

Mass spectrometric evidence for the occurrence of plant growth promoting cytokinins in vermicompost tea

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Abstract Through their decomposing activities, earthworms produce rich organic fertilizers called vermicomposts containing mineral nutrients and anecdotal evidence of biologically active phytohormones. Aqueous extracts of vermicomposts, namely vermicompost tea (VT), have positive effects on plant growth. It has been postulated that trace amounts of phytohormones in vermicomposts or its VT are beneficial for plant growth and development. We therefore screened for the different classes of phytohormones (auxins, cytokinins, abscisic acid, and gibberellin) in VT using liquid chromatography–tandem mass spectrometry (LC–MS/MS) after solid-phase extraction. VT was produced by earthworms being fed with a mixture of water hyacinth (*Eichhornia crassipes*) and chicken manure at a ratio of 4:1 (*w/w*). This investigation is the first mass spectrometric evidence for the presence of cytokinins in VT: namely *trans*-Zeatin (tZ), N⁶-Isopentenyladenine (iP) and N⁶-Isopentenyladenosine (iPR), which were present at 0.06, 3.33, and 0.02 nmol L⁻¹, respectively. The successful detection and quantitation of cytokinins in VT provided direct evidence to explain the growth efficacy of applying VT in order to enhance plant growth and development. We postulated that they were

microbially synthesized due to the abundance of microbial communities in the vermicompost.

Keywords Bio-fertilizer · Phytohormones · LC–MS/MS · Cytokinins · Earthworms