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Spectroscopic analysis of vermicompost for determination of nutritional quality



SPECTROCHIMICA ACTA

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HIGHLIGHTS

GRAPHICAL ABSTRACT

- *Eichhornia crassipes* is a noxious, aquatic and intransigent weed.
- *Eichhornia* was used as a raw material for production of vermicompost.
- Humic substances functional groups were analysed by FT-IR spectroscopy.
- GC–MS is used to analysis the compounds of vermicompost and compost.

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Introduction

Vermicomposting is an inexpensive biotechnology tool for recycling of a variety of wastes from different nature through the joint action of earthworms and microorganisms [1]. Various vermicomposts were produced from different raw materials like cattle

FT-IR spectra of vermicompost obtained from 50% E. crassipes + 50% cow dung - 10th day.



ABSTRACT

Spectroscopic analysis has been carried out to examine the compost quality, maturity and nutritional levels of vermicompost and compost of *Eichhornia*. 50% *Eichhornia crassipes* and 50% cow dung mixtures were vermicomposted using earthworms (*Eudrilus eugeniae*) and collected on different days' time intervals. Fourier transform infrared spectroscopy (FT-IR) spectra reveal the presence of humic substance from compost and vermicompost, which improves the soil fertility. Gas chromatography–mass spectroscopy (GC–MS) analysis shows maximum level of Benzene propanoic acid (95.98%) and by 2-Propanone, 1-Phenyl-, OXIM (10.10%) from vermicompost through earthworms activity. Atomic absorption spectroscopy (AAS) results reported high level of micronutrient from *Eichhornia* mediated compost and vermicompost. © 2014 Elsevier B.V. All rights reserved.

manure, pig manure, agriculture waste and food waste [2]. Vermicompost has rich microbial communities significant to increase soil fertility. As a result of microbial populations, the macro and micro nutrients are in available forms such as nitrates, phosphates, and exchangeable calcium and soluble potassium [3,4].

FTIR spectroscopy is used to determine composting processes and to describe compost maturity [5–7] or to characterize humic substances from compost [8–10]. Hsu and Lo [11] proposed that Fourier-transform infrared spectroscopy is considered a reliable

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