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Home and community composts are potential source of metals and metalloids for urban garden

Alice KOHLI[1, 2, 3], Liliane JEAN-SORO[1, 3], René GUÉNON[2, 3], Laure VIDAL-BEAUDET[2, 3]

1 Univ Gustave Eiffel, GERS-LEE, F-44344 Bouguenais, France
2 EPHOR, L'institut Agro, Agrocampus Ouest, F-49000 Angers, France
3 IRSTV, F-44000 Nantes, France
Corresponding author: Alice Kohli; kohlialice@hotmail.fr

Home composts (HC) and community composts (CC) are usually applied on soil in urban agriculture. They can be used in gardens in the close vicinity of the production sites, limiting the use of fertilizers by home gardeners. Moreover, self-production through home and community composting are a key strategy of local organic waste management but subjected to heterogeneous and approximate practices.

The lack of expertise and monitoring of self-production composts raised the question of their quality. Some studies have provided insights by assessing the process and end-product quality and showed efficient compost process but great variability.

The compost quality is a crucial factor for its use as a soil amendment to improve carbon storage, fertility, or else. It is defined by maturity, stability, nutrient availability, presence of pathogens or even (in)organic contaminants. The presence of trace metals and metalloids (TMM) in composts is an environmental and health issue because compost addition into soil could contribute to their accumulation or spreading by leaching or transfer to crops. The use of self-produced compost by home gardeners may have adverse effects because TMM contentsare not controlled and compost application rate into garden soils is often excessive. The few assessments of TMM in composts showed contrasted contents of TMM, from undetectable to unusually higher than national regulations.

The potential contamination of composts by TMM and TMM sources are not sufficiently documented for safety in home garden production. Sources of TMM may be difficult to identify due to diverse and approximate composting practices.

The main goal of this study was to assess the quality and the safety of home and community composts from urban and suburban areas including slightly Pb-contaminated allotment garden. The objectives were to (i) examine the compost quality regarding organic and mineral matters contents and their chemical functions, (ii) determine the TMM contents and establish relationships with compost quality.

First, organic matter content exhibited huge variability and chemical functions (Fourier-transform mid-infrared spectrometry) did not show any specific signature besides to the abundance of mineral fraction. Secondly, HC had a significantly higher Pb content than CC and a majority of HC exceeded organic farming thresholds for Pb and Zn while CC were generally compliant. Statistical analysis highlighted strong and significant link between TMM content and the whole signature of chemical functions.