

Determination of trace amount of heavy metal elements in sea water and highly salinity solution by high performance liquid chromatography combined with valve switching system

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### Summary

#### 1. Introduction

Highly sensitive determination methods of heavy metal elements in sea water and highly salinity solution have been required in the environmental protection and the factory process of salt. Most instrumental analyses are not always highly sensitive for sea water and highly salinity solution because of the effect of matrix. In this work, we aimed to develop a highly sensitive determination methods of heavy metal elements using high performance liquid chromatography (HPLC).

#### 2. Experiment

2-(5-Bromo-2-pyridylazo)-5-[N-n-propyl-N-(3-sulfopropyl)aminol]phenol (5-Br-PAPS), 8-quinolinol, and ammonium pyrrolidine-N-dithiocarbamate (APDC) were examined as chelating reagents for HPLC. The procedure for the determination of heavy metal elements is as follows: Sea water or highly salinity solution was taken into a 10 ml of volumetric flask. A solution of chelating reagent and pH buffer solution were added into the flask. Then, final volume was adjusted with water. An aliquote of the solution was injected into the HPLC system.

#### 3. Results and discussion

5-Br-PAPS gave the best results among the chelating reagents examined. The peaks of V, Fe, Co, Ni, and Cu were observed on the chromatogram by direct injection method. Seawater and high salinity solution were analyzed as real sample by both methods (the direct injection method and the valve switching method). Co, Ni, and Cu could be determined successfully by the direct injection method, but V and Fe could not be, due to the effect of matrix in the seawater and the high salinity solution. Compared with two factory processes, the freeze-dry method could suppress the loss of the heavy metal elements better than the boiling method.