

Analysis of Mono- and Di-valent Metal Cations Using the Hitachi Chromaster HPLC System with ELSD

Metal cations such as lithium, sodium, potassium, magnesium, calcium, and zinc play crucial roles in biological systems. They function as active sites in metalloenzymes, aid in electron transfer through redox reactions, and establish voltage differences across membranes that drive essential biological functions. Since these metal cations must be acquired through the diet, it is important to accurately measure the concentration of these metal ions in various food sources. Presented here is a method for analysis of six metal ions (Li^+ , Na^+ , K^+ , Mg^{2+} , Ca^{2+} , and Zn^{2+}) in food using the highly flexible Hitachi Chromaster HPLC system with evaporative light scattering detection.

Experimental Conditions

Module	Conditions
Pump (5110)	Mobile Phase: 70% CH_3CN , 30% H_2O , 0.2% trifluoroacetic acid Flow Rate: 1.0 mL/min
Autosampler (5210)	Injection Volume: 10 μL
Oven (5310)	Temperature: 30 $^\circ\text{C}$
Detector (Softa 1300)	ELSD, DT = 60 $^\circ\text{C}$, SC = 25 $^\circ\text{C}$
Column	Primesep 100, 4.6 x 250 mm

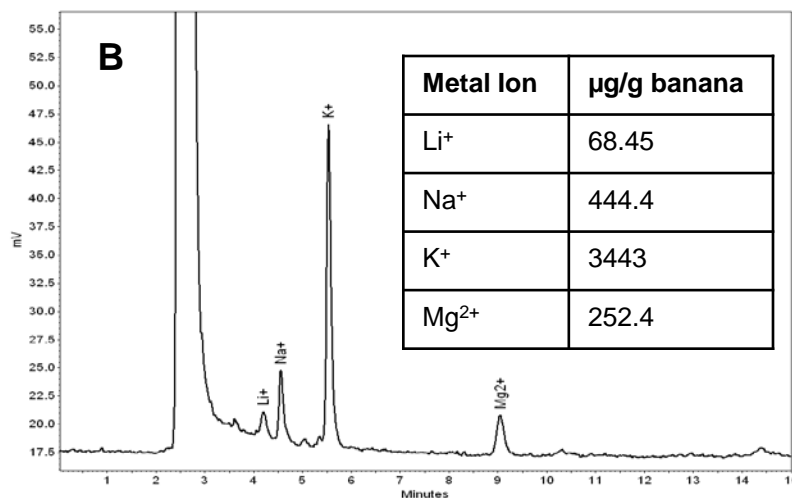
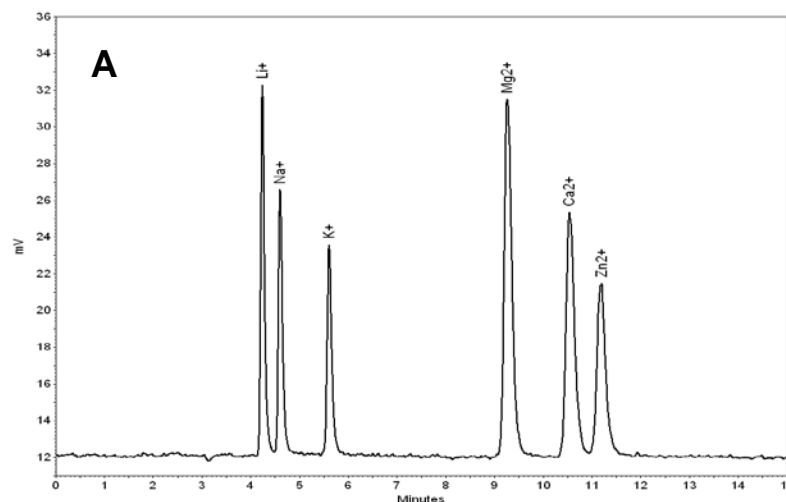
Results – Peak Area Linearity and Reproducibility

	Linearity (100 – 500 μM)	Reproducibility (300 μM , N = 4)
Li^+	$R^2 = 0.9970$	RSD = 1.57%
Na^+	$R^2 = 0.9920$	RSD = 2.48%
K^+	$R^2 = 0.9899$	RSD = 2.02%
Mg^{2+}	$R^2 = 0.9905$	RSD = 1.77%
Ca^{2+}	$R^2 = 0.9969$	RSD = 1.70%
Zn^{2+}	$R^2 = 0.9797$	RSD = 3.54%

Kendra L. Cox, Ph.D., Hitachi High Technologies America, Inc.

Results – Chromatographs

- A. 6-component mixture: Li^+ , Na^+ , K^+ , Mg^{2+} , Ca^{2+} , and Zn^{2+}
 B. Banana (0.1 g in 20 mL H_2O)



Discussion

Hitachi's Chromaster liquid chromatography system with evaporative light scattering detection is effective at analysis of multiple mono- and di-valent cations in under 15 minutes.

Hitachi High Technologies America, Inc.

Life Sciences Division
 5100 Franklin Drive, Pleasanton, CA 94588
 Toll Free: (800) 548-9001

Email: Sales-LS@hitachi-hta.com Website: www.hitachi-hta.com/hplc