ABSTRACT

The humic acid, albeit a minor component of the vast majority of soil systems, is an unchallenged potent contributor in reducing the heavy metal concentrations by complex formation and improving plant growth. However, very little is known about the adsorption-desorption processes and its influence on root growth under high heavy metal concentration, especially humic acids of organic matter rich Mollisols of Tarai. Langmuir and Freundlich isotherms were used to characterise the adsorption pattern of chromium, nickel, cadmium and lead on humic acid extracted from the soils. With increase in the levels of metal ions, per cent adsorption was forced to reduce. This reduction was more pronounced at higher levels of metal concentration on humic acid molecule and might be due to less availability of sites for adsorption. The $r^2$ values showed that adsorption of heavy metals on humic acids were better explained by Freundlich adsorption isotherm. The desorption of heavy metals viz. chromium, nickel, cadmium and lead from humic acids varied from 34.01 to 34.94; 29.05 to 30.69; 23.61 to 25.56 from 17.00 to 18.84 per cent, respectively.

Heavy metals upto 20 $\mu$g ml$^{-1}$ did not posed any significant effect on the germination of maize seeds. The per cent toxicity of heavy metals to the tune of 20 $\mu$g ml$^{-1}$ was recovered by humic acid metal complex of 5 per cent strength or more except for lead metal.

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