

## Monitoring Soil Organic Amendments Under Arid Climate: Evolution of Soil Quality and of Two Consecutive Barley Crops

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**Abstract :** Organic amendments are generally used for improving the fertility of arid and semi-arid soils. However, the price of farmyard manure, the organic amendment typically applied to many arid and semi-arid soils has highly increased in the last years. To investigate at field scale whether cheap, highly available organic amendments, such as sewage sludge compost and municipal solid waste compost, may be acceptable as substitutes for farmyard manure is therefore of great interest. A field plots experiment was carried out to assess the effects of a single application of three organic amendments on soil fertility, distribution of trace elements and on barley yield. Municipal solid waste compost (MSWC), farmyard manure (FYM) and sewage sludge compost (SSC) were applied at rates of 0, 20, 40 and 60 t ha<sup>-1</sup>, and barley was cultivated in two consecutive years. Plant samples and soils were collected for laboratory analyses after two consecutive harvests. Compared with unamended soil, the application of the three organic residues improved the fertility of the topsoil, showing a significant dose-dependent increase of TOC, N, P contents up to the highest dose of 60 t ha<sup>-1</sup> (0.74%, 0.06% and 40 mg kg<sup>-1</sup>, respectively). The enhancement of soil nutrient status impacted positively on grain yield (up to 51%). The distribution of trace elements in the soil, analysed by a sequential extraction procedure, revealed that the MSWC increased the acid-extractable Co and Cu and reducible Ni, while SSC increased reducible Co and Ni and oxidisable Cu, relative to the control soil.

**Keywords :** municipal solid waste compost, sewage sludge compost, fertility, trace metals

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