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Humic-Like Substances in Organic Wastes and Their Effects on Amended Soils

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Humic substances, and especially humic acids (HA), are the most important components of soil organic matter responsible of soil fertility, crop production, and land protection from contamination, degradation, erosion and desertification. In recent years recycling as soil organic amendment of composted materials of various nature and origin has became a very popular and efficient agricultural practice. However, organic wastes must be properly composted previous to soil application in order to obtain a mature and stabilized organic material in which the humification process has developed to an adequate degree. In particular, the chemical composition, structure and properties of HA-like components present in a compost are important indicators of its maturity and stability to achieve a successful agronomic performance and a safe environmental impact in soil.

The main objectives of this paper are to provide a review of chemical and spectroscopic data of the HA-like components in representative composts, with respect to the corresponding data of native soil HAs and of HAs present in soil after various times from compost application at various rates.

The HA-like components in composts are generally characterized by a larger aliphatic character and molecular heterogeneity, smaller amount of O-containing and acidic functional groups, and smaller degrees of aromatic polycondensation and humification than native soil HAs. The compositional, structural and functional chemical properties, and in particular the aliphatic, polysaccharide and lignin structures and S- and N-containing groups of HAs in amended soils are affected at various extent depending on the nature, origin, and application rate of the compost, thus suggesting a partial incorporation of HA-like fractions of compost into native soil HAs. However, with increasing time from compost application to soil the observed modifications of

amended soil HAs become less and less apparent with a clear trend to approach the molecular properties typical of native soil HA.