



Analysis of Pb in Food Additives (Citric Acid) (Electrothermal Method)

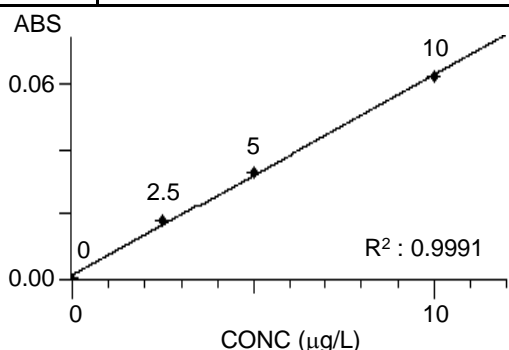
ZA3000

INTRODUCTION: The test method for purity in food additives is specified in the Japanese Standards of Food Additives. Heavy Metals Limit Test is employed in which the heavy metals are darkened with sodium sulfide TS in acidic solution, as their quantity is expressed in terms of the quantity of lead (Pb). The current component specification is 10 – 20 µg/g, calculated as lead. However, to harmonize with the international specifications by JECFA, it is predicted that the specifications will become applicable only to lead and the value will be lowered. By using the twin injection function of ZA3000 series atomic absorption photometers, a large sample volume can be injected and dried without extending the drying time and therefore, lead at 0.2 µg/L level in citric acid can be easily analyzed.

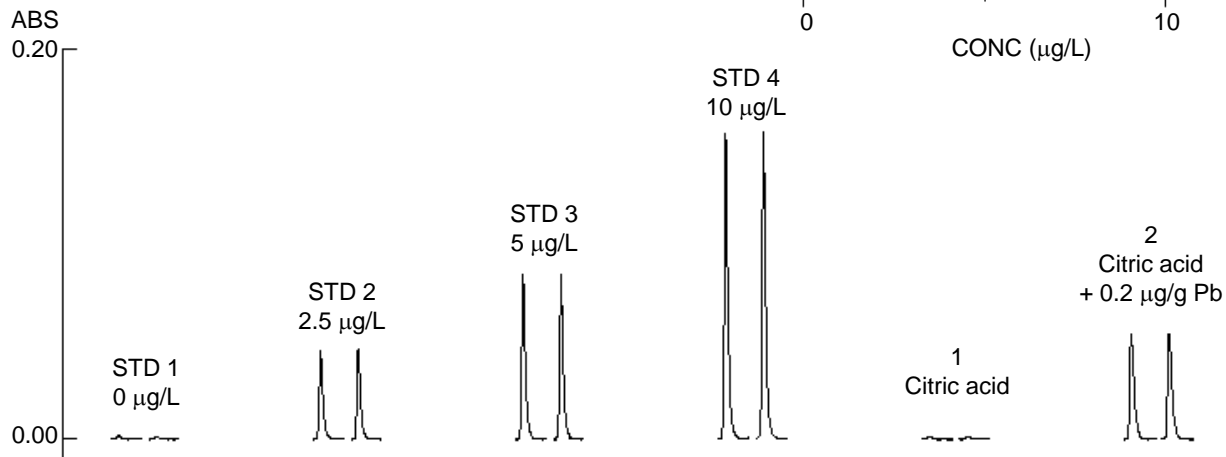
INSTRUMENT CONDITIONS	MEASUREMENT PARAMETERS	GA AUTOSAMPLER
Element : Pb	Meas. Mode : Working Curve	Sample Volume : 60 µL
Instrument : ZA3000	Signal Mode : BKG Corrected	Addition : Speed : 4
Atomization : GA	Curve Order : Linear	MATRIX MODIFIER
Wavelength : 283.3 nm	Calculation : Peak Area	Matrix Modifier : 100 mg/L Pd+Mg (10% nitric acid)
Lamp Current : 7.5 mA	Time Constant : 0.1 sec	Volume : 20 µL Order : After
Slit Width : 1.3 nm	Temp. Control : ON	
Cuvette : Pyro D HR		

TEMPERATURE PROGRAM					NOTE
Stage	Initial/Final Temperature (°C)	Heating/Keeping (sec)	Gas Flow Rate (mL/min)	Gas	Pyro D HR, a cuvette specially designed for twin injection, was used for the measurement. 1 g of citric acid was weighed out and the volume was made up to 50 mL with purified water.
1 Drying	50 / 110	40 / 0	200	Normal	
	110 / 300	20 / 0	200	Normal	
2 Incineration	800 / 800	20 / 0	200	Normal	
3 Atomization	2000 / 2000	0 / 3	30	Normal	
4 Cleaning	3000 / 3000	0 / 4	200	Normal	

	CONC (µg/L)	Mean ABS	SD	RSD	REF	ABS
STD 1	0.00	0.0002	0.0004	200.00 %	0.0066	
STD 2	2.50	0.0180	0.0002	1.11 %	0.0095	
STD 3	5.00	0.0329	0.0000	0.00 %	0.0114	
STD 4	10.00	0.0623	0.0001	0.16 %	0.0140	
1	ND	-00001	0.0002	- %	0.0055	
2	4.05	0.0264	0.0004	1.52 %	0.0095	



$4.05 (\mu\text{g/L}) \times 0.05(\text{L})/1(\text{g}) = 0.20 (\mu\text{g/g})$



KEY WORDS

Bio/Medical Science/Food/Pharmaceutical, Food, Food Chemistry, Food Additive, Citric Acid, Lead, Pb, Flameless, Graphite Furnace, AA, ZA3000, GA, Pyro D HR

Atomic Absorption Photometer (AA)

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