

CHROMATOGRAPHIC ANALYSIS OF HEAVY METAL IONS USING SUPER-SARAGRAPHY-831 SOFTWARE.

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Abstract : Chromatographic analysis of heavy metal ions has been carried out using advanced computational chromatographic software Super-Saragraphy-831 (SS-831) (© SW-10774/2018 India). The separation and analysis were carried out using a stannous silicate adsorbent and cationic surfactant. Method was effectively used for various environmental sample.

Index Terms - Stannous Silicate, adsorbent, Super-Saragraphy, environmental & surfactant.

I. INTRODUCTIONS

A thin layer chromatography is widely used for separation of various components from multicomponent systems. Surfactants as a mobile phase was successfully used for separation of various toxic metals^[1] from various sample. Many research were carried out for development in thin layer chromatography in terms of adsorbents and mobile phase. Metal ions separation were carried out on Aminoplast polymer^[2], Bismuth silicate^[3] and also on stannous silicate^[4]. Along with this development there was a development in techniques in chromatographic analysis. Various software were like JustTLC, qTLC & SS-831 used for rapid analysis of chromatographic plates. Among all these software SS-831 was found to be good for analysis of chromatography. Various toxic metal ions were analyzed using SS-831 software with silica gel-G^[5].

Current articles deals micellar chromatography in combination of advanced tool SS-831, for the separation and analysis of heavy metal cations.

II. MATERIALS AND METHODS

a. Chemicals and Reagents: DMG, dithizone, potassium ferrocyanide, CCl₄, ethanol, glacial acetic acid and cellulose were obtained from SD Fine India. Stannous chloride, sodium silicate & Benzalkonium Chloride and silica gel-G were obtained from Merk India. All other chemicals were of analytical reagent grade.

b. Metal ion Studied: Zn²⁺, Cd²⁺, Hg²⁺, Fe³⁺, Ni²⁺, Co²⁺, and Cu²⁺.

c. Test Solution: TLC was performed using standard aqueous solution (1%) of the chloride, nitrate or sulfate salts of the metal ions listed.

d. Stationary Phase: Stannous Silicate with silica gel-g binder as a binder^[6].

e. Mobile Phase: 3% aqueous solution of benzalkonium chlorides (cationic surfactant) with 10 ml ethanol as an additive.

f. Super-Saragraphy-831: After the development of chromatographic plates, they were analysed by SS-831 by using procedure mentioned in^[5].

III. RESULTS:

From Table no. 1 it was observed that, nearly same results were obtained in terms of retention factor.

Table 1: Comparative study of R_f values of metal

Metal	Old Method (R_f Value)	Super-Saragraphy-831 (R_f Value)
Lab Sample		
Co ²⁺	0.67	0.6614
Ni ²⁺	0.48	0.4912
Cu ²⁺	0.22	0.2234
Fe ³⁺	0.31	0.31450
Hg ²⁺	0.89	0.85068
Cd ²⁺	0.71	0.71845
Zn ²⁺	0.35	0.34587
River Sample		
Co ²⁺	0.60	0.6012
Ni ²⁺	0.47	0.4758
Cu ²⁺	0.19	0.1987
Fe ³⁺	0.30	0.3041
Hg ²⁺	0.87	0.8812
Cd ²⁺	0.73	0.77341
Zn ²⁺	0.32	0.3201
Industrial Sample		
Co ²⁺	0.63	0.6248
Ni ²⁺	0.50	0.5071
Cu ²⁺	0.24	0.2412
Fe ³⁺	0.34	0.3458
Hg ²⁺	0.84	0.8436
Cd ²⁺	0.72	0.7278
Zn ²⁺	0.31	0.3147

IV. CONCLUSION

From above result one can concluded that SS-831 software was consistent and convenient for identification of not only metals also enzymes and biological components from various samples. This software can easily run on any smart devices. One of the biggest advantage of this software is that this methods gives quick results so that software can be used for rapid analysis for bulk samples^[5]. This method gives widespread application in future development of thin layer chromatography.

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