

DEVELOPMENT AND VALIDATION OF A TECHNIQUE FOR THE ANALYSIS OF LEAD AND CADMIUM IN FOOD SUPPLEMENTS

CHEBLI .I , HADDAD.S , OUKIL.M , BESELEYM.S , CHERADI.S

Introduction

Dietary supplements are often contaminated with a variety of chemical contaminants that can counteract their beneficial effects. Among the wide range of toxic substances implicated, a major concern has been focused on heavy metals including cadmium, and lead.

The objective of this work is the development and validation of an analytical method for determining the levels of contamination of certain dietary supplements (multivitamins, herbal mixtures, nutritional supplements, etc.) by two heavy metals: lead and cadmium.

Toxicity of Cadmium and Lead

haematotoxicity

Neurotoxicity

Nephrotoxicity

Osteotoxic



Material and Method

Procedure for mineralization



Instrumental operating conditions

Element	Lead	Cadmium
Wavelength (nm)	283,3	228,8
Slit	0,7 L	0,7 L
Energy (A)	37	25
Flow rate (ml/mn)	250	250
Correction	Effet Zeeman	Effet Zeeman
Matrix Modifier Volume (µl)	5	5
Injected volume (µl)	20	20
Replicat	2	2



Microwave thermal program

Temperature (c°)	Time (min)	Energy (watts)
130	10	1000
150	15	1500
180	20	1500

Electrothermal atomization program

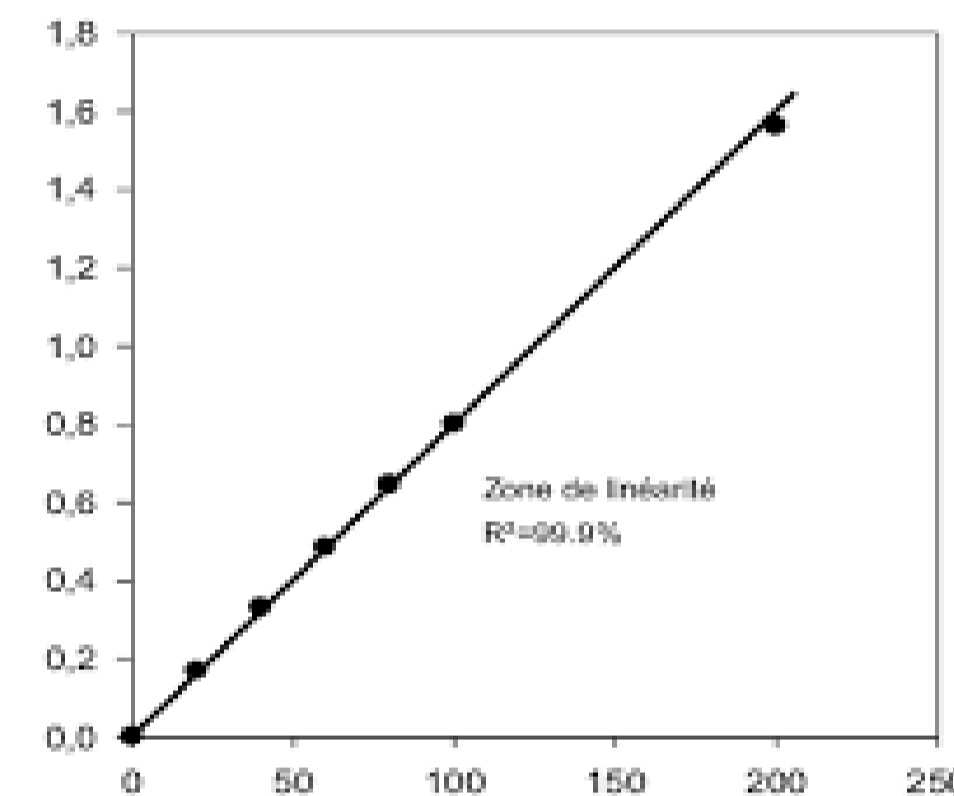
Step	Temperature (C °)		Rise time (s)		hold time (s)		Flow rate (l /min)	
	Pb	Cd	Pb	Cd	Pb	Cd	Pb	Cd
Dry	110	110	1	1	30	30	250	250
Pyrolyse	130	130	15	15	30	30	250	250
Atomisation	1600	1400	0	0	5	5	0	0
Cleaning	24500	24500	1	1	3	3	250	250

MRL



Results and discussion

Characteristics of the SFSTP method 2006



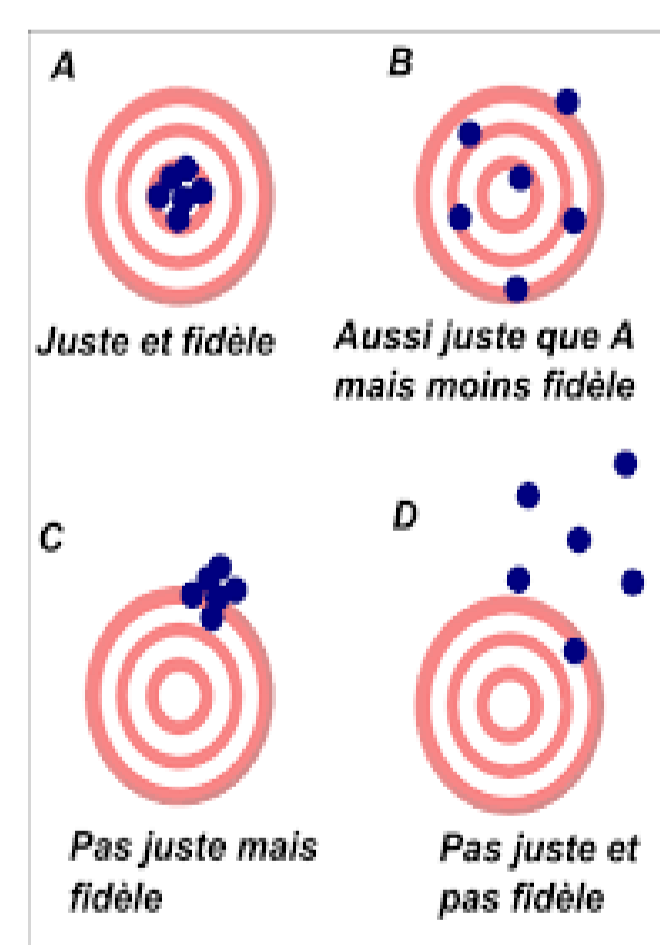
Linearity range from 0.5 to 8 mg/Kg

$$L_D = \frac{3 s(b)}{a}$$

$$L_Q = \frac{10 s(b)}{a}$$

Detection limit = 2.6 µg/Kg

Limit of Quantification = 3.7 µg/Kg



Repeatability: CV = 12.5%

Accuracy: relative bias = 14.5%

Conclusion

Dietary supplements can be a source of exposure to heavy metals, the accumulation of which in the body causes serious health consequences. The development of a technique for the analysis of heavy metals (lead and cadmium) by atomic absorption in food supplements of wide consumption allowed the latter to be checked to ensure the protection of the consumer.