It also represents a considerable wasted resource, whereas the organic matter might be exploited usefully in growing [food crops](#).

The process of vermicomposting in this way allows such waste materials to be remediated and the compost used subsequently for use in growing human food without the risk of accumulating heavy metals in crops. The team says that up to about three-quarters of the various [heavy metals](#) can

be removed by the worms from solid waste. The *E. eugeniae* species was the most effective worm at remediating [solid waste](#) and producing rich compost. The team's tests on vermicomposting reveal that the heavy [metal content](#) of such waste can be reduced to levels significantly below the permissible safe limits.

The worms' digestive system is apparently capable of detaching heavy metal ions from the complex aggregates between these ions and humic substances in the waste as it rots. Various enzyme-driven process then seem to lead to assimilation of the metal ions by the worms so that they are locked up in the organism's tissues rather than being released back into the compost as worm casts. The separation of dead worms from compost is a relatively straightforward process allowing the heavy metal to be removed from the organic waste.

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