



Photoinductive properties of compost

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Composting is a controlled aerobic/anaerobic process of decomposition of organic matter into humic and humic-like compounds. It is a good ecological way of recycling organic wastes and by-products into a reach organic carbon material, which can be used in landscaping, horticulture (growing media) and agriculture as a soil conditioner (amendment) and organic fertilizer.

Another promising application of compost would be to assist pollution remediation. Compost are highly concentrated in organic matter, part of which is composed of coloured macromolecules, the so-called humic and humic-like substances. These latter undergo reactions under light excitation, generating oxidant reactive species capable of degrading organic compounds. Thus, when they are exposed to solar light, compost shows photoinductive properties, which may be used to promote the degradation of organic pollutants such as pesticides.

The present talk will be devoted to this important new property. Laboratory-scale experiments and outdoor investigations on the impact of the compost organic matter on pesticides photodegradation coupled with an accurate characterization of it will be reported.

The presented study was conceived in three steps. Firstly, we undertook a fundamental study aiming to identify the reactive species photogenerated upon irradiation of compost. Using specific probes and the scavenging technique, we could delineate the role of oxidants such as hydroxyl radicals, singlet oxygen and triplet excited states in the reactions photoinduced by different types of compost organic extracts (1, 2).

Secondly, compost organic extracts were characterized by UV-visible spectrophotometry and excitation emission matrix (EEM). Correlations between spectral and photoinductive properties could be obtained.

Finally, the photodegrading capacity of compost or of their organic extracts towards three selected organic contaminants under relevant environmental conditions was demonstrated (3, 4).

Results would be used to assess the potential of compost as a photoinductor in relation to organic pollutant elimination and for development of this remediation technique.

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