

( )

( ( ) )

\*

( / / : // : )

**pH**

.( )

.( )

.( )

.( )

( )

pH

( )

( )

( )

$Zn^{+2}$

pH

pH

( )

pH

( )

( )

( )

( )

$+ +$

( )  $Mn^{+2}$

( )  $Mn^{+4}$

pH ( )

( )

( )

(

(

( )

...

:

( )

( )

( ( ) )

( )

pH

$$\frac{x}{m} = K_f C^{\frac{1}{n}}$$

:

$$\log \frac{x}{m} = \log K_f + \frac{1}{n} \log C$$

:  $\frac{x}{m}$

( )

)

: C

(

:  $k_f$  n

log C

log  $\frac{x}{m}$

log

$\frac{1}{n}$

$k_f$

)

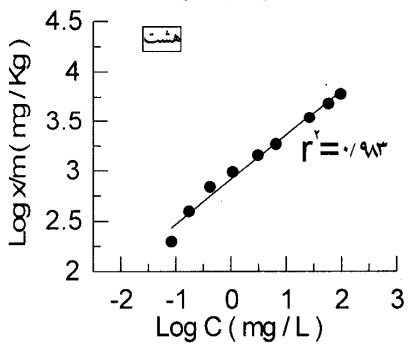
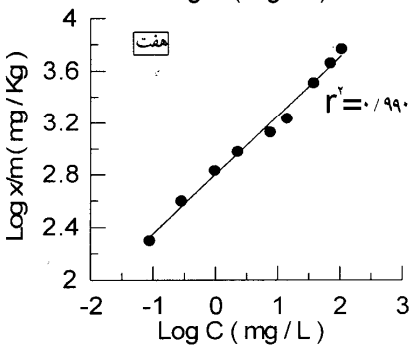
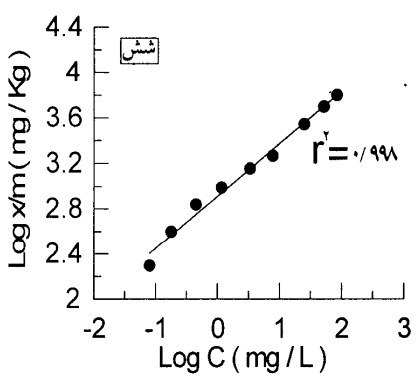
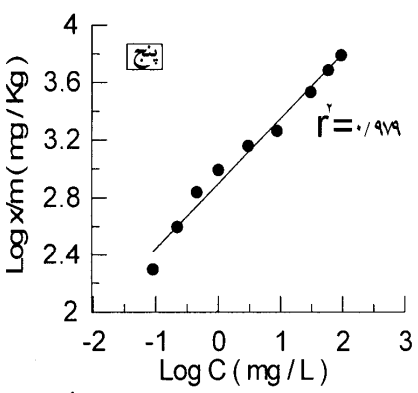
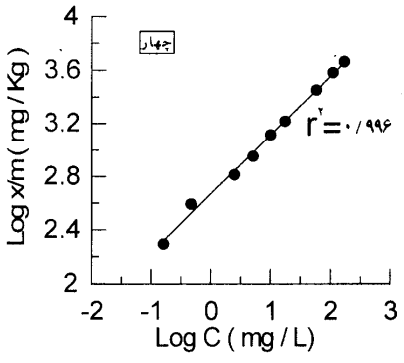
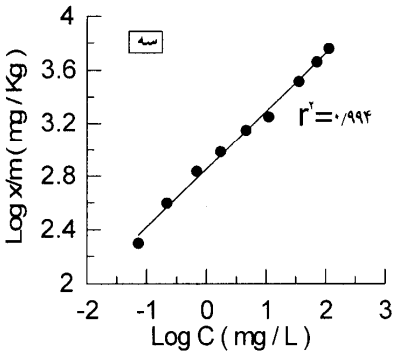
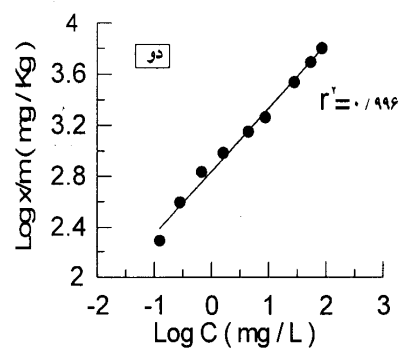
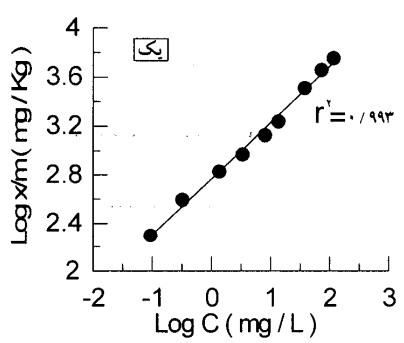
$\frac{1}{n} K_f$

( )

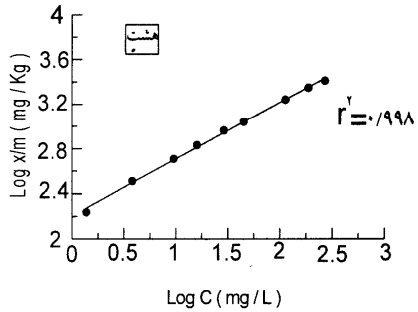
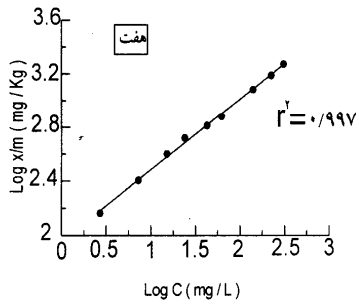
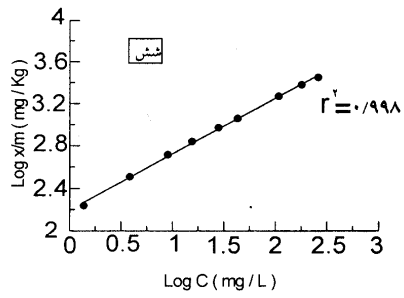
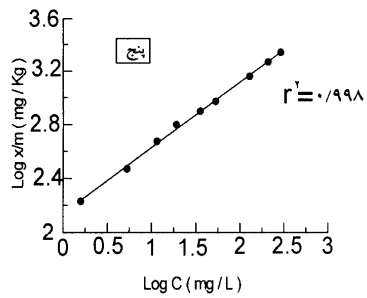
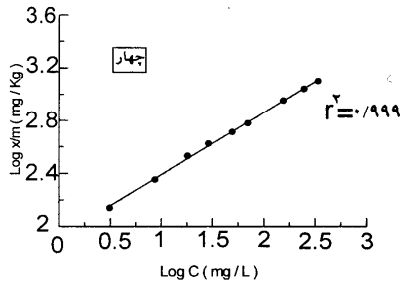
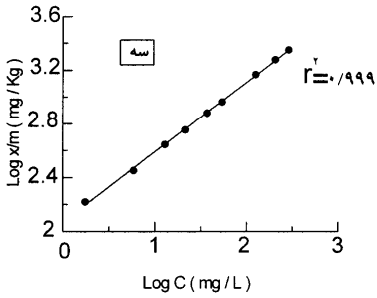
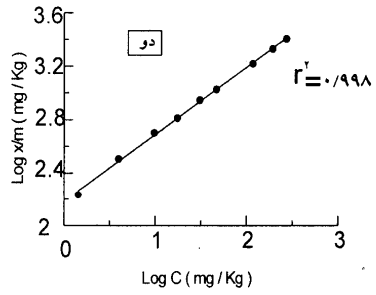
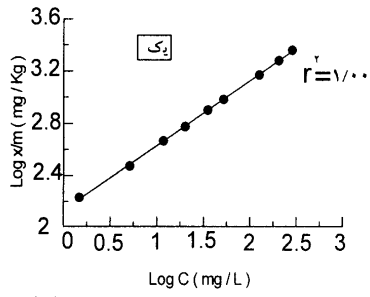
(

( )









( )

( )

$$K_f = \frac{1}{1 + \frac{1}{CEC} + \frac{1}{\%Clay} - \%OM} \quad R = \frac{1}{**}$$

$$K_f = \frac{1}{1 + \frac{1}{CEC} + \frac{1}{\%Clay} - \%OM} \quad R = \frac{1}{**}$$

$$K_f = \frac{1}{1 + \frac{1}{CEC} + \frac{1}{\%Clay} - \%OM} \quad R = \frac{1}{**}$$

$$K_f = \frac{1}{1 + \frac{1}{CEC} + \frac{1}{\%Clay} - \%OM} \quad R = \frac{1}{**}$$

$$K_f = \frac{1}{1 + \frac{1}{CEC} + \frac{1}{\%Clay} - \%OM} \quad R = \frac{1}{**}$$



## REFERENCES

6. Dhillon, K. S., 1984. Zinc adsorption by alkaline soils. *J. Indian Soc. Soil Sci.* 32: 250-254.
7. Elrashidi, M. A., & G. A. Oconnor. 1982. Influence of solution composition on sorption of zinc by soils. *Soil Sci. Soc. Am. J.* 46: 1153-1158.
8. Farrah, H. & W. F. Pickering. 1977a. Influence of clay-solute interactions on aqueous heavy metal ion levels. *Water, Air and Soil Pollution.* 8: 189-197.
9. Gharaie, H. A., M. Maftoun, & N. Karimian. 2002. Lead adsorption characteristics of selected calcareous soils of Iran and their relationship with soil properties. 17<sup>th</sup> WCSS. 14-21 August. Thailand.
10. Gotho, S. & W. H. Patrick., Jr. 1972. Transformation of manganese in a waterlogged soil as affected by redox potential and pH. *Soil Sci. Soc. Am. Proc.* 36: 738-748.

11. Gupta, R. K., S. Van den Elshout. & I. P. Abrol. 1987. Effect of pH on zinc adsorption-precipitation reactions in an alkali soil. *Soil Sci.* 143: 198-204.
12. Jain, C. K. & D. Ram. 1996. Adsorption of lead and zinc on bed sediments of the river Kali. *Water Research.* 31: 154-162.
13. Karimian, N. & A.Gholamalizadeh Ahangar. 1998. Manganese retention by selected calcareous soils as related to soil properties. *Commun. Soil Sci. Plant. Anal.* 29: 1061-1070 .
14. Karimian , N. & G. R. Mouafpouryan. 1999. Adsorption characteristics of selected calcareous soils as related to soil properties. *Commun. Soil Sci. Plant. Anal.* 29: 1061-1070 .
15. Korte, N. E. ET AL. 1976. Trace elements movement in soils : Influence of soil physical and chemical properties. *Soil Sci.* 122: 350-358.
16. Kurdi, F. & H. E. Doner. 1983. Zinc and copper sorption and interaction in soils. *Soil Sci. Soc. Am. J.* 47: 873-876.
17. Lindsay, W. L. 1979. *Chemical equilibrium in soils.* John Wiley & Sons. New York.
18. Nealson, K. H. 1993. The microbial manganese cycle. In: Krumbian WE, Editor. *Microbial geochemistry.* Oxford: Black well. 191-221.
19. Pavanasivam, V. 1973. Manganese studies in some soils with high organic matter content . *Plant Soil.* 38: 245-255.
20. Puls, R. W. & H. L. Bohn. 1988. Sorption of cadmium, nickel and zinc by kaolinite and montmorillonite suspensions. *Soil Sci. Soc. Am. J.* 52: 1289-1292.
21. Reddy, M. R. & H. F. Perkins. 1974. Fixation of zinc by clay minerals. *Soil Sci. Soc. Am. Proc.* 38: 229-231.
22. Shirwal, A. S. & P. B. Deshpande. 1984. Zinc adsorption isotherms of soils as related to soil properties. *J. Indian Soc. Soil Sci.* 32: 255-260.
23. Srivastava, S. C., M. P. Agrawal, & S. M. Jafri. 1966. Iron-Manganese relationship of chlorotic sugarcane plants grown on a high-lime soil. *Soil Sci.* 102: 208-211.
24. Welch, R. M., W. H. Alloway, W. A. House, & J. Kubota. 1991. Geographic distribution of trace elements problems. pp. 31-57. In: J. J. Mortved et al. (ed). *Micronutrients in Agriculture.* 2nd ed. SSSA, WI.

