SUMMARY

Home composting (HC) has potential as an alternative to landfill disposal for managing a proportion of the domestic biodegradable waste stream. It is a potentially unique waste management practice in that it offers the only means by which the producer can be the processor as well as the end-user of the recycled product. However, there is a lack of information on actual waste diversion rates achieved by this approach. This research project has quantitatively assessed the effectiveness of HC at diverting biodegradable household waste from landfill in a two year Study Trial involving 64 homeowners. The study was based on three refuse collection rounds in the Chertsey, Thorpe and Hythe areas in the Borough of Runnymede, Surrey with financial support from The Norlands Foundation. Participants in the Study Trial weighed their waste inputs to the compost bins and measured the temperature of the composting material. The total annual waste input per household was 360 kg and the relative contribution of kitchen, paper and garden waste was 29, 3 and 68 % of the total deposit, respectively. These waste inputs suggested that a recycling/diversion rate equivalent to 10 % of total household waste may be practicable where 20 % of households are actively engaged in HC in the community. The effects of different management practices on waste biodegradation in small-scale compost bins were assessed and the treatments included: factorial combinations of garden size, proprietary accelerator, mixing and inoculation with earthworms. Biochemical activities in the compost bins were determined by measuring the temperature and interstitial gas composition of composting materials. Temperature conditions were typically within the mesophilic range (20-45 ºC) and were indicative of active microbial degradation. Measurements of interstitial gas concentrations for oxygen, carbon dioxide and methane indicated that waste degradation was an aerobic processes. Chemical characteristics of organic residues sampled from the bins were determined after the first and second year of operation. Mass balances for moisture and volatile solids were constructed to quantify the extent of organic matter stabilisation and the moisture status of decomposing waste in the compost bins. This showed that small-scale home composters were effective at waste stabilisation and total losses measured from the bins were equivalent to 53 % of the input mass. A field trial was established to assess the end-use of composted products from the Study Trial as soil conditioners for the growth of *Petunia grandiflora* F_1H. Plants receiving home produced composts yielded larger flower numbers than either peat-amended soil or the untreated control treatment emphasising the value of the composted residue as an effective replacement for peat for general use as a soil conditioner. The environmental impact of airborne concentrations of *Aspergillus fumigatus* and potential nuisance due to vector attraction in small compost bins was investigated and were shown to be unimportant issues for HC. The overall aim of the research was to provide practical information and guidance to Local Authorities on the potential contribution of HC for the management of household biodegradable waste.