



CHARACTERISTIC STUDY OF HEAVY METAL ION BY USING THIN LAYER CHROMATOGRAPHY WITH HUMIC ACID AND L-METHIONINE AS A MOBILE PHASE

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Abstract

Thin layer chromatographic method has been developed for the separation 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 with L-methionine as mobile phase. Thin layer of Silica Gel-G was used to study the chromatographic behavior of metal ions in surfactant mixed solvents. Effect of presence of humic acid at various concentrations, presence of strong and weak electrolytes, and effect of concentration of surfactant, effect of acidity and basicity of aqueous surfactant on mobility of metal cations were also studied. By using surfactant and with various additives mixed in mobile phase, metal ions such as Cu (II), Mo(VI), Zn(II) and Ni(II) were separated from their binary mixture.

Introduction

Thin layer chromatography ie. (TLC) is superior and versatile method for the separation and identification of inorganic metal ions compared to other methods available for separation. Number of methods these days is available to recuperate thin layer chromatography such as use of support having characteristics different than those normally used in TLC. It has a number of basic advantages over other chromatographic techniques. While a methodology is being developed for a specific separation; it uses less solvent and polarity of the solvent or the type of a solvent mixture can be changed in a matter of minutes. Thus, because of short development time and easy change of mobile phase it is the

easiest method for separation and identification of metal ions. It has been successfully utilized in the analysis of waste water for heavy metal contents [Volynets. *et al.*, 1986.], characterization of hazardous waste[Stephans. *et al.*, 1980], estimation of toxic metal ions in industrial sewage[Thielemann. *et al.*, 1977], separation of heavy metal cations[Mohammad. *et al.*, 2004], separation of metal ion in tube well water sample[Deshmukh. *et al.*, 1989].

In recent years, there has been an increasing ecological and global public health concern associated with environmental contamination by heavy metals ions. Normal phenomena such as weathering and volcanic eruptions have also been reported to significantly contribute to heavy metal pollution [Bradl 2002 & HeZL. *et al.*, 2005] Industrial sources include metal processing in refineries, coal burning in power plants, petroleum combustion, nuclear power stations and high tension lines, plastics, textiles, microelectronics, wood preservation and paper processing plants [Sträter. *et al.*, 2010]. From the pesticides contain different concentration of heavy metals ions which is available in considerable amount in the soil once they are being used.

Using of amino acid as mobile phase is not common for chromatographic separations of heavy metal ion using conventional laboratory made TLC plates. Therefore it was favoured to use the analytical potential of amino acid that is aqueous solution of L - Methionine as mobile phase and silica gel-G as stationary phase for analysis of heavy metal ions. As a result distinct analytically important separations of heavy metals were performed. The importance of methionine in animal feed and food was discovered in the 1950s; and the first production