



Bioremediation of fluoride spiked soil by earthworm *Eisenia fetida*

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Abstract : A study was conducted to find out the role of earthworm *Eisenia fetida* in bioremediation of fluoride spiked soil. Earthworms were cultured in the mixture of cowdung and soil (3:1 W/W) for a month. Four experimental setups were designed and named as Control A (without earthworms), Control B (with earthworms), Test A (without earthworms) and Test B (with earthworms). Fluoriated water was sprinkled in Test A and Test B for one month. Coriander plants were grown in Control A, Test A and Test B. Samples of plants, earthworm tissues and soil were tested on 10th, 20th and 30th day to compare the percent reduction and accumulation of fluoride in the different setups. The results showed that earthworms had accumulated fluoride.

Keywords: Bioremediation, Fluoride spiked soil, earthworm.

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Introduction

Fluoride (F) enters into the human body via two major routes: (i) drinking water, (ii) nutritional supplement or food chain. When a fluoride compound is dissolved in water, the element fluorine will be present mainly as fluoride ions. WHO (1984) has prescribed the maximum permissible limit of fluoride in drinking water as 1.5mg/L. The Bureau of Indian Standards, has however, suggested the desirable limit of fluoride in drinking water as 1.0mg/L with a remark as "lesser the better". The amount of fluoride is considered lethal when taken orally as 35-70mg F/kg body weight. This is equivalent to 5-10g sodium fluoride (NaF) for a 70 kg adult and 1-2g NaF for a 15 kg child (Melberg and Ripa, 1983).

F has negative effects on human health. Excessive F intake over a long period of time may result in serious health problems, disfiguring dental fluorosis and disabling skeletal manifestations including crippling deformities, osteoporosis and osteosclerosis. Endemic fluorosis is known to be a global problem, occurring in all continents, and affecting many millions of people (Fawell et al., 2006). Gastrointestinal complaints, in the form of nausea, loss of appetite, pain in the stomach, constipation followed by intermittent diarrhoea