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## 2. Thin Layer Chromatographic Separations and Identifications of Toxic Heavy Metal ions by Using Aqueous Humic acid as a Mobile Phase

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### Abstract

Thin layer chromatographic method has been developed for the separation and identification of metal ions such as Cr (VI), Cr (III), Ni (II), Co(II), Cu(II), Fe(III), Zn(II) and Mo(VI) from their two, three and four component mixtures. The separations were performed on thin layer of silica gel-G using aqueous humic acid as mobile phase. The chromatographic behavior of metal ions in surfactant mixed solvents was generally studied by using the thin layer of Silica Gel-G. Effect of concentrations, effect of pH, effect of adsorbent effect on the  $R_f$  value of different metal cations were studied by using Aq. Humic acid as a mobile phase. By using surfactant and optimum separating conditions, metal ions such as Cu(II), Zn(II), Co(II), and Ni(II) were separated from their binary mixture as well as ternary mixture. The metal ion concentration has been carried out by spectroscopic method.

**Key words:** Thin layer chromatography, separation, silica Gel -G, aqueous humic acid, pH, adsorbent, toxic heavy metal ions.

### Introduction

Naturally occurring Metals in the earth's crust, and their contents in the environment can vary between different regions resulting in spatial variations of background concentrations. The distribution of metals in the environment is governed by the properties of the metal and influences of environmental factors[1]. Among 92 naturally occurring elements, at about 30 metalloids and metals are potentially toxic to humans, Al, Be, B, Ti, Li, Co, Ni, Cu, V, Cr, Mn, As, Pd, Ag, Se, Sr, Mo, Te, Cd, Sn, Sb, Cs, Ba, W, Pt, Au, Hg, Pb, and Bi. In generic term Heavy metals for metallic elements having an atomic weight higher than 40.04 (the atomic mass of Ca)[2]. The entry of Heavy metals in environment by natural and anthropogenic means. Like mining, natural weathering of the earth's crust soil erosion, urban runoff, industrial wastage,