

Abstract

The present work was conducted to estimate the contamination levels of two most common environmental pollutants i.e. Pb & Cd in samples of soil, dust, drinking water, sewage, irrigation water and blood from different locations. For this purpose, different locations on main national highway from Lahore to Sahiwal were selected. For irrigation water, sampling was done from River Ravi and its main canal Lower Bari Doab. The experimental setup to examine the effects of different treatments of Pb & Cd singly and in combination to monitor the effect of growth on leguminous fodder crops in field and pots and their transfer to the herbivore was tested by analyzing blood and faeces samples of the rabbits which were fed on them.

Results showed that soil and dust samples had significant levels of Pb & Cd throughout the area as compared to control. Mean values of Pb & Cd in soils were 44.223 and 1.686 $\mu\text{g g}^{-1}$ respectively whereas for dusts these were 207.508 and 2.909 $\mu\text{g g}^{-1}$ respectively showing clearly that dusts were more enriched with Pb & Cd as compared to soils. Mean values of Pb in drinking water were 0.078 while that of Cd were 0.005 $\mu\text{g ml}^{-1}$. Pb was higher than the permissible limits in all drinking water samples except control. Sewage had high Pb & Cd pollution with mean values of 0.930 and 0.145 $\mu\text{g ml}^{-1}$ respectively. Blood samples, drawn from the persons working on the same locations from where other samples were collected, had much higher mean Pb & Cd (0.243 & 0.032 $\mu\text{g ml}^{-1}$ respectively) values than permissible limits. Irrigation water also showed high Pb & Cd enrichment at all locations except control with mean values of 0.265 and 0.036 $\mu\text{g ml}^{-1}$ respectively. The significant positive correlation between Pb & Cd in all samples suggested that anthropogenic activities are main source of metal pollution in the study area.

The experimental set up clearly indicated that there was a significant decrease in all vegetative parameters with increasing metal levels in soil as compared to control. Metal contents in root, shoot and leaf of both crops along with faeces and blood samples of rabbits were also measured. Although roots accumulated much more metal contents as compared to shoots, both Pb & Cd not only behaved differently in

erent tissues (roots & shoots) but also in single and combined treatments which might be due to certain interactions between the two metals. Less than 1 ratio of Bioaccumulation Factor (BAF) also confirms high metal accumulation in roots as compared to shoots. Generally, Pb was more toxic than Cd in single treatments. Faeces of the rabbits contained higher Pb & Cd contents as compared to blood samples because about 66% Pb and 38% Cd excreted via faeces. Results showed that although the risk of metal transfer through this food chain is low but continuous pollution of soils can raise this risk.