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Research Article

Assessment of metal enrichments in industrial soil of Dindigul Town, Tamil Nadu

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Summary

Heavy metal enrichment and contamination of the soil has attracted a great deal of attention world wide due to their non-biodegradable nature. This study was conducted to investigate the concentration of heavy metals such as Fe,Mn, Zn,Cu, Pb ,Cd and Cr in soil which have been contaminated by industrial activity. In view of this, influence of an industrial environment on the accumulation of heavy metals in the surface soils of the Dindigul which is Industrial Town, Tamil Nadu has been investigated. The total 18 top soil samples enrichment (0-20cm) were collected for a period between October 2011 to February 2012 and the heavy metal contents were analyzed by atomic absorption spectrophotometer (AAS). The mean concentration of Mn (13.16 mg/kg) was found to higher followed by Fe (9.13 mg/kg), Cu (6.73 mg/kg), Zn (2.13 mg/kg), Cr (1.98 mg/kg), Pb (0.82 mg/kg) and Cd (0.079 mg/kg). The average enrichment factor for Cr (4.58) was found to be higher followed by Cd (3.06), Zn (1.93), Pb (1.78), Mn (1.49), Fe (1.41) and Cu (1.17). Cr and Cd have the more enrichment factor and normalized scatter coefficient compared to other heavy metals. It is inferred that Cr and Cd are accumulated to the greater extent in the industrial soil of Dindigul Town.

Key words : Enrichment factor, Normalized scatter coefficient, Heavy metals, Atomic absorption spectrophotometer, Contamination, Industrial soil, Non-biodegradable

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Introduction

Pollution of the natural environment by heavy metals is a universal problem because these metals are indestructible and most of them have toxic effects on living organisms, when permissible concentration levels are exceeded. Heavy metals frequently reported in literature with regards to potential hazard and occurrences in contaminated soils are Fe, Mn , Zn, Cu, Pb, Cd and Cr (Akoto *et al.*, 2008; Alloway, 1995). Vehicle exhausts, as well as several industrial activities emit these heavy metals so that soils, plants and even residents along roads with heavy traffic loads are subjected to increasing levels of contamination with heavy metals (Ghrefat and Yusuf, 2006) and (Sarala Thambavani and Prathipa, 2010).

Road construction has been the main activity for development for industrial units. This has led to the loss of forest cover and subsequent loss of soil fertility. Road side soils often show a high degree of contamination that can be attributed to motor vehicles .Various researchers have found that the concentrations of the metals Pb, Cu, Zn, Cd and Ni decrease rapidly within 10 to50 m from the road sides (Joshi *et al.*,2010; Pagotto *et al.*, 2001). According to Panek and Zawodny (1993) and Sarala Thambavani *et al.* (2009), pollution of roadside soils and plants by combustion of leaded petrol product is localized and usually limited to a belt of several meters wide on either side of the road and that for similar topography and vegetation, the level of pollution decreases with the distance from the road. Due to their cation exchange capacity, complexing organic substances, oxides and carbonates have retention capacity for heavy metals. Hence, contamination levels increase continuously as long as the nearby sources remain active. Nevertheless, some heavy metals attached to the soil particles can be removed from the soil surface and get trans located elsewhere by the action of