Table 3.2. The removal of -$Cr_2O_7^{2-}$ ion on polyurethane resin

Wt.of resin (g)	3	7	10	15
% Adsorption of -$Cr_2O_7^{2-}$ ion on (neutral resin)	42.5	51	52	52
% Adsorption of -$Cr_2O_7^{2-}$ ion on (acidified resin)	55	80	91	91.9

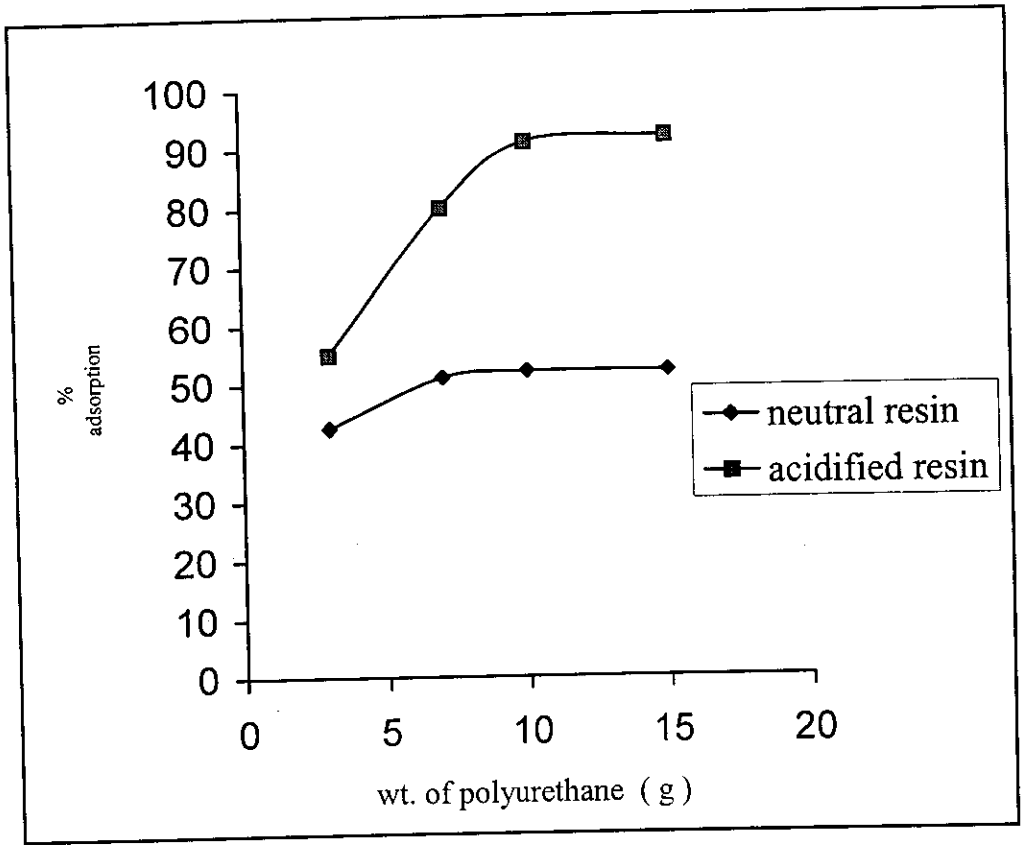

Fig. 3.5. Effect of amount of polyurethane on removal of -$Cr_2O_7^{2-}$ ion Solution (10 ppm)

Table 3.3. The removal of Ni^{2+} ion on polyurethane resin

Wt.of resin (g)	7	10	20	30
% Adsorption of Ni^{2+} ion on (neutral resin)	15	20	38.8	54
% Adsorption of Ni^{2+} ion on (acidified resin)	28	41	55	62

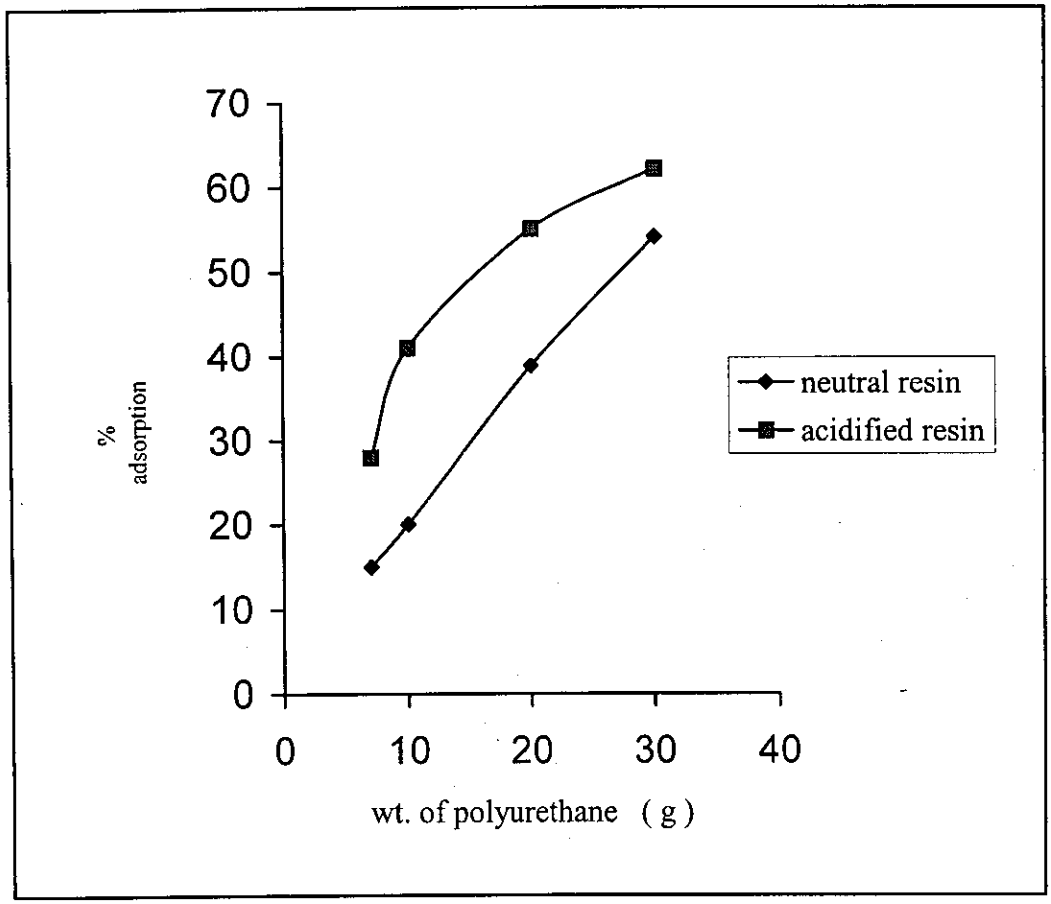

Fig.3.6. Effect of amount of polyurethane on removal of Ni^{2+} ion Solution (10 ppm)

Table 3.4. The removal of Zn^{2+} ion on polyurethane resin

Wt.of resin (g)	3	7	15	30
% Adsorption of Zn^{2+} ion on (neutral resin)	12	14	17	14
% Adsorption of Zn^{2+} ion on (acidified resin)	13	16	20	24.5

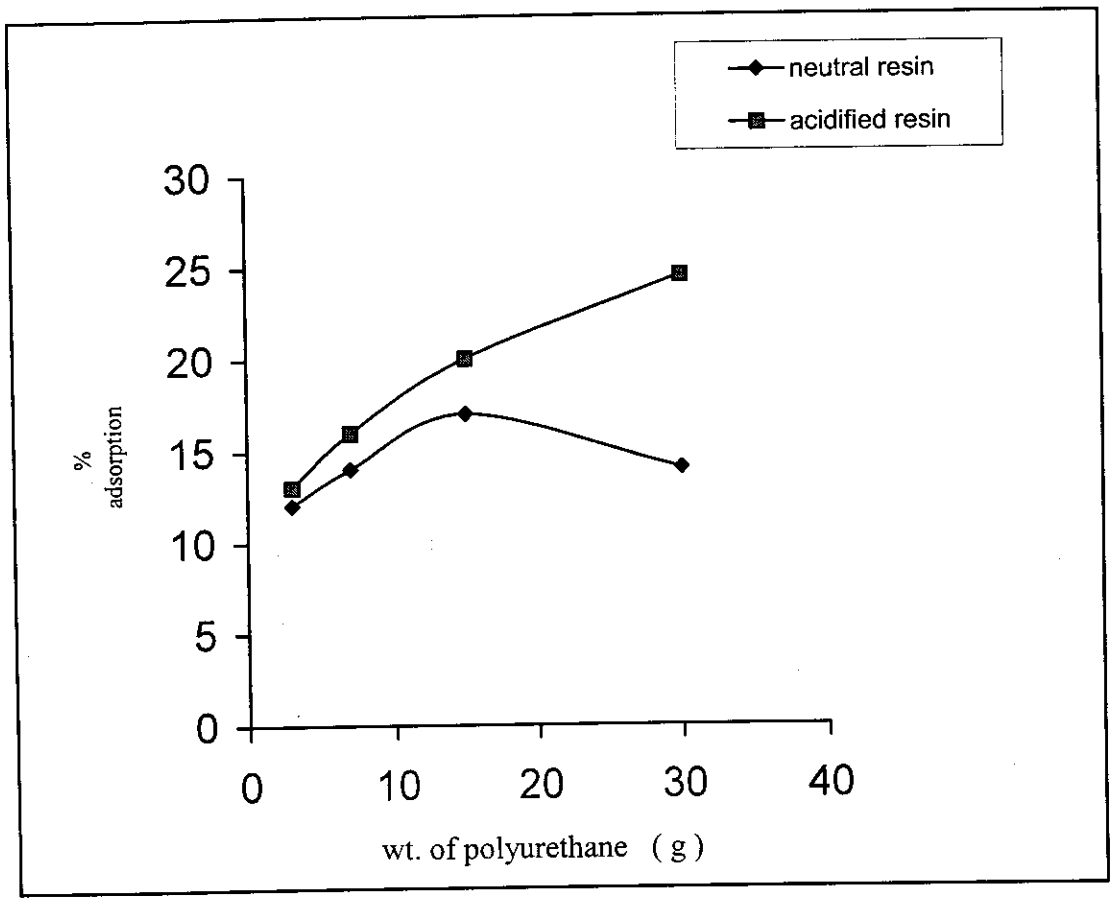

Fig. 3.7. Effect of amount of polyurethane on removal of Zn^{2+}ion Solution (10 ppm)

Table 3.5. The effect of amount of polyurethane resin on different Concentration of -$Cr_2O_7^{2-}$ ion.

Conc. of -$Cr_2O_7^{2-}$ (ppm)	10	50	100	150
% Adsorption of -$Cr_2O_7^{2-}$ ion	91.6	90.5	82	65

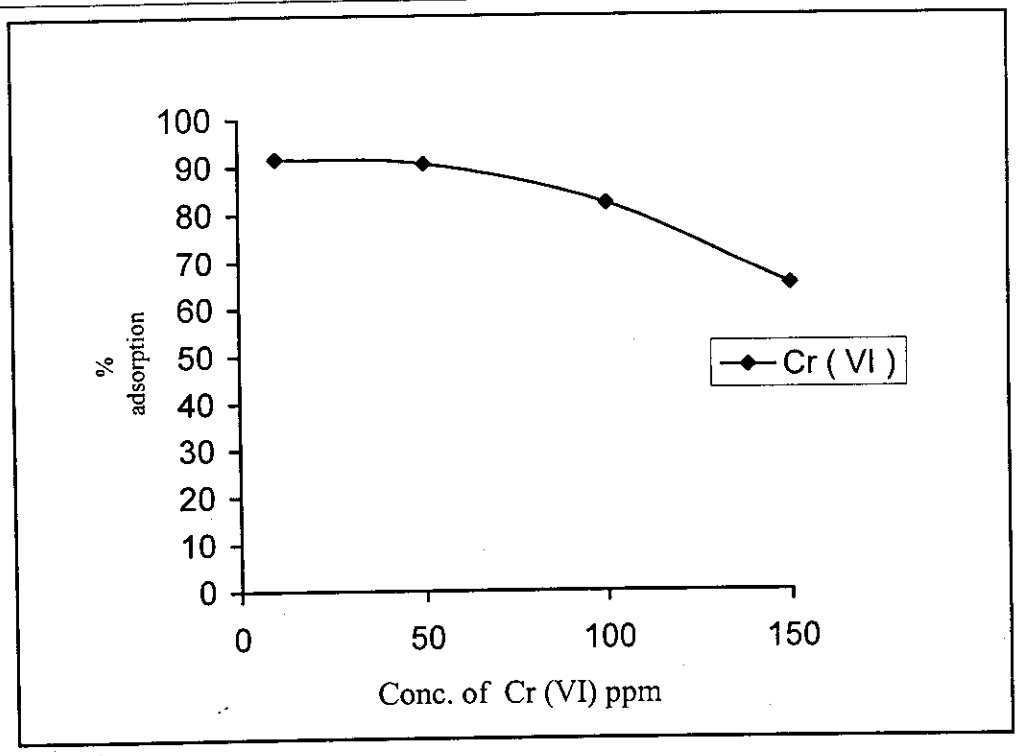

Fig. 3.8. Effect of amount of polyurethane resin on different concentration of -$Cr_2O_7^{2-}$ ion

3.2.2. Effect of time of agitation

Extensive studies were done on the effect of time of agitation on the removal of $-Cr_2O_7^{2-}$, Ni^{2+} ,Cu^{2+} and Zn^{2+} from their authentic solutions. The amount of polyurethane resin was kept at the optimum weight obtained from the previous study [20 g for Cu^{2+}, 15 g or $-Cr_2O_7^{2-}$ 30 g for Ni^{2+} and 30 g for Zn^{2+}] while the speed of rotation was kept at 400 rpm. The concentration of each metal ion was determined spectrophotometrically after different time intervals (60,120,180,and 240 minutes). The results of analysis showed that the removal of each metal ion increased rapidly up to 120 minutes then shows a steady state with nearly constant value. This can be explained by the fact that the equilibrium of complex formation between metal ion and the active center of the polyurethane reaches a steady state through- out that time intervals.

A representative example on the effect of agitation time on the removal of $-Cr_2O_7^{2-}$ and Cu^{2+} ions is shown in figures 3.9, and 3.10.

Table 3.6. The effect of agitation of time on removal of $-Cr_2O_7^{2-}$ ion on polyurethane resin.

Time (min.)	60	120	180	240
% Adsorption of $-Cr_2O_7^{2-}$ ion on (acidified resin)	85	91.9	93	93

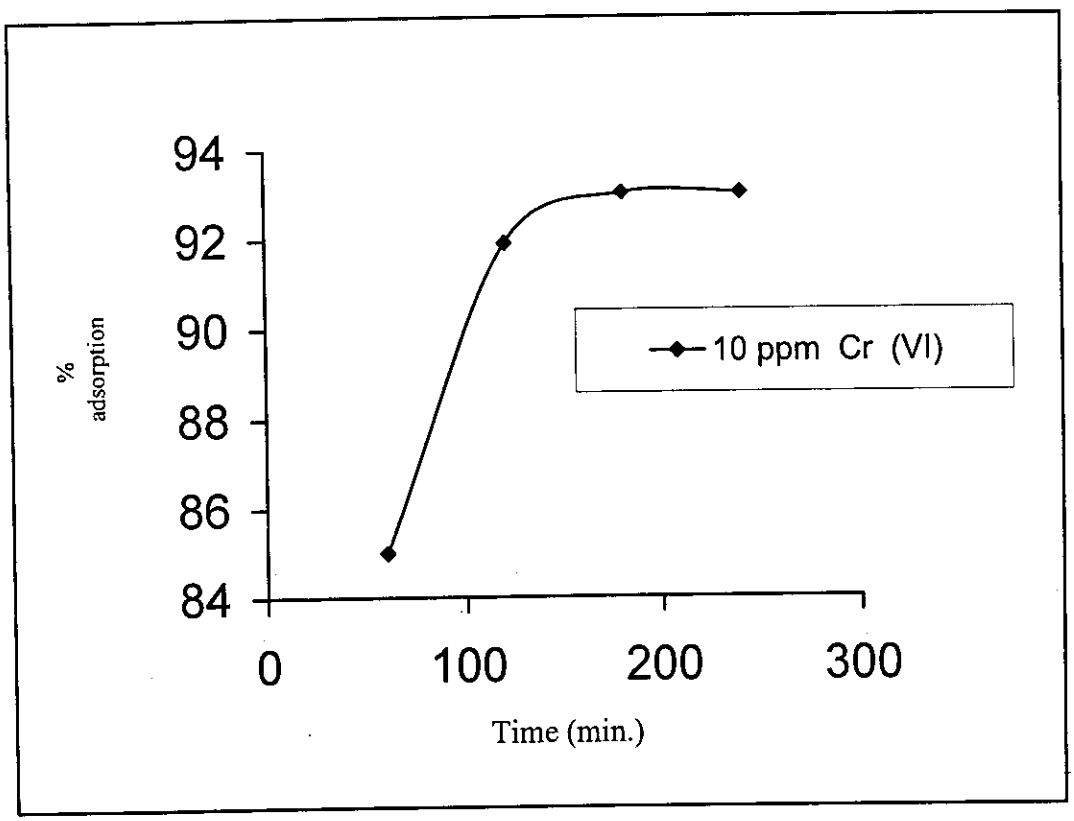

Fig. 3.9. Effect of agitation time on removal of $-Cr_2O_7^{2-}$ ion 10 ppm solution on polyurethane resin