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The Examination of The Genotoxic and Antigenotoxic (Pre-Treatment) Effects of Vermicompost Using Allium Test At 48 H Treatment in Tissue Culture

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Abstract

Vermicompost (worm compost) is a widely used bioavailable product in conventional agriculture. It is often derived from a type of worm called *Eisenia fetida* (Red Californian Worm). In this study, the genotoxic and antigenotoxic effects of various concentrations of vermicompost against H_2O_2 on the sterilized *Allium cepa* bulbs grown in tissue culture were investigated. All onions were first rooted in MS (Murashige and Skoog) medium for 3 days. Two different protocols were applied to the root tips. 1) *A. cepa* root tips were treated with 0, 5000, 10000, 20000, 40000 and 80000 µg/mL of vermicompost for 48 h to determine its genotoxic potential. 2) *A.cepa* root tips were also treated with the same concentrations of vermicompost for 48 h in the presence of H_2O_2 for the last 1 h (pre-treatment) to determine its antigenotoxic potentials. All the concentrations of vermicompost alone significantly increased the frequency of the mitotic index (MI) compared the the control. However, none of them induced significant increase in the frequency of mitotic abnormalities. Again, all the concentrations of pre-treatment (47 h vermicompost +1-hour H_2O_2) of vermicompost increased the frequency of MI in root tip cells. On the contrary, 47 h pre-treatment of vermicompost decreased the frequency of mitotic aberrations induced by H_2O_2 applied to roots for the last 1 h of the culture. These results show that while vermicompost treatment alone does not induce genotoxic effects, pre-treatment of vermicompost revealed protective effect agaist H_2O_2. This study indicated antigenotoxic potential of vermicompost, which has been extensively used in traditional agriculture, against genotoxic chemicals. This is the first research indicating that vermicompost can be used in tissue culture conditions.

Keywords: *Vermicompost, Genotoxicity, Antigenotoxicity, Tissue culture, Allium cepa*

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