Application Guide to Method Validation of Metals in Fruit and Vegetables Using ICP-MS

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Preface

Analytical methods are crucial for ensuring food safety and compliance with global health standards. This book provides a detailed manual for those assessing metal contaminants in food, addressing the need for accurate, reproducible analytical techniques. Inductively ICP-MS is highlighted for its sensitivity and precision, vital for adhering to strict food safety limits. The book offers a clear, step-by-step guide on method validation, covering scope, specificity, detection and quantification limits, and precision. It details setting up ICP-MS protocols to meet standards from bodies like the International Conference on Harmonisation (ICH) and the U.S. Food and Drug Administration (FDA). Authored by experienced analytical chemists, the book is both practical and scientifically thorough, aiming to enhance professional competence in metal analysis for food safety. It seeks to be a pivotal learning tool and reference for global laboratories, underlining the importance of precise metal analysis in safeguarding public health.

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Analytical Method Validation

1.0 Objective:

To develop and validate an ICP-MS procedure for the estimation of Metals in fruit and vegetables by using ICP-MS

2.0 Scope & Application:

Following performance parameters will be assessed during validation

- ❖ System suitability & Selectivity
- ❖ Linearity
- ❖ Limit of Detection (LOD)
- ❖ Limit of Quantification (LOQ)
- ❖ Precision (Standard & Sample)
- ❖ Recovery

2.1 Application:

This procedure is applicable for the determination the trace metals like As, Cd, Hg, Sn,Cu & Pb in fruit and vegetables by following ICH guide lines.

3.0 Procedure:

3.1 Requirements:

3.2 Equipment & Glass Ware :

1) Calibrated Volumetric Flasks-10mL and 50mL capacity

2) Polypropylene centrifuge tubes, capasity15 & 50 mL

3) Calibrated Micropipettes with range of 10 to 100 µL, 100 to 1000 µL and 500 to 5000 µL

4) PTFE SF 0.45 micron syringe filter.

3.3 Chemicals & Standards

- Supra pure HNO_3 (Fisher chemicals)
- Supra pure HCl
- Supra pure H_2O_2 (Thermo fisher)
- Type-I Water

Table 1: Details of certified reference materials used**.**

SL NO	ELEMENTS	CONCENTRATION (mg/L)	MAKE	TRACABILITY	PURITY
1	LEAD (Pb)	1000	Inorganic venture	NIST	1000 ± 4 µg/ mL
2	COPPER (Cu)	1000	Inorganic venture	NIST	1004 ± 5 µg/ mL
3	ARSENIC (As)	1000	Inorganic venture	NIST	997 ± 7 µg/ mL
4	TIN (Sn)	1000	Inorganic venture	NIST	1000 ± 6 µg/ mL
5	CADMIUM (Cd)	1000	Inorganic venture	NIST	1000 ± 4 µg/ mL
6	MERCURY (Hg)	1000	Inorganic venture	NIST	1002 ± 3 µg/ mL
7	GOLD (Au)	1000	CPA chem	NIST	998.3 ± 3.4 µg/ mL
8	YTTRIUM (Y)	1000	CPA chem	NIST	1003.7 ± 2.5 µg/ mL

3.4 Sample Preparation:

Homogenize the sample properly and weigh ~0.25 g of the sample in a cleaned micro wave digestion vessel (FSSAI Lab manual. 2016, De Souza et al. 2021). Avoid placing on walls of digestion vessels. Move vessels linear to a Microwave digestion area. Add 2 mL of Concentrated HNO_3, 0.2mL Conc. HCL, 1 mL Hydrogen Peroxide, 0.2mL gold (10ppm), 2mL type-I water in to vessel and wait for 10 minutes. Let the vessels sit uncovered for 10 min, leave some more time if there is any reaction. Cap the vessels with the safety seal and tighten to appropriate torque to prevent loss of sample or acid. Keep the vessel linear in a microwave rotor unit. Run the digestion cycles according to ramping method (AOAC. 2015, Bhatt et al. 2024).

Microwave digester details and ramping conditions for food matrices;

Make : Anton Paar multiwave Pro
Vessel type : PTFE-TFM (HVT 50)

Table 2: Digestion program in microwave digestor

Steps	Temperature	Hold Time
Ramp	200ºC	30
Hold	200ºC	20
Cool	55ºC	

3.5 Preparation of spike sample for Recovery:
Spike at LOQ, 2LOQ, and 4LOQ levels

3.6 Preparation of standard mix stock solutions:

Preparation of Reagents:

- 2% Nitric acid: 2 mL of the Supra pure HNO_3 was taken into a 100mL Vol.Flask and make up to the mark with Type-I water (Mohapatra et al 2024).

Preparation of 6 element standards mix solution

- From the Stock 1000mg/l of Pb, As, Cd, Hg, consequently taken each 1mL of the standard and made up to the mark with 2% HNO3. The final conc. of the solution was 100mg/L. (*Valid up to 3 months).
- From each element of 100mg/L specific amount of reagent were taken and added into a 50 mL tarson tube. Specific amount of reagent from Cu 1000 mg/L and Sn 1000 mg/L were taken and added into that tarson tube.
- A standard mix stock was prepared as follows.

Table 3: Preparation of standard mix solution

Parameters	Intermediate (mg/L)	mix (mL)
Pb	100	0.5
Cu	1000	1.5
As	100	0.55
Sn	1000	1.5
Cd	100	0.75
Hg	100	0.5

4.0 ICP-MS ANALYSIS:

4.1 Equipment:

Inductively Coupled Plasma Mass Spectrometer system

Make : PerkinElmer

Model : NexION 2000

4.2 Instrument operational conditions:

- Rf power -1600w
- Plasma gas (Argon) flow – 15 L/min
- Nebulizer pump uptake speed- 50 Sec
- Auxillary gas flow - 0.8 to 1.2 L/min
- Make up and Dilution gas flow – 0 to 1.0 L/min
- Nebulizer gas flow- 0.7 to 1.2 L/min
- Cell tune mode – No gas/Helium
- Integration time – 10 Sec
- Replicates -3.0
- Mode- He

4.3 Preparation of calibration curve:

The ICP-MS system is stable according to the instrument specification and manufacturer's instruction. The instrument is calibrated with six Concentrations of desired metals and one blank (ICH. 2005, US FDA. 2015, İslamoğlu et al. 2021).

5.0 Specificity:

Specificity is the ability to assess unequivocally the analyte in the presence of compounds that may be expected to be present. The specificity and selectivity of the present method is in terms of Response (Sensitivity), Abundance of the Element at different mass number interference. As per the literature & Instrument response finally selected the following masses for analysis**.**

SPECIFICITY SOLUTION PREPARATION:

- Reagent blank solution to a 50 mL centrifuge tube.
- Add 0.1 mL of 10ppm ISTD.
- Volume makeup to 50 mL with Type-I water.

Table 4: Mass selected for analysis.

Mass Selection:

Element	:	Mass (m)
As	:	75
Cd	:	111
Pb	:	208
Hg	:	202
Cu	:	63
Sn	:	118

* This parameter may change based upon the sensitivity & sample.

Note: Selectivity and system suitability see: (Raw data and chromatograms Annexure A)

6.0 System Suitability:

The suitability of the instrument (ICP-MS) is established by Injecting Six (06) replicate standard solutions to ensure that the variation between all the Six (06) replicates must be within 20.0%.

SYSTEM SUITABILITY SOLUTION PREPARATION:

- Pipette out 1.0 mL from standard mix stock.
- Transfer to a 50 mL centrifuge tube.

- Add 0.1 mL of 10ppm ISTD.
- Volume makeup to 50 mL with Type-I water.

7.0 Limit of Detection (LOD):

% Relative Standard Deviation (RSD) value of concentration for all Six (06) Standard replicates at LOD level should not be more than 20%.

Note: The Target LOD Level is considered as

Table 5: LOD concentration.

Parameters	µg/L
Pb	0.5
Cu	15
As	0.55
Sn	15
Cd	0.75
Hg	0.5

LOD SOLUTION PREPARATION:

- Pipette out 0.1 mL from standard mix stock.
- Transfer to a 50 mL centrifuge tube.
- Add 0.1 mL of 10ppm ISTD.
- Volume makeup to 50 mL with Type-I water.

8.0 Limit of Quantification (LOQ):

% Relative Standard Deviation (RSD) value of concentration for all Six (06) Standard replicates at LOQ level should not be more than 20%.

Note: The Target LOD Level is considered as

Table 6: LOQ concentration

Parameters	µg/L
Pb	1
Cu	30
As	1.1
Sn	30
Cd	1.5
Hg	1

LOQ SOLUTION PREPARATION:

- Pipette out 0.2 mL from standard mix stock.

- Transfer to a 50 mL centrifuge tube.
- Add 0.1 mL of 10ppm ISTD.
- Volume makeup to 50 mL with Type-I water.

9.0 Linearity:

The Linearity is established by injecting Linearity soulutions at different level to ensure that the Correlation Coefficient (R^2) must exceed 0.995 (Tan. 2018 Voica et al.2021**)**.Regression is calculated based on the formula Y = mX + C. For this purpose, the standards prepared under section 3.6 are aspirated into ICP-MS and counts are measured. A calibration curve is plotted with concentration on X-axis and counts on Y-axis (Calibration curve See Annexure-A).

Table 7: Preparation of calibration standards (CC1 to CC6)

	Linearity	Final vol
BLK	0.1 mL 10PPM ISTD	50 mL
STD1 (10%)	0.1 mL + 0.1 mL 10PPM ISTD	50 mL
STD2 (20%)	0.2 mL + 0.1 mL 10PPM ISTD	50 mL
STD3 (50%)	0.5 mL + 0.1 mL 10PPM ISTD	50 mL
STD4 (100%)	1 mL + 0.1 mL 10PPM ISTD	50 mL
STD5 (125%)	1.25 mL + 0.1 mL 10PPM ISTD	50 mL
STD6 (150%)	1.5 mL + 0.1 mL 10PPM ISTD	50 mL

Table 8: Conentration of calibartion standards (CC1 to CC6)

Parameters	**10% (µg/L)**	**20% (µg/L)**	**50% (µg/L)**	**100% (µg/L)**	**125% (µg/L)**	**150% (µg/L)**
Pb	0.5	1	2.5	5	6.25	7.5
Cu	15	30	75	150	187.5	225
As	0.55	1.1	2.75	5.5	6.875	8.25
Sn	15	30	75	150	187.5	225
Cd	0.75	1.5	3.75	7.5	9.375	11.25
Hg	0.5	1	2.5	5	6.25	7.5

10.0 Precision:

The method precision is established by injecting six (06) spiked solutions at 100% level to ensure that the % RSD of found concentration in spiked sample solution should not exceed 20.0%.

11.0 Accuracy (Recovery study):

The sample is repeatedly analyzed six times to establish the base value of desired element in the sample and to carry out the spike study further. Spiking is carried out with different known concentrations (LOQ, 2LOQ, 4LOQ). The sample are aspirated into the ICP-MS in the manner as mentioned in section 4.2 and the results are tabulated in Annexure – E.

Calculate the Spike recovery using the formula:

$$\% \text{ Recovery (R)} = \frac{(\text{Spiked sample Conc.} - \text{Sample Conc.}) \times 100}{\text{Conc.of the Spike Standard}}$$

*** Acceptance Limit for Recovery: 70-130 %** (AOAC. 2015)

12.0 Robustness:

The robustness of an analytical procedure is a measure of its capacity to remain unaffected by small, but deliberate variation in method parameters and provides an indication of its reliability during normal usages. **In this method validation, deliberate change has done in the sample preparation by changing parameters like acid volume and digestion on day-3.**

Homogenize the sample properly and weigh ~0.25 g of the sample in a cleaned micro wave digestion vessel. Avoid placing on walls of digestion vessels. Move vessels linear to a Microwave digestion area. Add 3 mL of Concentrated HNO_3, 0.5mL Conc. HCL, 1 mL Hydrogen Peroxide, 0.2mL gold (10ppm), 2mL type-I water in to vessel and wait for 10 minutes (Millour et al. 2021, Şahan et al. 2007). Let the vessels sit uncovered for 10 min, leave some more time if there is any reaction. Cap the vessels with the safety seal and tighten to appropriate torque to prevent loss of sample or acid. Keep the vessel linear in a microwave rotor unit. Run the digestion cycles according to ramping method.

Microwave digester details and ramping conditions for food matrices.

Table 9: Digestion programe in microwave digestor

Steps	Temperature	Hold Time
Ramp	195ºC	40
Hold	195ºC	30
Cool	55ºC	

13.0 Conclusion

After this validation, the selected criteria of performance (linearity, LOQ, specificity, trueness, repeatability, intermediate precision reproducibility) demonstrated that the use of both microwave digestion in closed-vessel for sample preparation and the ICP-MS for detection permitted an accurate determination of 6 elements (Pb, Cu, As, Sn, Cd, Hg) in food samples (matrices of fruit and vegetables).

13.0 References

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Specificity, System suitability and Linearity

Annexure - A

DAY-1

Specificity

SPECIFICTY						
Sl. No	**Copper (Cu)**	**Arsenic (As)**	**Cadmium (Cd)**	**Tin (Sn)**	**Mercury (Hg)**	**Lead (Pb)**
Specificity-1	8404.3	11.5	19.8	77.7	136.5	1745.9
Specificity-2	8500.5	10.0	17.7	81.2	134.3	1715.1
Specificity-3	8855.7	10.2	16.2	85.5	116.0	1667.9
Specificity-4	8818.6	9.0	19.0	74.5	114.8	1650.6
Specificity-5	8911.3	10.2	18.7	79.0	113.3	1566.9
Specificity-6	8975.3	14.2	18.2	79.2	117.5	1508.6
AVG	8744.29	10.83	18.25	79.50	122.08	1642.51
SD	234.182	1.817	1.259	3.674	10.441	89.811
RSD%	**2.68**	**16.77**	**6.90**	**4.62**	**8.55**	**5.47**
AVG LOQ INTENSITY	581727.03	1237.14	4259.55	172910.05	6883.72	88623.79
% OF LOQ INTENSITY	**1.50**	**0.88**	**0.43**	**0.05**	**1.77**	**1.85**
RESULT	Pass	Pass	Pass	Pass	Pass	Pass

Acceptance Criteria: There should be no significant interference of target analyte Count per Second (CPS), if any interference is observed; the level of such Interference should be lower than 20% of the RSD and 30% of the LOQ concentration.

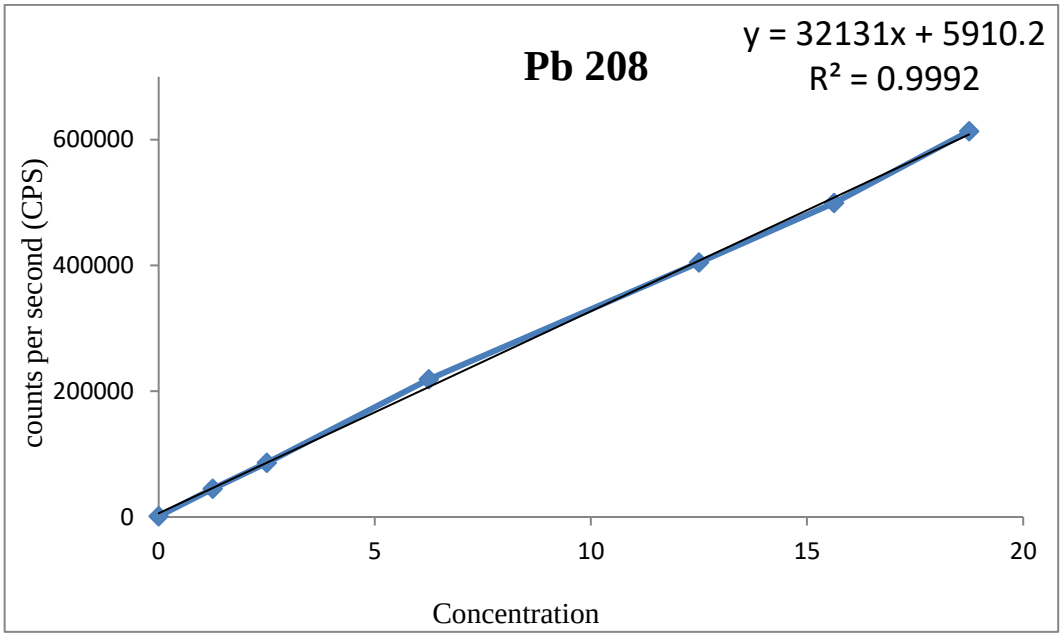
System suitability

SYSTEM SUITABILITY						
SL. No.	**Copper (Cu)**	**Arsenic (As)**	**Cadmium (Cd)**	**Tin (Sn)**	**Mercury (Hg)**	**Lead (Pb)**
SST-1	2625921.5	5666.0	19639.0	789116.8	25017.4	418356.8
SST-2	2535825.7	5591.4	19748.5	803223.4	27263.7	422332.5
SST-3	2355922.1	5828.0	20034.7	819801.5	28095.6	429757.8
SST-4	2755911.9	5786.0	20101.3	820154.5	28540.8	426614.2
SST-5	2855922.7	5817.5	20360.3	824650.5	28564.0	431759.2
SST-6	2855922.5	5827.2	20261.2	812016.7	28777.8	429217.2
AVG.	2664237.73	5752.69	20024.17	811493.90	27709.88	426339.61
SD	180234.40	91.35	258.07	12155.43	1301.14	4640.30
% of RSD	**6.76**	**1.59**	**1.29**	**1.50**	**4.70**	**1.09**
RESULT	Pass	Pass	Pass	Pass	Pass	Pass

Acceptance Criteria: a) The % RSD of intensity of Six standard injections is not more than 20.0.

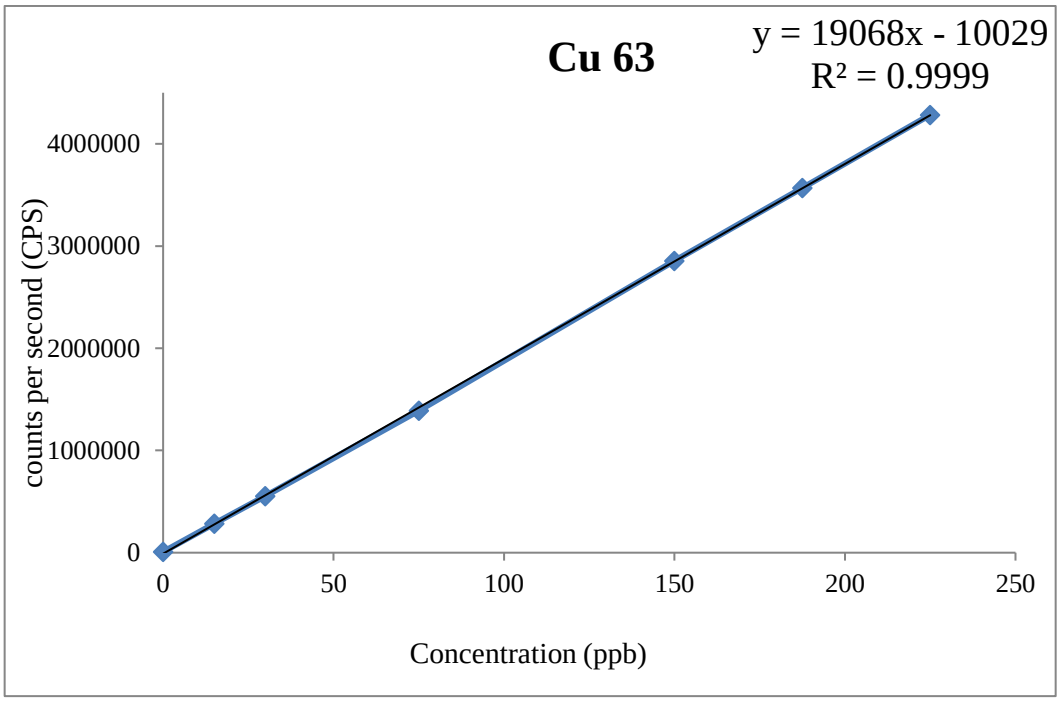
LINEARITY

LINEARITY LEAD	
Concentration (ppb)	**Lead (Pb)**
Blank	0
1.25 PPB	1.250
2.5 PPB	2.480
6.25 PPB	6.280
12.5 PPB	12.426
15.625 PPB	15.568
18.75 PPB	18.738
Correlation Coefficient(R^2)	0.999
Result	**Pass**



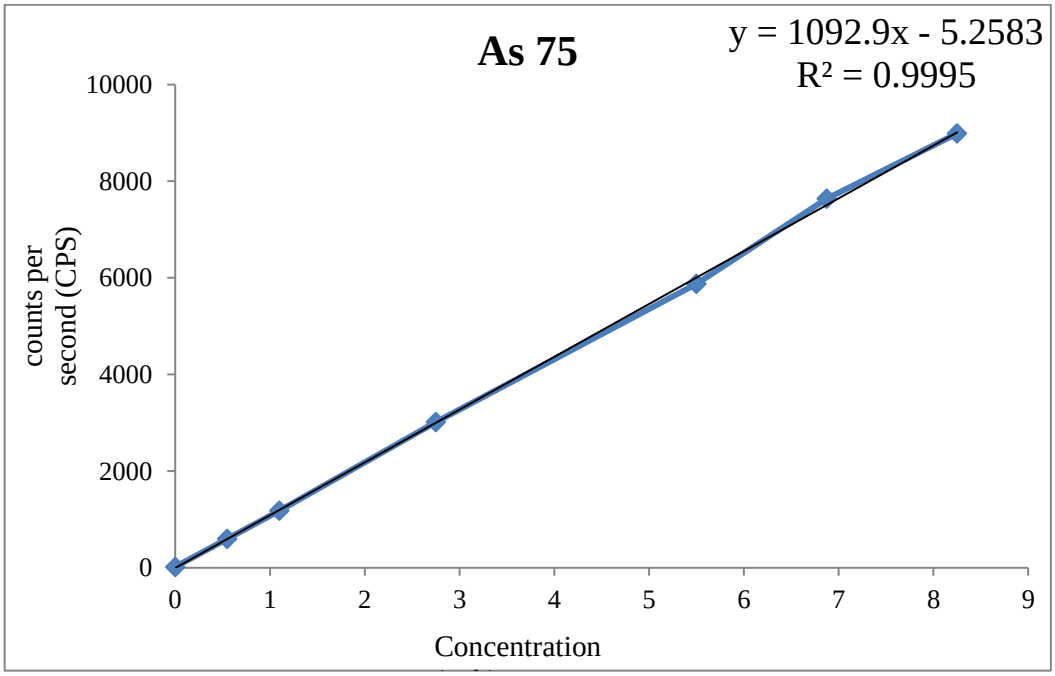
Acceptance Criteria: The R^2 value of six Linearity standards is NLT: 0.995

LINEARITY COPPER	
Concentration (ppb)	**Copper (Cu)**
Blank	0
15 PPB	15.000
30 PPB	29.808
75 PPB	75.269
150 PPB	150.178
187.5 PPB	187.803
225 PPB	225.672
Correlation Coefficient(R^2)	0.999
Result	**Pass**



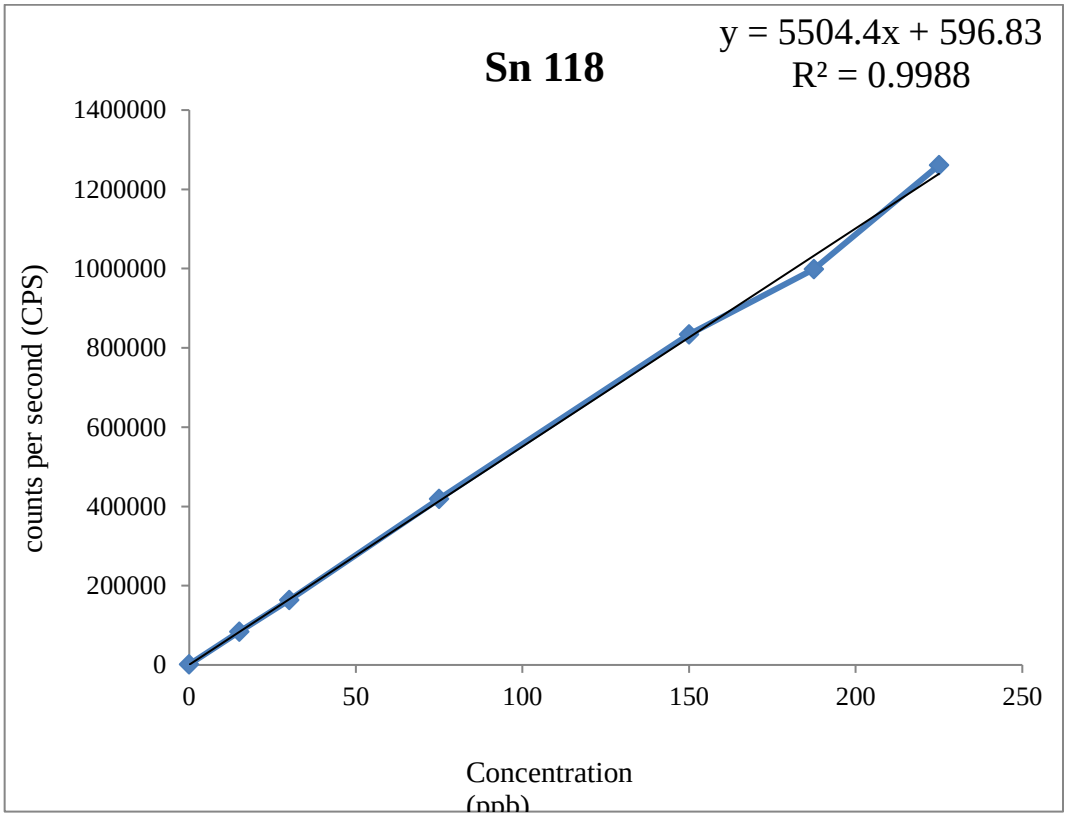
Acceptance Criteria: The R^2 value of six Linearity standards is NLT: 0.995

LINEARITY ARSENIC	
Concentration (ppb)	**Arsenic (As)**
Blank	0
0.55 PPB	0.550
1.1 PPB	1.099
2.75 PPB	2.769
5.5 PPB	5.446
6.875 PPB	6.844
8.25 PPB	8.312
Correlation Coefficient(R^2)	0.999
Result	**Pass**



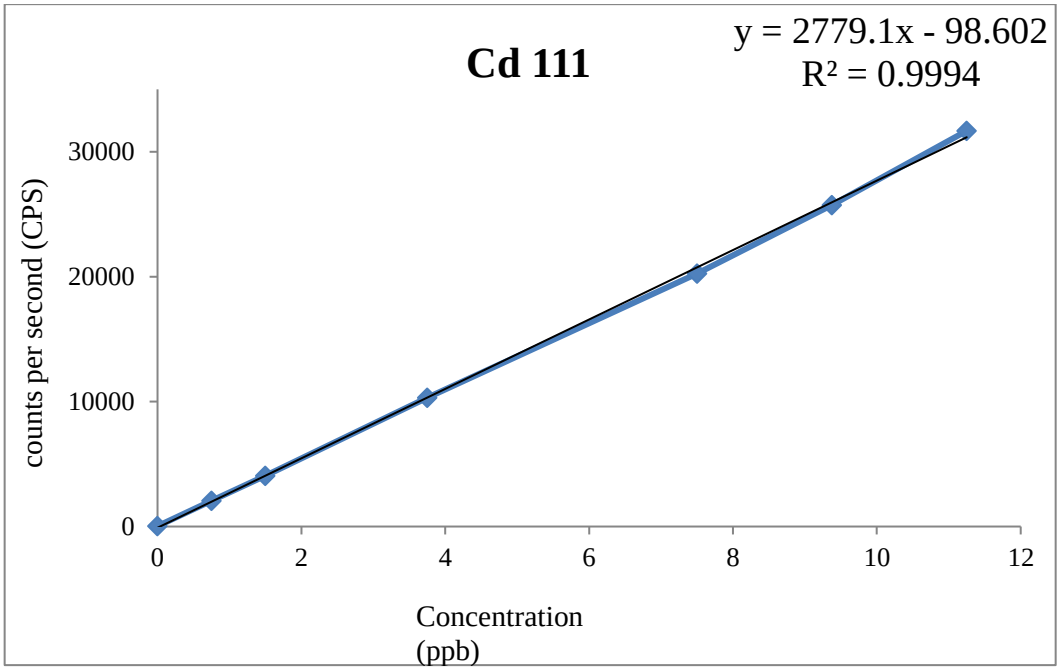
Acceptance Criteria: The R^2 value of six Linearity standards is NLT: 0.995

LINEARITY TIN	
Concentration (ppb)	**Tin (Sn)**
Blank	0
15 PPB	15.000
30 PPB	29.855
75 PPB	75.434
150 PPB	149.233
187.5 PPB	187.443
225 PPB	225.064
Correlation Coefficient(R^2)	0.998
Result	**Pass**



Acceptance Criteria: The R^2 value of six Linearity standards is NLT: 0.995

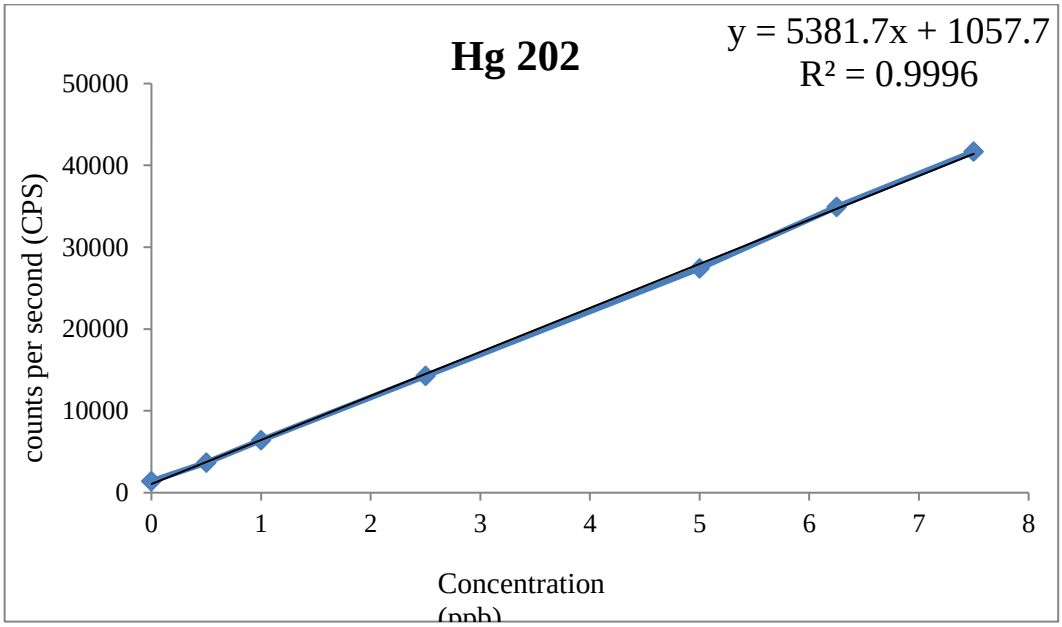
LINEARITY CADMIUM	
Concentration (ppb)	**Cadmium (Cd)**
Blank	0
0.75 PPB	0.750
1.5 PPB	1.493
3.75 PPB	3.766
7.5 PPB	7.435
9.375 PPB	9.428
11.25 PPB	11.400
Correlation Coefficient(R^2)	0.999
Result	**Pass**



Acceptance Criteria: The R^2 value of six Linearity standards is NLT: 0.995

+

LINEARITY MERCURY	
Concentration (ppb)	**Mercury (Hg)**
Blank	0
0.5 PPB	0.500
1 PPB	1.016
2.5 PPB	2.525
5 PPB	4.993
6.25 PPB	6.321
7.5 PPB	7.665
Correlation Coefficient(R^2)	0.999
Result	**Pass**



Acceptance Criteria: The R^2 value of six Linearity standards is NLT: 0.995

DAY-2

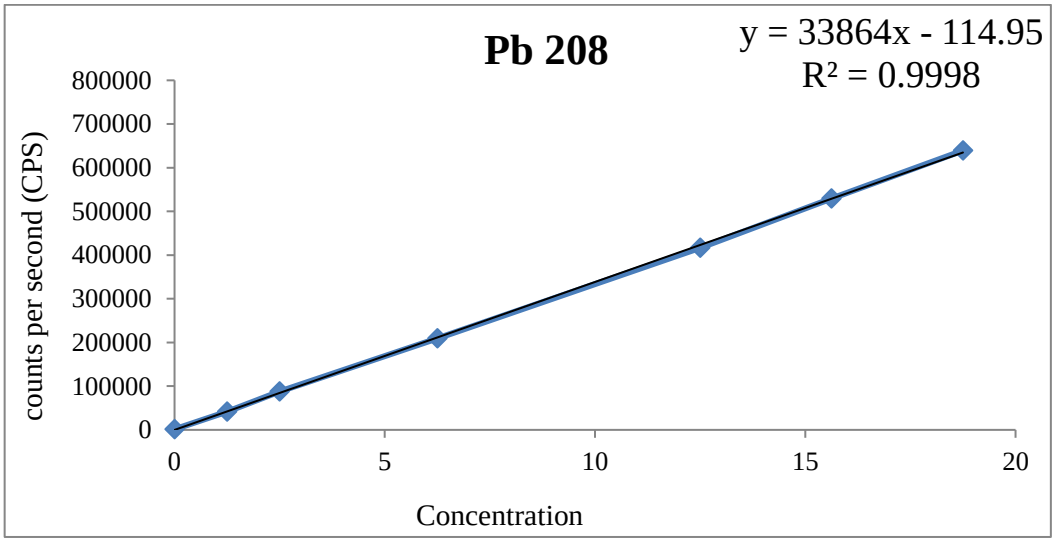
Specificity

SPECIFICTY						
Sl No	Copper (Cu)	Arsenic (As)	Cadmium (Cd)	Tin (Sn)	Mercury (Hg)	Lead (Pb)
Specificity-1	8375.6	15.8	25.3	277.5	277.0	1476.6
Specificity-2	8137.0	9.8	17.7	253.0	272.3	1382.9
Specificity-3	8084.1	11.8	17.3	245.3	262.5	1368.9
Specificity-4	8257.4	12.5	18.2	227.0	262.2	1367.6
Specificity-5	8345.9	13.3	22.3	191.3	266.2	1335.6
Specificity-6	8470.7	12.5	23.8	200.0	241.2	1364.6
AVG	8278.45	12.64	20.78	232.36	263.56	1382.68
SD	147.762	1.962	3.489	32.837	12.401	48.545
RSD%	**1.78**	**15.52**	**16.79**	**14.13**	**4.71**	**3.51**
AVG LOQ INTENSITY	581727.0	1464.7	4938.8	192768.2	7480.6	91539.3
% OF LOQ INTENSITY	1.42	0.86	0.42	0.12	3.52	1.51
RESULT	Pass	Pass	Pass	Pass	Pass	Pass

Acceptance Criteria: There should be no significant interference of target analyte Count per Second (CPS), if any interference is observed; the level of such Interference should be lower than 20% of the RSD and 30% of the LOQ concentration.

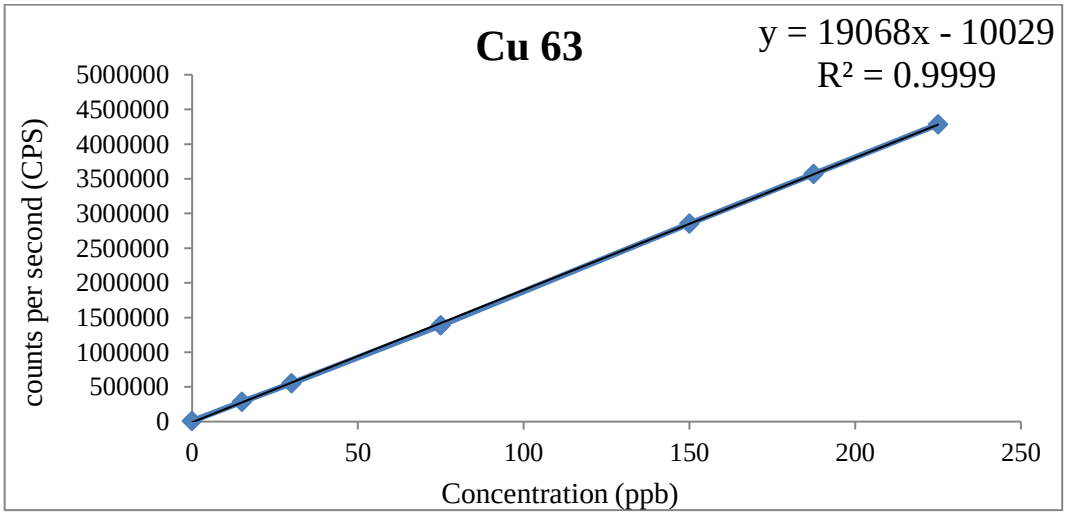
LINEARITY

LINEARITY LEAD	
Concentration (ppb)	**Lead (Pb)**
Blank	0
1.25 PPB	1.250
2.5 PPB	2.502
6.25 PPB	6.256
12.5 PPB	12.447
15.625 PPB	15.791
18.75 PPB	18.862
Correlation Coefficient(R^2)	0.999
Result	**Pass**



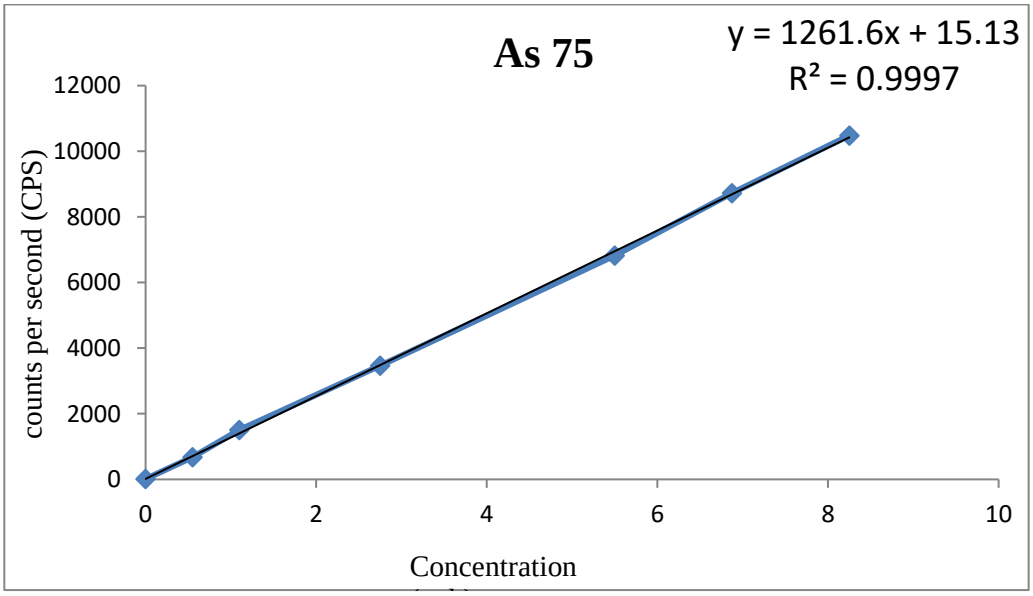
Acceptance Criteria: The R^2 value of six Linearity standards is NLT: 0.995

LINEARITY COPPER	
Concentration (ppb)	**Copper (Cu)**
Blank	0
15 PPB	15.000
30 PPB	29.961
75 PPB	74.927
150 PPB	150.178
187.5 PPB	187.803
225 PPB	225.672
Correlation Coefficient(R^2)	0.999
Result	**Pass**



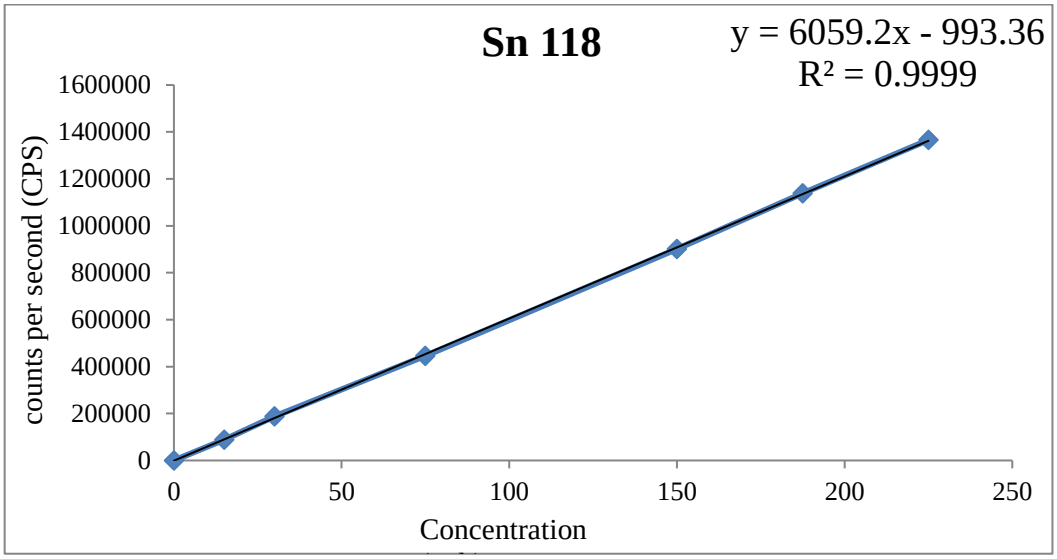
Acceptance Criteria: The R^2 value of six Linearity standards is NLT: 0.995

LINEARITY ARSENIC	
Concentration (ppb)	**Arsenic (As)**
Blank	0
0.55 PPB	0.550
1.1 PPB	1.112
2.75 PPB	2.739
5.5 PPB	5.453
6.875 PPB	6.951
8.25 PPB	8.281
Correlation Coefficient(R^2)	0.999
Result	**Pass**



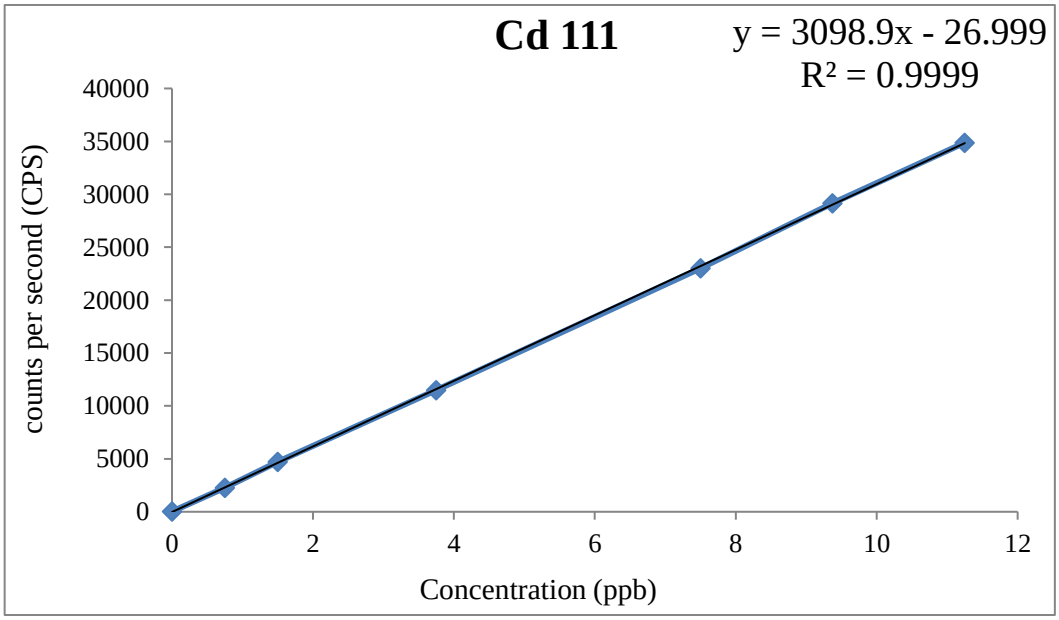
Acceptance Criteria: The R^2 value of six Linearity standards is NLT: 0.995

LINEARITY TIN	
Concentration (ppb)	**Tin (Sn)**
Blank	0
15 PPB	15.000
30 PPB	30.046
75 PPB	74.889
150 PPB	149.646
187.5 PPB	188.951
225 PPB	225.213
Correlation Coefficient(R^2)	0.999
Result	**Pass**



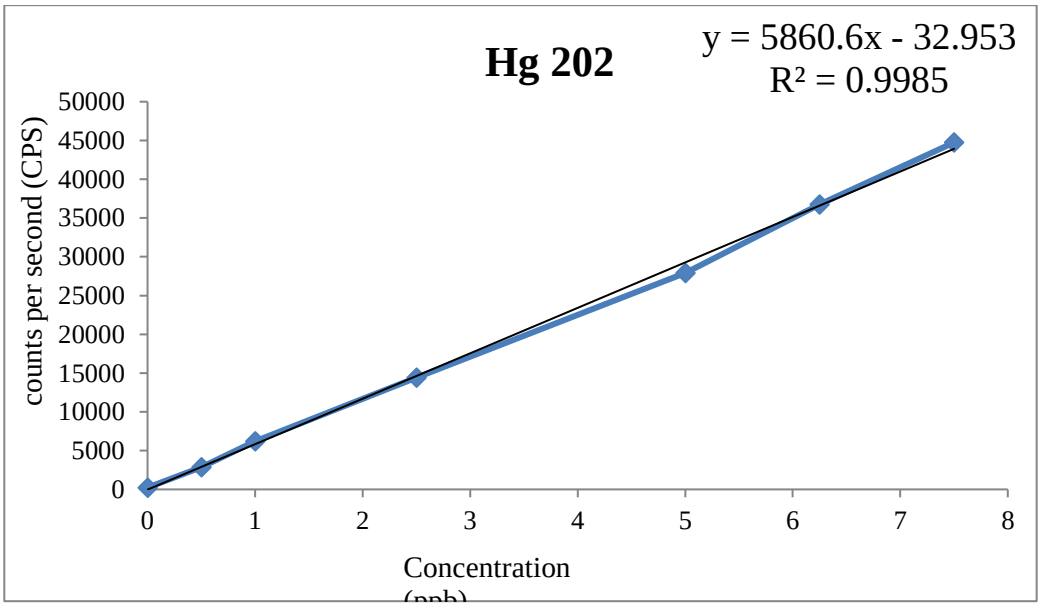
Acceptance Criteria: The R^2 value of six Linearity standards is NLT: 0.995

LINEARITY CADMIUM	
Concentration (ppb)	**Cadmium (Cd)**
Blank	0
0.75 PPB	0.750
1.5 PPB	1.498
3.75 PPB	3.759
7.5 PPB	7.477
9.375 PPB	9.459
11.25 PPB	11.249
Correlation Coefficient(R^2)	0.999
Result	**Pass**



Acceptance Criteria: The R^2 value of six Linearity standards is NLT: 0.995

LINEARITY MERCURY	
Concentration (ppb)	**Mercury (Hg)**
Blank	0
0.5 PPB	0.500
1 PPB	1.013
2.5 PPB	2.502
5 PPB	4.951
6.25 PPB	6.400
7.5 PPB	7.642
Correlation Coefficient(R^2)	0.998
Result	**Pass**



Acceptance Criteria: The R^2 value of six Linearity standards is NLT: 0.995

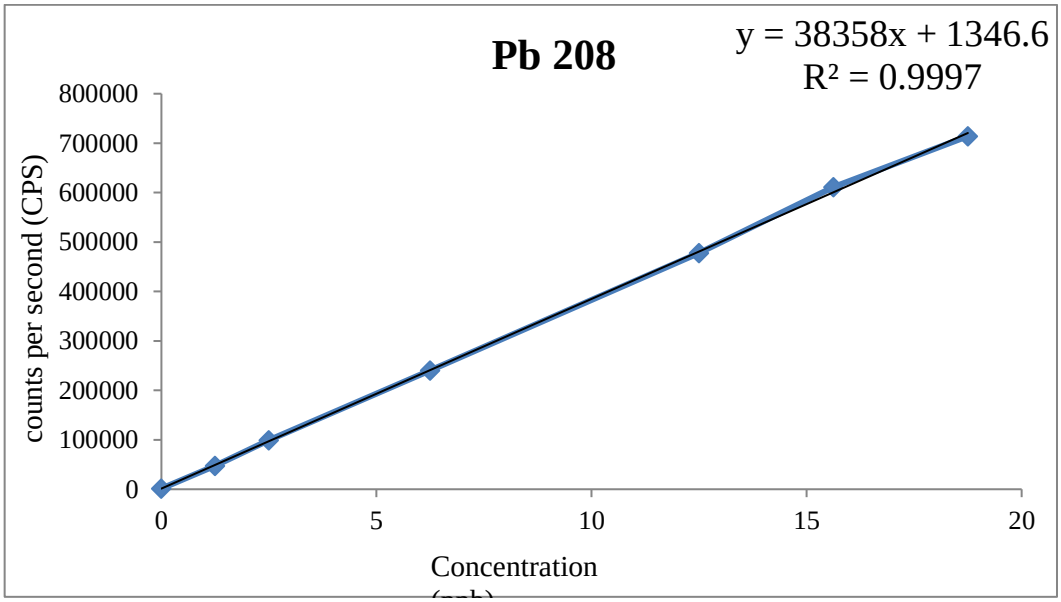
DAY-3

SPECIFICTY						
Sl No	**Copper (Cu)**	**Arsenic (As)**	**Cadmium (Cd)**	**Tin (Sn)**	**Mercury (Hg)**	**Lead (Pb)**
Specificity-1	8985.5	18.8	26.8	316.7	641.3	1610.6
Specificity-2	8889.3	10.8	25.3	316.8	629.7	1467.9
Specificity-3	8772.9	15.3	22.2	311.7	576.2	1462.9
Specificity-4	8714.3	13.0	25.3	284.2	560.0	1421.6
Specificity-5	8941.6	16.2	20.0	292.7	536.2	1377.2
Specificity-6	9085.1	14.0	26.8	255.2	501.7	1318.2
AVG	8898.10	14.69	24.42	296.20	574.18	1443.07
SD	137.129	2.756	2.754	24.187	53.847	99.455
RSD%	**1.54**	**18.75**	**11.28**	**8.17**	**9.38**	**6.89**
AVG LOQ INTENSITY	581727.03	1464.74	4938.80	192768.17	7480.61	91539.34
% OF LOQ INTENSITY	**1.53**	**1.00**	**0.49**	**0.15**	**7.68**	**1.58**
RESULT	Pass	Pass	Pass	Pass	Pass	Pass

Acceptance Criteria: There should be no significant interference of target analyte Count per Second (CPS), if any interference is observed; the level of such Interference should be lower than 20% of the RSD and 30% of the LOQ concentration.

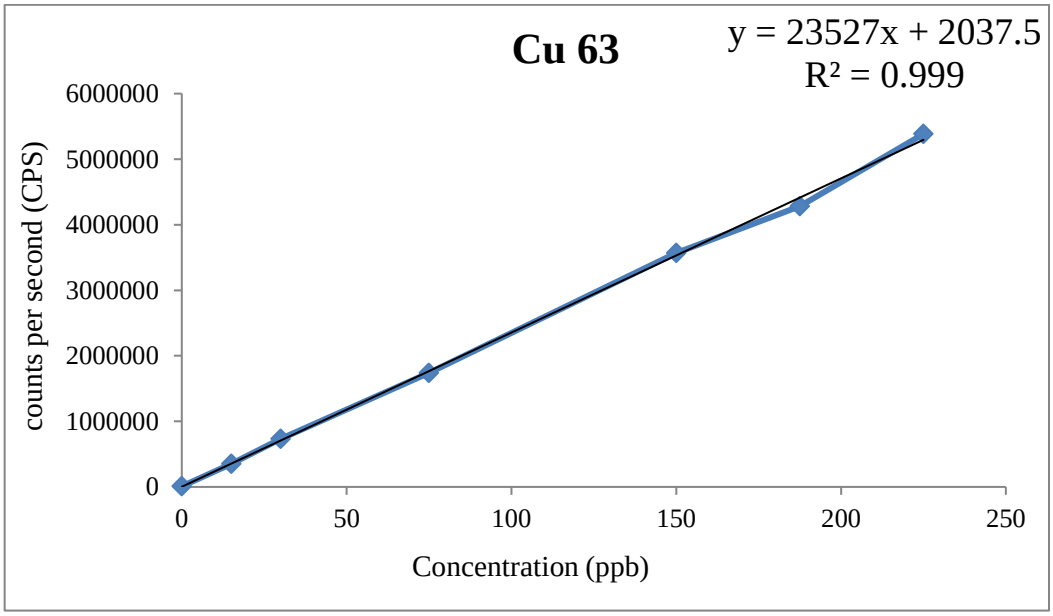
LINEARITY

LINEARITY LEAD	
Concentration (ppb)	**Lead (Pb)**
Blank	0
1.25 PPB	1.250
2.5 PPB	2.522
6.25 PPB	6.259
12.5 PPB	12.438
15.625 PPB	15.710
18.75 PPB	18.670
Correlation Coefficient(R^2)	0.999
Result	**Pass**



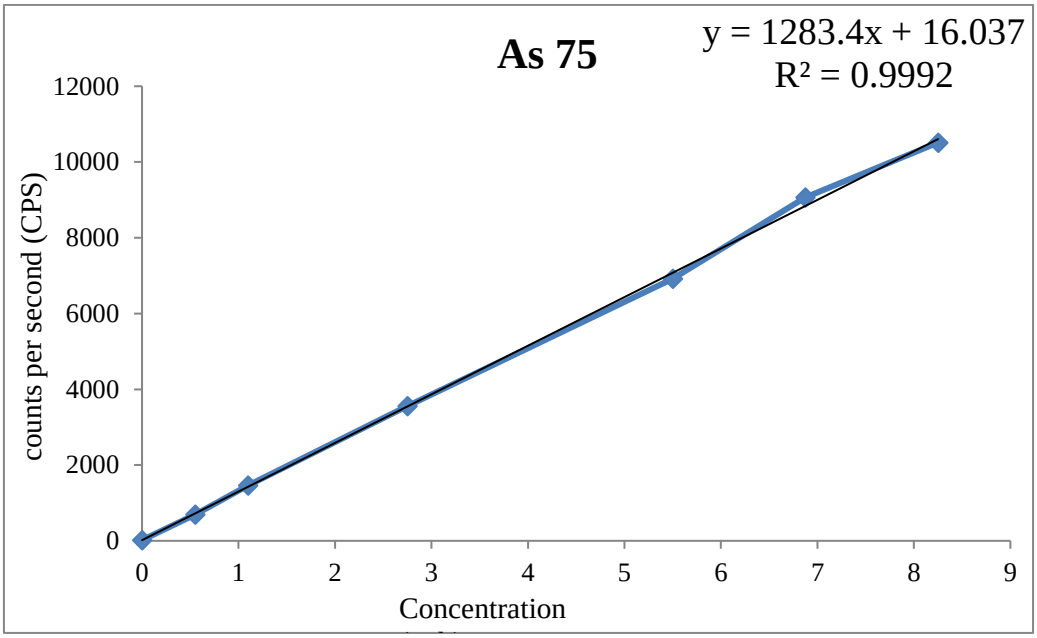
Acceptance Criteria: The R^2 value of six Linearity standards is NLT: 0.995

LINEARITY COPPER	
Concentration (ppb)	**Copper (Cu)**
Blank	0
15 PPB	15.000
30 PPB	30.198
75 PPB	74.819
150 PPB	151.178
187.5 PPB	187.703
225 PPB	225.572
Correlation Coefficient((R^2))	0.999
Result	**Pass**



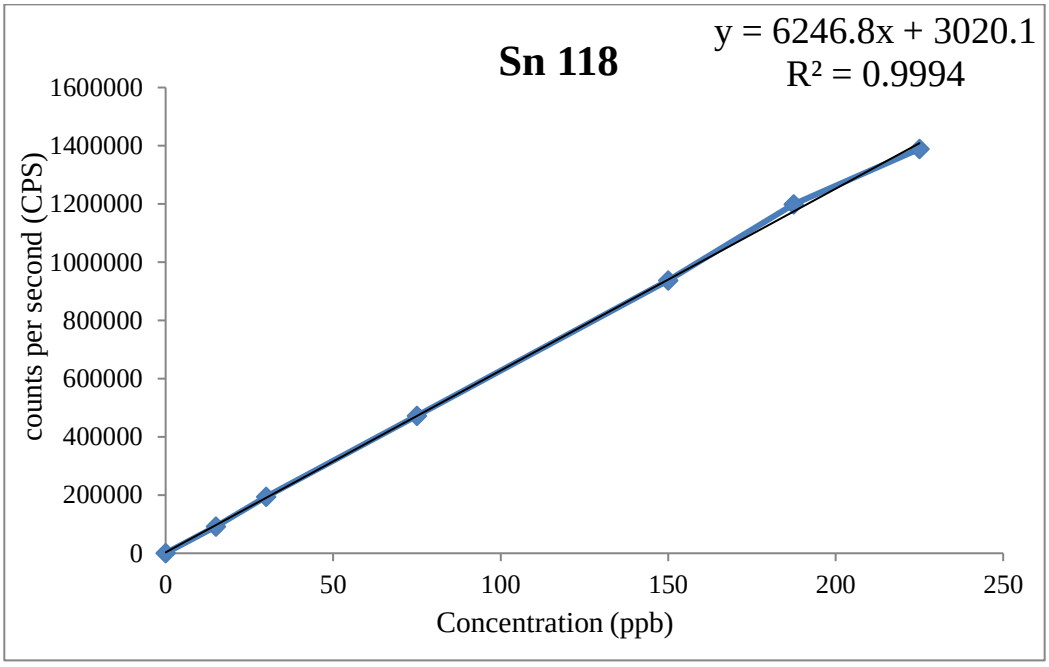
Acceptance Criteria: The R^2 value of six Linearity standards is NLT: 0.995

LINEARITY ARSENIC	
Concentration (ppb)	**Arsenic (As)**
Blank	0
0.55 PPB	0.550
1.1 PPB	1.111
2.75 PPB	2.755
5.5 PPB	5.444
6.875 PPB	6.971
8.25 PPB	8.217
Correlation Coefficient(R^2)	0.999
Result	**Pass**



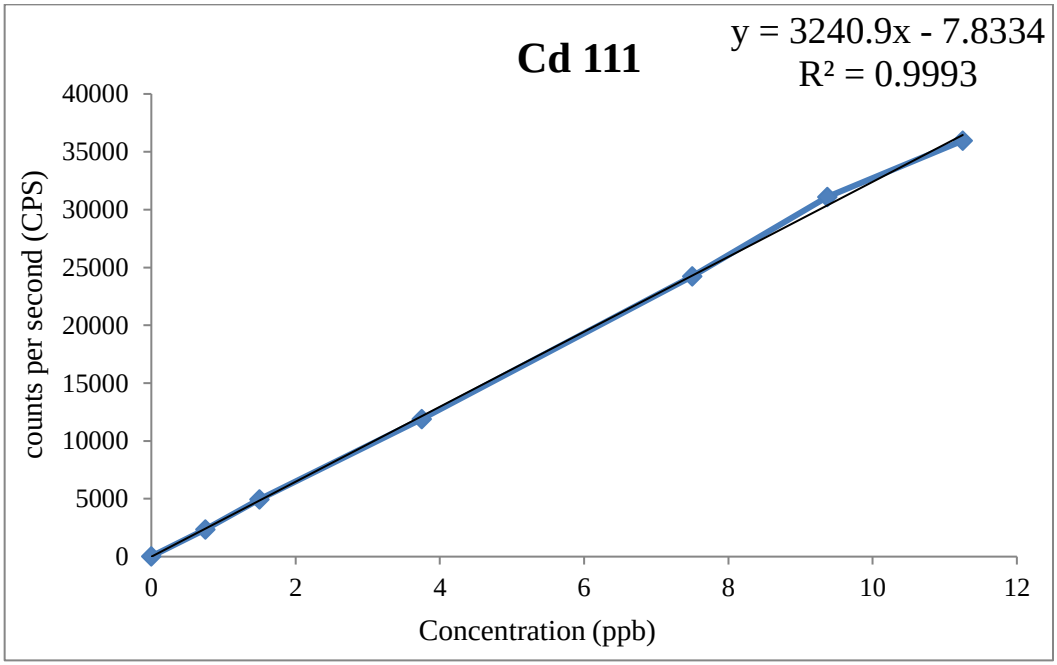
Acceptance Criteria: The R^2 value of six Linearity standards is NLT: 0.995

LINEARITY TIN	
Concentration (ppb)	**Tin (Sn)**
Blank	0
15 PPB	15.000
30 PPB	30.206
75 PPB	74.989
150 PPB	149.019
187.5 PPB	188.346
225 PPB	222.753
Correlation Coefficient(R^2)	0.999
Result	**Pass**



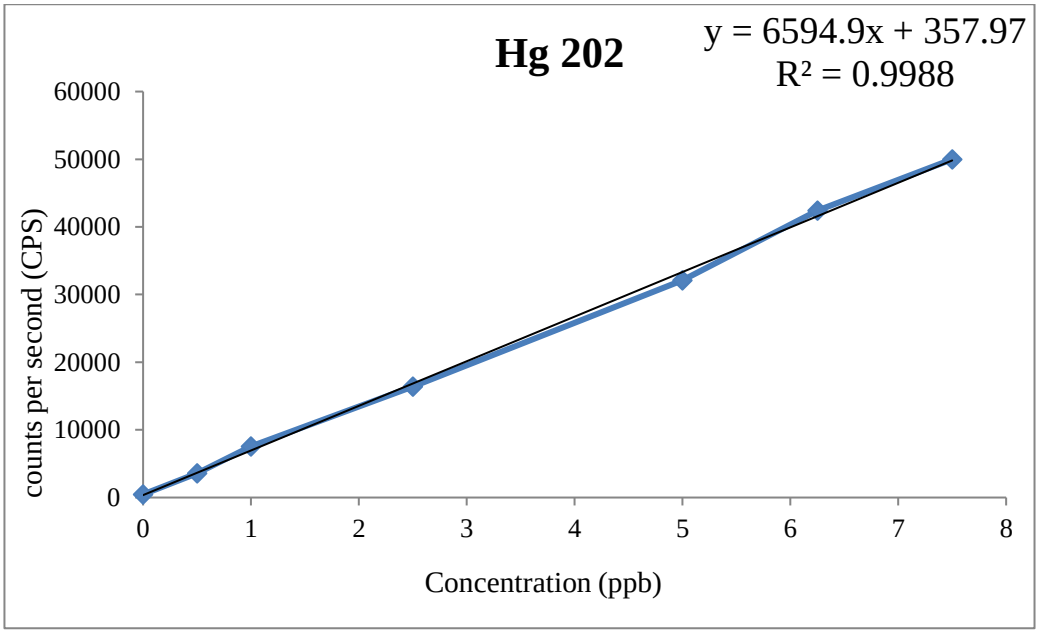
Acceptance Criteria: The R^2 value of six Linearity standards is NLT: 0.995

LINEARITY CADMIUM	
Concentration (ppb)	**Cadmium (Cd)**
Blank	0
0.75 PPB	0.750
1.5 PPB	1.512
3.75 PPB	3.744
7.5 PPB	7.494
9.375 PPB	9.453
11.25 PPB	11.153
Correlation Coefficient(R^2)	0.999
Result	**Pass**



Acceptance Criteria: The R^2 value of six Linearity standards is NLT: 0.995

LINEARITY MERCURY	
Concentration (ppb)	**Mercury (Hg)**
Blank	0
0.5 PPB	0.500
1 PPB	1.028
2.5 PPB	2.481
5 PPB	4.963
6.25 PPB	6.380
7.5 PPB	7.575
Correlation Coefficient(R^2)	0.998
Result	**Pass**



Acceptance Criteria: The R^2 value of six Linearity standards is NLT: 0.995

LIMIT OF DETECTION (LOD) AND LIMIT OF QUANTIFICATION (LOQ)

Annexure - B

DAY-1

LIMIT OF DETECTION (LOD)

LOD (Lead)				
LOD	Vol (ml)	Dilution factor	Sample Conc (ppb)	Conc. (mg/kg)
Rep-1	50	200.00	1.292	0.258
Rep-2	50	200.00	1.295	0.259
Rep-3	50	200.00	1.287	0.257
Rep-4	50	200.00	1.269	0.254
Rep-5	50	200.00	1.284	0.257
Rep-6	50	200.00	1.293	0.259
			Mean	0.26
			SD	0.002
			% of RSD	0.74

Result: LOD of Lead established as 0.26 mg/kg

LOD (Copper)				
LOD	Vol (ml)	Dilution factor	Sample Conc (ppb)	Conc. (mg/kg)
Rep-1	50	200.00	15.668	3.134
Rep-2	50	200.00	15.419	3.084
Rep-3	50	200.00	15.165	3.033
Rep-4	50	200.00	15.556	3.111
Rep-5	50	200.00	15.148	3.030
Rep-6	50	200.00	15.774	3.155
			Mean	3.091
			SD	0.052
			% of RSD	1.68

Result: LOD of Copper established as 3.091 mg/kg

LOD (Arsenic)				
LOD	Vol (ml)	Dilution factor	Sample Conc (ppb)	Conc. (mg/kg)
Rep-1	50	200.00	0.553	0.111
Rep-2	50	200.00	0.578	0.116
Rep-3	50	200.00	0.567	0.113
Rep-4	50	200.00	0.575	0.115
Rep-5	50	200.00	0.574	0.115
Rep-6	50	200.00	0.581	0.116
			Mean	0.114
			SD	0.002
			% of RSD	1.78

Result : LOD of Arsenic established as 0.114 mg/kg

LOD (Tin)				
LOD	Vol (ml)	Dilution factor	Sample Conc (ppb)	Conc. (mg/kg)
Rep-1	50	200.00	15.286	3.057
Rep-2	50	200.00	15.496	3.099
Rep-3	50	200.00	15.439	3.088
Rep-4	50	200.00	15.244	3.049
Rep-5	50	200.00	15.305	3.061
Rep-6	50	200.00	15.441	3.088
			Mean	3.074
			SD	0.019
			% of RSD	0.61

Result: LOD of Tin established as 3.074 mg/kg

LOD (Cadmium)				
LOD	Vol (ml)	Dilution factor	Sample Conc (ppb)	Conc. (mg/kg)
Rep-1	50	200.00	0.775	0.155
Rep-2	50	200.00	0.774	0.155
Rep-3	50	200.00	0.767	0.153
Rep-4	50	200.00	0.744	0.149
Rep-5	50	200.00	0.748	0.150
Rep-6	50	200.00	0.787	0.157
			Mean	0.153
			SD	0.003
			% of RSD	2.18

Result : LOD of Cadmium established as 0.153 mg/kg

LOD (Mercury)				
LOD	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	0.523	0.105
Rep-2	50	200.00	0.489	0.098
Rep-3	50	200.00	0.485	0.097
Rep-4	50	200.00	0.472	0.094
Rep-5	50	200.00	0.485	0.097
Rep-6	50	200.00	0.516	0.103
			Mean	0.099
			SD	0.00
			% of RSD	3.98

Result : LOD of Mercury established as 0.099 mg/kg

LIMIT OF QUANTIFICATION (LOQ)

LOQ (Lead)				
LOQ	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	2.468	0.494
Rep-2	50	200.00	2.452	0.490
Rep-3	50	200.00	2.468	0.494
Rep-4	50	200.00	2.414	0.483
Rep-5	50	200.00	2.462	0.492
Rep-6	50	200.00	2.456	0.491
			Mean	0.491
			SD	0.004
			% of RSD	0.83

Result : LOQ of Lead established as 0.491 mg/kg

LOQ (Copper)				
LOQ	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	30.313	6.063
Rep-2	50	200.00	30.573	6.115
Rep-3	50	200.00	30.432	6.086
Rep-4	50	200.00	30.594	6.119
Rep-5	50	200.00	30.830	6.166
Rep-6	50	200.00	30.951	6.190
			Mean	6.123
			SD	0.048
			% of RSD	0.78

Result : LOQ of Copper established as 6.123 mg/kg

LOQ (Arsenic)				
LOQ	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	1.093	0.219
Rep-2	50	200.00	1.113	0.223
Rep-3	50	200.00	1.102	0.220
Rep-4	50	200.00	1.113	0.223
Rep-5	50	200.00	1.101	0.220
Rep-6	50	200.00	1.096	0.219
			Mean	0.221
			SD	0.002
			% of RSD	0.75

Result : LOQ of Arsenic established as 0.221 mg/kg

LOQ (Tin)				
LOQ	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	29.821	5.964
Rep-2	50	200.00	29.952	5.990
Rep-3	50	200.00	30.321	6.064
Rep-4	50	200.00	29.563	5.913
Rep-5	50	200.00	30.117	6.023
Rep-6	50	200.00	30.015	6.003
			Mean	5.993
			SD	0.047
			% of RSD	0.79

Result: LOQ of Tin established as 5.993 mg/kg

LOQ (Cadmium)				
LOQ	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	1.474	0.295
Rep-2	50	200.00	1.513	0.303
Rep-3	50	200.00	1.494	0.299
Rep-4	50	200.00	1.469	0.294
Rep-5	50	200.00	1.494	0.299
Rep-6	50	200.00	1.486	0.297
			Mean	0.298
			SD	0.003
			% of RSD	1.06

Result: LOQ of Cadmium established as 0.298 mg/kg

LOQ (Mercury)				
LOQ	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	0.931	0.186
Rep-2	50	200.00	0.982	0.196
Rep-3	50	200.00	0.984	0.197
Rep-4	50	200.00	0.972	0.194
Rep-5	50	200.00	0.989	0.198
Rep-6	50	200.00	1.002	0.200
			Mean	0.195
			SD	0.00
			% of RSD	2.51

Result : LOQ of Mercury established as 0.195 mg/kg

PRECISION

Annexure – C

PRECISION (Lead)				
PRECISION	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	12.317	2.463
Rep-2	50	200.00	12.559	2.512
Rep-3	50	200.00	12.389	2.478
Rep-4	50	200.00	12.490	2.498
Rep-5	50	200.00	12.446	2.489
Rep-6	50	200.00	12.381	2.476
			Mean	2.486
			SD	0.017
			% of RSD	0.70
			Result	Pass

Acceptance Criteria : The %RSD value not more than 20%

PRECISION (Copper)				
PRECISION	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	150.370	30.074
Rep-2	50	200.00	150.399	30.080
Rep-3	50	200.00	150.282	30.056
Rep-4	50	200.00	150.303	30.061
Rep-5	50	200.00	150.298	30.060
Rep-6	50	200.00	150.226	30.045
			Mean	30.063
			SD	0.012
			% of RSD	0.04
			Result	Pass

Acceptance Criteria : The %RSD value not more than 20%.

PRECISION (Arsenic)				
PRECISION	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	5.479	1.096
Rep-2	50	200.00	5.632	1.126
Rep-3	50	200.00	5.606	1.121
Rep-4	50	200.00	5.638	1.128
Rep-5	50	200.00	5.578	1.116
Rep-6	50	200.00	5.559	1.112
			Mean	1.116
			SD	0.012
			% of RSD	1.06
			Result	Pass

Acceptance Criteria : The %RSD value not more than 20%.

PRECISION (Tin)				
PRECISION	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	147.707	29.541
Rep-2	50	200.00	152.561	30.512
Rep-3	50	200.00	152.234	30.447
Rep-4	50	200.00	151.160	30.232
Rep-5	50	200.00	151.792	30.358
Rep-6	50	200.00	151.046	30.209
			Mean	30.217
			SD	0.321
			% of RSD	1.06
			Result	Pass

Acceptance Criteria : The %RSD value not more than 20%.

PRECISION(Cadmium)				
PRECISION	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	7.538	1.508
Rep-2	50	200.00	7.579	1.516
Rep-3	50	200.00	7.628	1.526
Rep-4	50	200.00	7.605	1.521
Rep-5	50	200.00	7.515	1.503
Rep-6	50	200.00	7.526	1.505
			Mean	1.513
			SD	0.009
			% of RSD	0.61
			Result	Pass

Acceptance Criteria : The %RSD value not more than 20%.

PRECISION (Mercury)				
PRECISION	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	4.673	0.935
Rep-2	50	200.00	5.093	1.019
Rep-3	50	200.00	5.149	1.030
Rep-4	50	200.00	5.231	1.046
Rep-5	50	200.00	5.246	1.049
Rep-6	50	200.00	5.185	1.037
			Mean	1.019
			SD	0.04
			% of RSD	4.21
			Result	Pass

Acceptance Criteria : The %RSD value not more than 20%.

LIMIT OF DETECTION (LOD) AND LIMIT OF QUANTIFICATION (LOQ)

DAY-2

LOD (Lead)				
LOD	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	1.277	0.255
Rep-2	50	200.00	1.277	0.255
Rep-3	50	200.00	1.281	0.256
Rep-4	50	200.00	1.292	0.258
Rep-5	50	200.00	1.287	0.257
Rep-6	50	200.00	1.289	0.258
			Mean	0.257
			SD	0.001
			% of RSD	0.49

Result : LOD of Lead established as 0.257 mg/kg

LOD (Copper)				
LOD	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	15.668	3.134
Rep-2	50	200.00	15.419	3.084
Rep-3	50	200.00	15.165	3.033
Rep-4	50	200.00	15.556	3.111
Rep-5	50	200.00	15.148	3.030
Rep-6	50	200.00	15.774	3.155
			Mean	3.091
			SD	0.052
			% of RSD	1.68

Result : LOD of Copper established as 3.091 mg/kg

LOD (Arsenic)				
LOD	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	0.565	0.113
Rep-2	50	200.00	0.569	0.114
Rep-3	50	200.00	0.572	0.114
Rep-4	50	200.00	0.582	0.116
Rep-5	50	200.00	0.565	0.113
Rep-6	50	200.00	0.558	0.112
			Mean	0.114
			SD	0.002
			% of RSD	1.47

Result : LOD of Arsenic established as 0.114 mg/kg

LOD (Tin)				
LOD	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	15.678	3.136
Rep-2	50	200.00	15.526	3.105
Rep-3	50	200.00	15.723	3.145
Rep-4	50	200.00	15.879	3.176
Rep-5	50	200.00	15.693	3.139
Rep-6	50	200.00	15.570	3.114
			Mean	3.136
			SD	0.023
			% of RSD	0.72

Result : LOD of Tin established as 3.136 mg/kg

LOD (Cadmium)				
LOD	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	0.760	0.152
Rep-2	50	200.00	0.778	0.156
Rep-3	50	200.00	0.759	0.152
Rep-4	50	200.00	0.788	0.158
Rep-5	50	200.00	0.783	0.157
Rep-6	50	200.00	0.786	0.157
			Mean	0.155
			SD	0.003
			% of RSD	1.65

Result : LOD of Cadmium established as 0.155 mg/kg

LOD (Mercury)				
LOD	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	0.677	0.135
Rep-2	50	200.00	0.673	0.135
Rep-3	50	200.00	0.666	0.133
Rep-4	50	200.00	0.663	0.133
Rep-5	50	200.00	0.649	0.130
Rep-6	50	200.00	0.659	0.132
			Mean	0.133
			SD	0.00
			% of RSD	1.51

Result : LOD of Mercury established as 0.133 mg/kg

LOQ (Lead)				
LOQ	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	2.742	0.548
Rep-2	50	200.00	2.624	0.525
Rep-3	50	200.00	2.643	0.529
Rep-4	50	200.00	2.652	0.530
Rep-5	50	200.00	2.672	0.534
Rep-6	50	200.00	2.655	0.531
			Mean	0.533
			SD	0.008
			% of RSD	1.54

Result : LOQ of Lead established as 0.533 mg/kg

LOQ (Copper)				
LOQ	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	30.313	6.063
Rep-2	50	200.00	30.573	6.115
Rep-3	50	200.00	30.432	6.086
Rep-4	50	200.00	30.594	6.119
Rep-5	50	200.00	30.830	6.166
Rep-6	50	200.00	30.951	6.190
			Mean	6.123
			SD	0.048
			% of RSD	0.78

Result : LOQ of Copper established as 6.123 mg/kg

LOQ (Arsenic)				
LOQ	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	1.178	0.236
Rep-2	50	200.00	1.122	0.224
Rep-3	50	200.00	1.147	0.229
Rep-4	50	200.00	1.160	0.232
Rep-5	50	200.00	1.139	0.228
Rep-6	50	200.00	1.142	0.228
			Mean	0.230
			SD	0.004
			% of RSD	1.68

Result : LOQ of Arsenic established as 0.230 mg/kg

LOQ (Tin)				
LOQ	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	31.689	6.338
Rep-2	50	200.00	31.471	6.294
Rep-3	50	200.00	31.940	6.388
Rep-4	50	200.00	31.610	6.322
Rep-5	50	200.00	31.645	6.329
Rep-6	50	200.00	31.944	6.389
			Mean	6.343
			SD	0.035
			% of RSD	0.55

Result : LOQ of Tin established as 6.343 mg/kg

LOQ (Cadmium)				
LOQ	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	1.581	0.316
Rep-2	50	200.00	1.578	0.316
Rep-3	50	200.00	1.585	0.317
Rep-4	50	200.00	1.591	0.318
Rep-5	50	200.00	1.591	0.318
Rep-6	50	200.00	1.579	0.316
			Mean	0.317
			SD	0.001
			% of RSD	0.35

Result : LOQ of Cadmium established as 0.317 mg/kg

LOQ (Mercury)				
LOQ	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	1.256	0.251
Rep-2	50	200.00	1.221	0.244
Rep-3	50	200.00	1.252	0.250
Rep-4	50	200.00	1.240	0.248
Rep-5	50	200.00	1.247	0.249
Rep-6	50	200.00	1.238	0.248
			Mean	0.248
			SD	0.00
			% of RSD	1.01

Result : LOQ of Mercury established as 0.248 mg/kg

PRECISION

PRECISION (Lead)				
PRECISION	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	13.046	2.609
Rep-2	50	200.00	12.906	2.581
Rep-3	50	200.00	13.091	2.618
Rep-4	50	200.00	12.933	2.587
Rep-5	50	200.00	13.078	2.616
Rep-6	50	200.00	13.035	2.607
			Mean	2.603
			SD	0.015
			% of RSD	0.59

Acceptance Criteria : The %RSD value not more than 20%.

PRECISION (Copper)				
PRECISION	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	150.370	30.074
Rep-2	50	200.00	150.399	30.080
Rep-3	50	200.00	150.282	30.056
Rep-4	50	200.00	150.303	30.061
Rep-5	50	200.00	150.298	30.060
Rep-6	50	200.00	150.226	30.045
			Mean	30.063
			SD	0.012
			% of RSD	0.04

Acceptance Criteria : The %RSD value not more than 20%.

PRECISION (Arsenic)				
PRECISION	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	5.557	1.111
Rep-2	50	200.00	5.673	1.135
Rep-3	50	200.00	5.638	1.128
Rep-4	50	200.00	5.521	1.104
Rep-5	50	200.00	5.503	1.101
Rep-6	50	200.00	5.523	1.105
			Mean	1.114
			SD	0.014
			% of RSD	1.26

Acceptance Criteria : The %RSD value not more than 20%.

PRECISION (Tin)				
PRECISION	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	154.222	30.844
Rep-2	50	200.00	153.834	30.767
Rep-3	50	200.00	156.082	31.216
Rep-4	50	200.00	154.113	30.823
Rep-5	50	200.00	155.928	31.186
Rep-6	50	200.00	154.871	30.974
			Mean	30.968
			SD	0.176
			% of RSD	0.57

Acceptance Criteria : The %RSD value not more than 20%.

PRECISION(Cadmium)				
PRECISION	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	7.739	1.548
Rep-2	50	200.00	7.690	1.538
Rep-3	50	200.00	7.782	1.556
Rep-4	50	200.00	7.754	1.551
Rep-5	50	200.00	7.719	1.544
Rep-6	50	200.00	7.817	1.563
			Mean	1.550
			SD	0.009
			% of RSD	0.58

Acceptance Criteria : The %RSD value not more than 20%.

PRECISION (Mercury)				
PRECISION	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	4.864	0.973
Rep-2	50	200.00	5.354	1.071
Rep-3	50	200.00	5.461	1.092
Rep-4	50	200.00	5.397	1.079
Rep-5	50	200.00	5.513	1.103
Rep-6	50	200.00	5.537	1.107
			Mean	1.071
			SD	0.05
			% of RSD	4.67

Acceptance Criteria : The %RSD value not more than 20%

LIMIT OF DETECTION (LOD) AND LIMIT OF QUANTIFICATION (LOQ)

DAY-3

LOD (Lead)				
LOD	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	1.285	0.257
Rep-2	50	200.00	1.247	0.249
Rep-3	50	200.00	1.240	0.248
Rep-4	50	200.00	1.247	0.249
Rep-5	50	200.00	1.239	0.248
Rep-6	50	200.00	1.247	0.249
			Mean	0.250
			SD	0.003
			% of RSD	1.38

Result : LOD of Lead established as 0.250 mg/kg

LOD (Copper)				
LOD	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	15.668	3.134
Rep-2	50	200.00	15.419	3.084
Rep-3	50	200.00	15.165	3.033
Rep-4	50	200.00	15.556	3.111
Rep-5	50	200.00	15.148	3.030
Rep-6	50	200.00	15.774	3.155
			Mean	3.091
			SD	0.052
			% of RSD	1.68

Result : LOD of Copper established as 3.091 mg/kg

LOD (Arsenic)				
LOD	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	0.550	0.110
Rep-2	50	200.00	0.558	0.112
Rep-3	50	200.00	0.544	0.109
Rep-4	50	200.00	0.567	0.113
Rep-5	50	200.00	0.545	0.109
Rep-6	50	200.00	0.576	0.115
			Mean	0.111
			SD	0.003
			% of RSD	2.32

Result : LOD of Arsenic established as 0.111 mg/kg

LOD (Tin)				
LOD	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	15.907	3.181
Rep-2	50	200.00	15.799	3.160
Rep-3	50	200.00	15.722	3.144
Rep-4	50	200.00	15.624	3.125
Rep-5	50	200.00	15.556	3.111
Rep-6	50	200.00	15.751	3.150
			Mean	3.145
			SD	0.023
			% of RSD	0.72

Result : LOD of Tin established as 3.145 mg/kg

LOD (Cadmium)				
LOD	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	0.773	0.155
Rep-2	50	200.00	0.757	0.151
Rep-3	50	200.00	0.759	0.152
Rep-4	50	200.00	0.757	0.151
Rep-5	50	200.00	0.765	0.153
Rep-6	50	200.00	0.767	0.153
			Mean	0.153
			SD	0.001
			% of RSD	0.85

Result : LOD of Cadmium established as 0.153 mg/kg

LOD (Mercury)				
LOD	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	0.741	0.148
Rep-2	50	200.00	0.662	0.132
Rep-3	50	200.00	0.657	0.131
Rep-4	50	200.00	0.663	0.133
Rep-5	50	200.00	0.667	0.133
Rep-6	50	200.00	0.678	0.136
			Mean	0.136
			SD	0.01
			% of RSD	4.65

Result : LOD of Mercury established as 0.136 mg/kg

LOQ (Lead)				
LOQ	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	2.541	0.508
Rep-2	50	200.00	2.577	0.515
Rep-3	50	200.00	2.568	0.514
Rep-4	50	200.00	2.515	0.503
Rep-5	50	200.00	2.571	0.514
Rep-6	50	200.00	2.558	0.512
			Mean	0.511
			SD	0.005
			% of RSD	0.91

Result : LOQ of Lead established as 0.511 mg/kg

LOQ (Copper)				
LOQ	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	31.132	6.226
Rep-2	50	200.00	31.473	6.295
Rep-3	50	200.00	30.432	6.086
Rep-4	50	200.00	30.594	6.119
Rep-5	50	200.00	30.830	6.166
Rep-6	50	200.00	30.951	6.190
			Mean	6.180
			SD	0.075
			% of RSD	1.21

Result : LOQ of Copper established as 6.180 mg/kg

LOQ (Arsenic)				
LOQ	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	1.125	0.225
Rep-2	50	200.00	1.159	0.232
Rep-3	50	200.00	1.094	0.219
Rep-4	50	200.00	1.139	0.228
Rep-5	50	200.00	1.122	0.224
Rep-6	50	200.00	1.121	0.224
			Mean	0.225
			SD	0.004
			% of RSD	1.93

Result : LOQ of Arsenic established as 0.225 mg/kg

LOQ (Tin)				
LOQ	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	31.370	6.274
Rep-2	50	200.00	31.629	6.326
Rep-3	50	200.00	31.552	6.310
Rep-4	50	200.00	31.148	6.230
Rep-5	50	200.00	31.605	6.321
Rep-6	50	200.00	31.774	6.355
			Mean	6.303
			SD	0.040
			% of RSD	0.64

Result : LOQ of Tin established as 6.303 mg/kg

LOQ (Cadmium)				
LOQ	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	1.546	0.309
Rep-2	50	200.00	1.552	0.310
Rep-3	50	200.00	1.549	0.310
Rep-4	50	200.00	1.495	0.299
Rep-5	50	200.00	1.570	0.314
Rep-6	50	200.00	1.532	0.306
			Mean	0.308
			SD	0.005
			% of RSD	1.66

Result : LOQ of Cadmium established as 0.308 mg/kg

LOQ (Mercury)				
LOQ	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	1.122	0.224
Rep-2	50	200.00	1.200	0.240
Rep-3	50	200.00	1.197	0.239
Rep-4	50	200.00	1.195	0.239
Rep-5	50	200.00	1.231	0.246
Rep-6	50	200.00	1.224	0.245
			Mean	0.239
			SD	0.01
			% of RSD	3.24

Result : LOQ of Mercury established as 0.239 mg/kg

PRECISION

PRECISION (Lead)				
PRECISION	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	12.635	2.527
Rep-2	50	200.00	12.727	2.545
Rep-3	50	200.00	12.608	2.522
Rep-4	50	200.00	12.712	2.542
Rep-5	50	200.00	12.533	2.507
Rep-6	50	200.00	12.723	2.545
			Mean	2.531
			SD	0.016
			% of RSD	0.62
			Result	Pass

Acceptance Criteria : The %RSD value not more than 20%.

PRECISION (Copper)				
PRECISION	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	150.695	30.139
Rep-2	50	200.00	150.993	30.199
Rep-3	50	200.00	150.819	30.164
Rep-4	50	200.00	150.034	30.007
Rep-5	50	200.00	150.979	30.196
Rep-6	50	200.00	150.261	30.052
			Mean	30.126
			SD	0.079
			% of RSD	0.26
			Result	Pass

Acceptance Criteria : The %RSD value not more than 20%.

PRECISION (Arsenic)				
PRECISION	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	5.565	1.113
Rep-2	50	200.00	5.741	1.148
Rep-3	50	200.00	5.535	1.107
Rep-4	50	200.00	5.501	1.100
Rep-5	50	200.00	5.541	1.108
Rep-6	50	200.00	5.591	1.118
			Mean	1.116
			SD	0.017
			% of RSD	1.52

Acceptance Criteria : The %RSD value not more than 20%.

PRECISION (Tin)				
PRECISION	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	152.356	30.471
Rep-2	50	200.00	155.696	31.139
Rep-3	50	200.00	151.896	30.379
Rep-4	50	200.00	154.546	30.909
Rep-5	50	200.00	154.639	30.928
Rep-6	50	200.00	155.872	31.174
			Mean	30.834
			SD	0.306
			% of RSD	0.99
			Result	Pass

Acceptance Criteria : The %RSD value not more than 20%.

PRECISION(Cadmium)				
PRECISION	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	7.614	1.523
Rep-2	50	200.00	7.747	1.549
Rep-3	50	200.00	7.724	1.545
Rep-4	50	200.00	7.641	1.528
Rep-5	50	200.00	7.650	1.530
Rep-6	50	200.00	7.742	1.548
			Mean	1.537
			SD	0.012
			% of RSD	0.75
			Result	Pass

Acceptance Criteria : The %RSD value not more than 20%.

PRECISION (Mercury)				
PRECISION	vol(ml)	Dilution factor	Sample Conc(ppb)	Conc. (mg/kg)
Rep-1	50	200.00	4.661	0.932
Rep-2	50	200.00	5.292	1.058
Rep-3	50	200.00	5.329	1.066
Rep-4	50	200.00	5.376	1.075
Rep-5	50	200.00	5.303	1.061
Rep-6	50	200.00	5.375	1.075
			Mean	1.045
			SD	0.06
			% of RSD	5.31
			Result	Pass

Acceptance Criteria : The %RSD value not more than 20%.

RECOVERY STUDY

RECOVERY AT LOQ LEVEL

Annexure – D

DAY-1

Accuracy @LOQ (Lead)								
Spike LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24951	50	200.39	3.485	0.19	0.70	0.50	101.02
Rep-2	0.25693	50	194.61	3.516	0.19	0.68	0.50	98.96
Rep-3	0.26224	50	190.67	3.455	0.18	0.66	0.50	95.52
Rep-4	0.22592	50	221.32	3.466	0.22	0.77	0.50	108.49
Rep-5	0.26113	50	191.48	3.535	0.20	0.68	0.50	96.34
Rep-6	0.25712	50	194.46	3.436	0.19	0.67	0.50	94.88
					Mean	0.69		99.20
					SD	0.04		5.10
					% of RSD	5.65		5.14
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount

Accuracy @LOQ (Copper)								
Spike LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24951	50	200.39	240.401	41.12	48.17	6.00	117.50
Rep-2	0.25693	50	194.61	243.162	40.47	47.32	6.00	114.16
Rep-3	0.26224	50	190.67	241.355	38.43	46.02	6.00	126.41
Rep-4	0.22592	50	221.32	240.994	47.32	53.34	6.00	100.25
Rep-5	0.26113	50	191.48	241.839	41.63	46.31	6.00	77.98
Rep-6	0.25712	50	194.46	243.202	41.49	47.29	6.00	96.70
					Mean	48.07		105.50
					SD	2.69		17.43
					% of RSD	5.60		16.52
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @LOQ (Arsenic)								
Spike LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24951	50	200.39	1.597	0.09	0.32	0.22	104.74
Rep-2	0.25693	50	194.61	1.620	0.09	0.32	0.22	103.63
Rep-3	0.26224	50	190.67	1.580	0.08	0.30	0.22	99.72
Rep-4	0.22592	50	221.32	1.572	0.10	0.35	0.22	112.76
Rep-5	0.26113	50	191.48	1.599	0.09	0.31	0.22	98.76
Rep-6	0.25712	50	194.46	1.567	0.09	0.30	0.22	97.26
					Mean	0.32		102.81
					SD	0.02		5.66
					% of RSD	5.45		5.50
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @LOQ (Tin)								
Spike LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. . (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24951	50	200.39	42.756	2.470	8.57	6.00	101.64
Rep-2	0.25693	50	194.61	42.960	2.382	8.36	6.00	99.63
Rep-3	0.26224	50	190.67	42.476	2.278	8.10	6.00	97.01
Rep-4	0.22592	50	221.32	42.774	2.795	9.47	6.00	111.19
Rep-5	0.26113	50	191.48	43.028	2.457	8.24	6.00	96.37
Rep-6	0.25712	50	194.46	42.682	2.439	8.30	6.00	97.68
					Mean	8.51		100.59
					SD	0.50		5.54
					% of RSD	5.83		5.51
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @LOQ (Cadmium)								
Spike LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24951	50	200.39	2.148	0.123	0.43	0.30	102.58
Rep-2	0.25693	50	194.61	2.153	0.116	0.42	0.30	101.18
Rep-3	0.26224	50	190.67	2.174	0.113	0.41	0.30	100.56
Rep-4	0.22592	50	221.32	2.142	0.137	0.47	0.30	112.45
Rep-5	0.26113	50	191.48	2.182	0.123	0.42	0.30	98.36
Rep-6	0.25712	50	194.46	2.119	0.123	0.41	0.30	96.24
					Mean	0.43		101.89
					SD	0.02		5.63
					% of RSD	5.49		5.53
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount

Accuracy @LOQ (Mercury)								
Spike LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24951	50	200.39	1.313	0.070	0.26	0.20	96.52
Rep-2	0.25693	50	194.61	1.419	0.068	0.28	0.20	104.15
Rep-3	0.26224	50	190.67	1.393	0.065	0.27	0.20	100.17
Rep-4	0.22592	50	221.32	1.405	0.084	0.31	0.20	113.38
Rep-5	0.26113	50	191.48	1.469	0.080	0.28	0.20	100.47
Rep-6	0.25712	50	194.46	1.418	0.077	0.28	0.20	99.09
					Mean	0.28		102.30
					SD	0.02		5.96
					% of RSD	6.18		5.83
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

DAY-2

Accuracy @LOQ (Lead)								
Spike LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24983	50	200.14	4.120	0.25	0.82	0.50	115.14
Rep-2	0.24841	50	201.28	4.057	0.24	0.82	0.50	115.64
Rep-3	0.26223	50	190.67	4.100	0.23	0.78	0.50	109.47
Rep-4	0.25821	50	193.64	4.196	0.25	0.81	0.50	112.28
Rep-5	0.24562	50	203.57	4.142	0.26	0.84	0.50	116.95
Rep-6	0.24391	50	204.99	4.064	0.27	0.83	0.50	112.76
					Mean	0.82		113.71
					SD	0.02		2.73
					% of RSD	2.59		2.40
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount

Accuracy @LOQ (Copper)								
Spike LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24983	50	200.14	240.401	43.18	48.11	6.00	82.15
Rep-2	0.24841	50	201.28	243.162	42.08	48.94	6.00	114.34
Rep-3	0.26223	50	190.67	241.355	40.49	46.02	6.00	92.09
Rep-4	0.25821	50	193.64	240.994	42.07	46.67	6.00	76.53
Rep-5	0.24562	50	203.57	241.839	43.35	49.23	6.00	98.07
Rep-6	0.24391	50	204.99	243.202	45.37	49.85	6.00	74.70
					Mean	48.14		89.65
					SD	1.51		15.09
					% of RSD	3.14		16.83
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @LOQ (Arsenic)								
Spike LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24983	50	200.14	1.574	0.10	0.31	0.22	97.81
Rep-2	0.24841	50	201.28	1.594	0.10	0.32	0.22	100.74
Rep-3	0.26223	50	190.67	1.530	0.10	0.29	0.22	89.19
Rep-4	0.25821	50	193.64	1.596	0.10	0.31	0.22	94.62
Rep-5	0.24562	50	203.57	1.599	0.10	0.33	0.22	102.37
Rep-6	0.24391	50	204.99	1.574	0.10	0.32	0.22	99.70
					Mean	0.31		97.41
					SD	0.01		4.83
					% of RSD	3.97		4.96
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount

Accuracy @LOQ (Tin)								
Spike LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. . (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24983	50	200.14	45.807	2.947	9.17	6.00	103.68
Rep-2	0.24841	50	201.28	45.835	2.856	9.23	6.00	106.16
Rep-3	0.26223	50	190.67	44.938	2.755	8.57	6.00	96.89
Rep-4	0.25821	50	193.64	45.610	2.926	8.83	6.00	98.43
Rep-5	0.24562	50	203.57	45.807	2.961	9.32	6.00	106.06
Rep-6	0.24391	50	204.99	45.814	3.047	9.39	6.00	105.74
					Mean	9.08		102.83
					SD	0.32		4.13
					% of RSD	3.51		4.02
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @LOQ (Cadmium)								
Spike LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24983	50	200.14	2.257	0.140	0.45	0.30	103.83
Rep-2	0.24841	50	201.28	2.223	0.138	0.45	0.30	103.15
Rep-3	0.26223	50	190.67	2.171	0.133	0.41	0.30	93.72
Rep-4	0.25821	50	193.64	2.234	0.142	0.43	0.30	96.96
Rep-5	0.24562	50	203.57	2.274	0.141	0.46	0.30	107.26
Rep-6	0.24391	50	204.99	2.212	0.146	0.45	0.30	102.66
					Mean	0.44		101.26
					SD	0.02		4.97
					% of RSD	3.97		4.91
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @LOQ (Mercury)								
Spike LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24983	50	200.14	1.645	0.083	0.33	0.20	123.17
Rep-2	0.24841	50	201.28	1.732	0.090	0.35	0.20	129.17
Rep-3	0.26223	50	190.67	1.821	0.100	0.35	0.20	123.62
Rep-4	0.25821	50	193.64	1.869	0.112	0.36	0.20	125.25
Rep-5	0.24562	50	203.57	1.832	0.122	0.37	0.20	125.61
Rep-6	0.24391	50	204.99	1.799	0.129	0.37	0.20	119.70
					Mean	0.35		124.42
					SD	0.02		3.14
					% of RSD	4.59		2.52
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

DAY-3

Accuracy @LOQ (Lead)								
Spike LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24912	50	200.71	3.684	0.23	0.74	0.50	102.07
Rep-2	0.25384	50	196.97	3.645	0.21	0.72	0.50	100.82
Rep-3	0.26225	50	190.66	3.659	0.22	0.70	0.50	95.51
Rep-4	0.22596	50	221.28	3.680	0.25	0.81	0.50	112.44
Rep-5	0.24812	50	201.52	3.714	0.22	0.75	0.50	105.36
Rep-6	0.25714	50	194.45	3.669	0.22	0.71	0.50	99.06
					Mean	0.74		102.54
					SD	0.04		5.84
					% of RSD	5.61		5.70
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @LOQ (Copper)								
Spike LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24912	50	200.71	240.401	41.83	48.25	6.00	107.05
Rep-2	0.25384	50	196.97	243.162	40.47	47.90	6.00	123.71
Rep-3	0.26225	50	190.66	241.355	41.44	46.02	6.00	76.31
Rep-4	0.22596	50	221.28	240.994	47.31	53.33	6.00	100.23
Rep-5	0.24812	50	201.52	241.839	41.64	48.73	6.00	118.25
Rep-6	0.25714	50	194.45	243.202	41.49	47.29	6.00	96.62
					Mean	48.59		103.69
					SD	2.50		16.95
					% of RSD	5.16		16.34
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @LOQ (Arsenic)								
Spike LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24912	50	200.71	1.556	0.10	0.31	0.22	98.76
Rep-2	0.25384	50	196.97	1.570	0.09	0.31	0.22	97.68
Rep-3	0.26225	50	190.66	1.553	0.09	0.30	0.22	91.90
Rep-4	0.22596	50	221.28	1.555	0.11	0.34	0.22	106.29
Rep-5	0.24812	50	201.52	1.588	0.09	0.32	0.22	102.66
Rep-6	0.25714	50	194.45	1.515	0.09	0.29	0.22	91.41
					Mean	0.31		98.12
					SD	0.02		5.86
					% of RSD	5.80		5.97
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @LOQ (Tin)								
Spike LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. . (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24912	50	200.71	45.833	2.840	9.20	6.00	105.99
Rep-2	0.25384	50	196.97	45.204	2.702	8.90	6.00	103.36
Rep-3	0.26225	50	190.66	45.288	2.795	8.63	6.00	97.32
Rep-4	0.22596	50	221.28	45.392	3.187	10.04	6.00	114.30
Rep-5	0.24812	50	201.52	46.465	2.840	9.36	6.00	108.73
Rep-6	0.25714	50	194.45	45.572	2.788	8.86	6.00	101.22
					Mean	9.17		105.15
					SD	0.50		5.95
					% of RSD	5.47		5.66
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount

Accuracy @LOQ (Cadmium)								
Spike LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24912	50	200.71	2.173	0.135	0.44	0.30	100.54
Rep-2	0.25384	50	196.97	2.164	0.129	0.43	0.30	99.03
Rep-3	0.26225	50	190.66	2.149	0.133	0.41	0.30	92.15
Rep-4	0.22596	50	221.28	2.164	0.154	0.48	0.30	108.27
Rep-5	0.24812	50	201.52	2.205	0.131	0.44	0.30	104.37
Rep-6	0.25714	50	194.45	2.171	0.135	0.42	0.30	95.56
					Mean	0.44		99.99
					SD	0.02		5.83
					% of RSD	5.51		5.83
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 80 % and not more than 130 % of spiked amount.

Accuracy @LOQ (Mercury)								
Spike LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24912	50	200.71	1.480	0.081	0.30	0.20	107.84
Rep-2	0.25384	50	196.97	1.578	0.075	0.31	0.20	117.77
Rep-3	0.26225	50	190.66	1.602	0.089	0.31	0.20	108.20
Rep-4	0.22596	50	221.28	1.618	0.108	0.36	0.20	124.98
Rep-5	0.24812	50	201.52	1.616	0.098	0.33	0.20	113.70
Rep-6	0.25714	50	194.45	1.635	0.099	0.32	0.20	109.24
					Mean	0.32		113.62
					SD	0.02		6.76
					% of RSD	6.73		5.95
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 80 % and not more than 130 % of spiked amount

RECOVERY STUDY

RECOVERY AT 2*LOQ LEVEL

DAY-1

Accuracy @2LOQ (Lead)								
Spike 2LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 2LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 2LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.25951	50	192.67	5.949	0.19	1.15	1.00	95.28
Rep-2	0.25393	50	196.90	5.916	0.19	1.16	1.00	97.55
Rep-3	0.26221	50	190.69	5.959	0.18	1.14	1.00	95.51
Rep-4	0.23594	50	211.92	5.930	0.22	1.26	1.00	103.21
Rep-5	0.25872	50	193.26	5.901	0.20	1.14	1.00	94.52
Rep-6	0.23981	50	208.50	5.930	0.19	1.24	1.00	104.27
					Mean	1.18		98.39
					SD	0.05		4.28
					% of RSD	4.47		4.35
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount

Accuracy @2LOQ (Copper)								
Spike 2LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 2LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 2LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.25951	50	192.67	270.691	41.12	52.15	12.00	91.91
Rep-2	0.25393	50	196.90	273.106	40.47	53.78	12.00	110.87
Rep-3	0.26221	50	190.69	271.133	38.43	51.70	12.00	110.57
Rep-4	0.23594	50	211.92	271.715	47.32	57.58	12.00	85.50
Rep-5	0.25872	50	193.26	270.400	41.63	52.26	12.00	88.58
Rep-6	0.23981	50	208.50	273.245	41.49	56.97	12.00	129.00
					Mean	54.07		102.74
					SD	2.58		16.92
					% of RSD	4.78		16.47
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @2LOQ (Arsenic)								
Spike 2LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 2LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 2LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.25951	50	192.67	2.712	0.09	0.52	0.44	98.40
Rep-2	0.25393	50	196.90	2.697	0.09	0.53	0.44	100.85
Rep-3	0.26221	50	190.69	2.721	0.08	0.52	0.44	99.32
Rep-4	0.23594	50	211.92	2.715	0.10	0.58	0.44	108.06
Rep-5	0.25872	50	193.26	2.706	0.09	0.52	0.44	98.68
Rep-6	0.23981	50	208.50	2.710	0.09	0.57	0.44	107.80
					Mean	0.54		102.18
					SD	0.02		4.53
					% of RSD	4.54		4.44
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @2LOQ (Tin)								
Spike 2LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 2LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 2LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.25951	50	192.67	72.350	2.470	13.94	12.00	95.58
Rep-2	0.25393	50	196.90	72.914	2.382	14.36	12.00	99.79
Rep-3	0.26221	50	190.69	73.794	2.278	14.07	12.00	98.28
Rep-4	0.23594	50	211.92	72.989	2.795	15.47	12.00	105.60
Rep-5	0.25872	50	193.26	72.504	2.457	14.01	12.00	96.29
Rep-6	0.23981	50	208.50	74.063	2.439	15.44	12.00	108.36
					Mean	14.55		100.65
					SD	0.72		5.19
					% of RSD	4.92		5.16
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @2LOQ (Cadmium)								
Spike 2LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 2LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 2LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.25951	50	192.67	3.639	0.123	0.70	0.60	96.38
Rep-2	0.25393	50	196.90	3.683	0.116	0.73	0.60	101.63
Rep-3	0.26221	50	190.69	3.640	0.113	0.69	0.60	96.86
Rep-4	0.23594	50	211.92	3.668	0.137	0.78	0.60	106.75
Rep-5	0.25872	50	193.26	3.679	0.123	0.71	0.60	98.06
Rep-6	0.23981	50	208.50	3.718	0.123	0.78	0.60	108.66
					Mean	0.73		101.39
					SD	0.04		5.26
					% of RSD	5.05		5.19
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @2LOQ (Mercury)								
Spike 2LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 2LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 2LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.25951	50	192.67	2.273	0.070	0.44	0.40	91.97
Rep-2	0.25393	50	196.90	2.469	0.068	0.49	0.40	104.60
Rep-3	0.26221	50	190.69	2.480	0.065	0.47	0.40	101.91
Rep-4	0.23594	50	211.92	2.472	0.084	0.52	0.40	109.91
Rep-5	0.25872	50	193.26	2.475	0.080	0.48	0.40	99.48
Rep-6	0.23981	50	208.50	2.506	0.077	0.52	0.40	111.25
					Mean	0.49		103.19
					SD	0.03		7.12
					% of RSD	6.69		6.90
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amountt

DAY-2

Accuracy @2LOQ (Lead)								
Spike 2LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 2LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 2LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24412	50	204.82	6.630	0.25	1.36	1.00	110.91
Rep-2	0.24563	50	203.56	6.576	0.24	1.34	1.00	110.01
Rep-3	0.27112	50	184.42	6.647	0.23	1.23	1.00	99.15
Rep-4	0.26525	50	188.50	6.596	0.25	1.24	1.00	99.22
Rep-5	0.24254	50	206.15	6.644	0.26	1.37	1.00	111.14
Rep-6	0.24663	50	202.73	6.656	0.27	1.35	1.00	108.02
					Mean	1.31		106.41
					SD	0.06		5.70
					% of RSD	4.77		5.36
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @2LOQ (Copper)								
Spike 2LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 2LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 2LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24412	50	204.82	270.691	43.18	55.44	12.00	102.15
Rep-2	0.24563	50	203.56	273.106	42.08	55.59	12.00	112.58
Rep-3	0.27112	50	184.42	271.133	40.49	50.00	12.00	79.23
Rep-4	0.26525	50	188.50	271.715	42.07	51.22	12.00	76.20
Rep-5	0.24254	50	206.15	270.400	43.35	55.74	12.00	103.31
Rep-6	0.24663	50	202.73	273.245	45.37	55.40	12.00	83.53
					Mean	53.90		92.83
					SD	2.58		15.07
					% of RSD	4.79		16.23
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @2LOQ (Arsenic)								
Spike 2LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 2LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 2LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24412	50	204.82	2.621	0.10	0.54	0.44	99.31
Rep-2	0.24563	50	203.56	2.665	0.10	0.54	0.44	100.75
Rep-3	0.27112	50	184.42	2.614	0.10	0.48	0.44	87.86
Rep-4	0.26525	50	188.50	2.683	0.10	0.51	0.44	91.98
Rep-5	0.24254	50	206.15	2.592	0.10	0.53	0.44	98.66
Rep-6	0.24663	50	202.73	2.633	0.10	0.53	0.44	97.84
					Mean	0.52		96.07
					SD	0.02		5.03
					% of RSD	4.52		5.23
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @2LOQ (Tin)								
Spike 2LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 2LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 2LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24412	50	204.82	77.220	2.947	15.82	12.00	107.24
Rep-2	0.24563	50	203.56	77.043	2.856	15.68	12.00	106.89
Rep-3	0.27112	50	184.42	77.090	2.755	14.22	12.00	95.52
Rep-4	0.26525	50	188.50	77.369	2.926	14.58	12.00	97.15
Rep-5	0.24254	50	206.15	77.723	2.961	16.02	12.00	108.85
Rep-6	0.24663	50	202.73	77.911	3.047	15.80	12.00	106.23
					Mean	15.35		103.65
					SD	0.75		5.75
					% of RSD	4.92		5.55
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @2LOQ (Cadmium)								
Spike 2LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 2LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 2LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24412	50	204.82	3.732	0.140	0.76	0.60	104.01
Rep-2	0.24563	50	203.56	3.689	0.138	0.75	0.60	102.15
Rep-3	0.27112	50	184.42	3.702	0.133	0.68	0.60	91.65
Rep-4	0.26525	50	188.50	3.736	0.142	0.70	0.60	93.75
Rep-5	0.24254	50	206.15	3.780	0.141	0.78	0.60	106.36
Rep-6	0.24663	50	202.73	3.733	0.146	0.76	0.60	101.87
					Mean	0.74		99.97
					SD	0.04		5.89
					% of RSD	5.09		5.89
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @2LOQ (Mercury)								
Spike 2LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 2LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 2LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.24412	50	204.82	2.508	0.083	0.51	0.40	107.70
Rep-2	0.24563	50	203.56	2.720	0.090	0.55	0.40	115.90
Rep-3	0.27112	50	184.42	2.760	0.100	0.51	0.40	102.25
Rep-4	0.26525	50	188.50	2.764	0.112	0.52	0.40	102.40
Rep-5	0.24254	50	206.15	2.790	0.122	0.58	0.40	113.38
Rep-6	0.24663	50	202.73	2.807	0.129	0.57	0.40	109.89
					Mean	0.54		108.59
					SD	0.03		5.61
					% of RSD	5.41		5.16
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount

DAY-3

Accuracy @2LOQ (Lead)								
Spike 2LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 2LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 2LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.25452	50	196.45	6.266	0.23	1.23	1.00	100.18
Rep-2	0.25391	50	196.92	6.242	0.21	1.23	1.00	101.55
Rep-3	0.26225	50	190.66	6.319	0.22	1.20	1.00	98.47
Rep-4	0.23593	50	211.93	6.205	0.25	1.32	1.00	106.29
Rep-5	0.25871	50	193.27	6.359	0.22	1.23	1.00	100.72
Rep-6	0.24487	50	204.19	6.337	0.22	1.29	1.00	107.58
					Mean	1.25		102.47
					SD	0.04		3.63
					% of RSD	3.48		3.54
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @2LOQ (Copper)								
Spike 2LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 2LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 2LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.25452	50	196.45	270.913	41.83	53.22	12.00	94.94
Rep-2	0.25391	50	196.92	273.064	40.47	53.77	12.00	110.81
Rep-3	0.26225	50	190.66	271.326	41.44	51.73	12.00	85.77
Rep-4	0.23593	50	211.93	271.149	47.31	57.46	12.00	84.59
Rep-5	0.25871	50	193.27	270.005	41.64	52.18	12.00	87.86
Rep-6	0.24487	50	204.19	273.454	41.49	55.84	12.00	119.53
					Mean	54.03		97.25
					SD	2.21		14.60
					% of RSD	4.09		15.01
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @2LOQ (Arsenic)								
Spike 2LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 2LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 2LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.25452	50	196.45	2.544	0.10	0.50	0.44	91.97
Rep-2	0.25391	50	196.92	2.637	0.09	0.52	0.44	96.57
Rep-3	0.26225	50	190.66	2.650	0.09	0.51	0.44	93.46
Rep-4	0.23593	50	211.93	2.641	0.11	0.56	0.44	102.17
Rep-5	0.25871	50	193.27	2.681	0.09	0.52	0.44	96.36
Rep-6	0.24487	50	204.19	2.678	0.09	0.55	0.44	103.00
					Mean	0.52		97.26
					SD	0.02		4.49
					% of RSD	4.50		4.62
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @2LOQ (Tin)								
Spike 2LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 2LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 2LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.25452	50	196.45	76.651	2.840	15.06	12.00	101.82
Rep-2	0.25391	50	196.92	77.206	2.702	15.20	12.00	104.17
Rep-3	0.26225	50	190.66	76.869	2.795	14.66	12.00	98.84
Rep-4	0.23593	50	211.93	76.054	3.187	16.12	12.00	107.76
Rep-5	0.25871	50	193.27	77.113	2.840	14.90	12.00	100.53
Rep-6	0.24487	50	204.19	77.245	2.788	15.77	12.00	108.21
					Mean	15.29		103.55
					SD	0.55		3.85
					% of RSD	3.62		3.72
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @LOQ 2(Cadmium)								
Spike 2LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 2LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 2LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.25452	50	196.45	3.638	0.135	0.71	0.60	96.69
Rep-2	0.25391	50	196.92	3.645	0.129	0.72	0.60	98.12
Rep-3	0.26225	50	190.66	3.703	0.133	0.71	0.60	95.46
Rep-4	0.23593	50	211.93	3.638	0.154	0.77	0.60	102.81
Rep-5	0.25871	50	193.27	3.694	0.131	0.71	0.60	97.12
Rep-6	0.24487	50	204.19	3.673	0.135	0.75	0.60	102.42
					Mean	0.73		98.77
					SD	0.03		3.10
					% of RSD	3.51		3.14
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @LOQ 2(Mercury)								
Spike 2LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 2LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 2LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.25452	50	196.45	2.383	0.081	0.47	0.40	96.67
Rep-2	0.25391	50	196.92	2.600	0.075	0.51	0.40	109.22
Rep-3	0.26225	50	190.66	2.643	0.089	0.50	0.40	103.71
Rep-4	0.23593	50	211.93	2.616	0.108	0.55	0.40	111.57
Rep-5	0.25871	50	193.27	2.649	0.098	0.51	0.40	103.44
Rep-6	0.24487	50	204.19	2.654	0.099	0.54	0.40	110.63
					Mean	0.52		105.87
					SD	0.03		5.69
					% of RSD	5.90		5.37
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

RECOVERY STUDY

RECOVERY AT 4*LOQ LEVEL

DAY-1

Accuracy @4LOQ (Lead)								
Spike 4LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.26331	50	189.89	10.826	0.19	2.06	2.00	93.13
Rep-2	0.24384	50	205.05	10.858	0.19	2.23	2.00	101.86
Rep-3	0.24873	50	201.02	10.806	0.18	2.17	2.00	99.55
Rep-4	0.25334	50	197.36	10.740	0.22	2.12	2.00	94.75
Rep-5	0.26331	50	189.89	10.851	0.20	2.06	2.00	93.27
Rep-6	0.27514	50	181.73	10.824	0.19	1.97	2.00	88.67
					Mean	2.10		95.20
					SD	0.09		4.78
					% of RSD	4.41		5.02
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @4LOQ (Copper)								
Spike 4LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.26331	50	189.89	330.106	41.12	62.68	24.00	89.83
Rep-2	0.24384	50	205.05	333.235	40.47	68.33	24.00	116.08
Rep-3	0.24873	50	201.02	331.225	38.43	66.58	24.00	117.29
Rep-4	0.25334	50	197.36	331.268	47.32	65.38	24.00	75.25
Rep-5	0.26331	50	189.89	330.236	41.63	62.71	24.00	87.84
Rep-6	0.27514	50	181.73	333.238	41.49	60.56	24.00	79.44
					Mean	64.37		94.29
					SD	2.89		18.16
					% of RSD	4.49		19.26
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @4LOQ (Arsenic)								
Spike 4LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.26331	50	189.89	5.019	0.09	0.95	0.88	98.13
Rep-2	0.24384	50	205.05	4.992	0.09	1.02	0.88	106.39
Rep-3	0.24873	50	201.02	5.024	0.08	1.01	0.88	105.45
Rep-4	0.25334	50	197.36	4.997	0.10	0.99	0.88	100.71
Rep-5	0.26331	50	189.89	4.972	0.09	0.94	0.88	97.20
Rep-6	0.27514	50	181.73	4.986	0.09	0.91	0.88	92.66
					Mean	0.97		100.09
					SD	0.04		5.22
					% of RSD	4.55		5.21
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @4LOQ (Tin)								
Spike 4LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.26331	50	189.89	135.372	2.470	25.71	24.00	96.82
Rep-2	0.24384	50	205.05	135.005	2.382	27.68	24.00	105.42
Rep-3	0.24873	50	201.02	134.933	2.278	27.12	24.00	103.53
Rep-4	0.25334	50	197.36	135.403	2.795	26.72	24.00	99.70
Rep-5	0.26331	50	189.89	135.064	2.457	25.65	24.00	96.63
Rep-6	0.27514	50	181.73	136.283	2.439	24.77	24.00	93.03
					Mean	26.28		99.19
					SD	1.09		4.65
					% of RSD	4.13		4.69
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @4LOQ (Cadmium)								
Spike 4LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.26331	50	189.89	6.825	0.123	1.30	1.20	97.77
Rep-2	0.24384	50	205.05	6.754	0.116	1.39	1.20	105.79
Rep-3	0.24873	50	201.02	6.788	0.113	1.36	1.20	104.30
Rep-4	0.25334	50	197.36	6.743	0.137	1.33	1.20	99.50
Rep-5	0.26331	50	189.89	6.814	0.123	1.29	1.20	97.61
Rep-6	0.27514	50	181.73	6.787	0.123	1.23	1.20	92.51
					Mean	1.32		99.58
					SD	0.05		4.86
					% of RSD	4.16		4.88
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @4LOQ (Mercury)								
Spike 4LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.26331	50	189.89	4.188	0.070	0.80	0.80	90.65
Rep-2	0.24384	50	205.05	4.481	0.068	0.92	0.80	106.37
Rep-3	0.24873	50	201.02	4.522	0.065	0.91	0.80	105.47
Rep-4	0.25334	50	197.36	4.495	0.084	0.89	0.80	100.36
Rep-5	0.26331	50	189.89	4.573	0.080	0.87	0.80	98.51
Rep-6	0.27514	50	181.73	4.631	0.077	0.84	0.80	95.50
					Mean	0.87		99.48
					SD	0.05		5.98
					% of RSD	5.29		6.01
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

DAY-2

Accuracy @4LOQ (Lead)								
Spike 4LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 4LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 4LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.26332	50	189.88	11.672	0.25	2.22	2.00	98.37
Rep-2	0.24381	50	205.08	11.999	0.24	2.46	2.00	111.11
Rep-3	0.24873	50	201.02	11.913	0.23	2.39	2.00	108.02
Rep-4	0.25331	50	197.39	11.834	0.25	2.34	2.00	104.23
Rep-5	0.26332	50	189.88	11.834	0.26	2.25	2.00	99.44
Rep-6	0.26511	50	188.60	11.902	0.27	2.24	2.00	98.77
					Mean	2.32		103.32
					SD	0.10		5.37
					% of RSD	4.20		5.19
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @4LOQ (Copper)								
Spike 4LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 4LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 4LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.26332	50	189.88	330.106	43.18	62.68	24.00	81.24
Rep-2	0.24381	50	205.08	333.235	42.08	68.34	24.00	109.40
Rep-3	0.24873	50	201.02	331.225	40.49	66.58	24.00	108.70
Rep-4	0.25331	50	197.39	331.268	42.07	65.39	24.00	97.14
Rep-5	0.26332	50	189.88	330.236	43.35	62.71	24.00	80.67
Rep-6	0.26511	50	188.60	333.238	45.37	62.85	24.00	72.82
					Mean	64.76		91.66
					SD	2.40		15.62
					% of RSD	3.70		17.04
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @4LOQ (Arsenic)								
Spike 4LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 4LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 4LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.26332	50	189.88	4.721	0.10	0.90	0.88	90.52
Rep-2	0.24381	50	205.08	4.702	0.10	0.96	0.88	98.32
Rep-3	0.24873	50	201.02	4.734	0.10	0.95	0.88	97.29
Rep-4	0.25331	50	197.39	4.742	0.10	0.94	0.88	94.90
Rep-5	0.26332	50	189.88	4.757	0.10	0.90	0.88	91.26
Rep-6	0.26511	50	188.60	4.764	0.10	0.90	0.88	90.37
					Mean	0.93		93.78
					SD	0.03		3.55
					% of RSD	3.19		3.78
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @4LOQ (Tin)								
Spike 4LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 4LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 4LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.26332	50	189.88	138.110	2.947	26.22	24.00	96.99
Rep-2	0.24381	50	205.08	140.415	2.856	28.80	24.00	108.08
Rep-3	0.24873	50	201.02	139.298	2.755	28.00	24.00	105.20
Rep-4	0.25331	50	197.39	137.431	2.926	27.13	24.00	100.84
Rep-5	0.26332	50	189.88	138.182	2.961	26.24	24.00	96.99
Rep-6	0.26511	50	188.60	140.352	3.047	26.47	24.00	97.60
					Mean	27.14		100.95
					SD	1.06		4.72
					% of RSD	3.89		4.68
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @4LOQ (Cadmium)								
Spike 4LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 4LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 4LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.26332	50	189.88	6.655	0.140	1.26	1.20	93.62
Rep-2	0.24381	50	205.08	6.832	0.138	1.40	1.20	105.24
Rep-3	0.24873	50	201.02	6.714	0.133	1.35	1.20	101.41
Rep-4	0.25331	50	197.39	6.784	0.142	1.34	1.20	99.79
Rep-5	0.26332	50	189.88	6.750	0.141	1.28	1.20	95.06
Rep-6	0.26511	50	188.60	6.737	0.146	1.27	1.20	93.75
					Mean	1.32		98.14
					SD	0.05		4.75
					% of RSD	4.13		4.84
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @4LOQ (Mercury)								
Spike 4LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 4LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 4LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.26332	50	189.88	4.329	0.083	0.82	0.80	92.40
Rep-2	0.24381	50	205.08	4.805	0.090	0.99	0.80	111.90
Rep-3	0.24873	50	201.02	4.787	0.100	0.96	0.80	107.78
Rep-4	0.25331	50	197.39	4.851	0.112	0.96	0.80	105.76
Rep-5	0.26332	50	189.88	4.800	0.122	0.91	0.80	98.72
Rep-6	0.26511	50	188.60	4.829	0.129	0.91	0.80	97.67
					Mean	0.92		102.37
					SD	0.06		7.30
					% of RSD	6.32		7.13
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

DAY-3

Accuracy @4LOQ (Lead)								
Spike 4LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 4LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 4LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.26131	50	191.34	11.526	0.23	2.21	2.00	98.82
Rep-2	0.24385	50	205.04	11.340	0.21	2.33	2.00	105.57
Rep-3	0.23076	50	216.68	11.206	0.22	2.43	2.00	110.40
Rep-4	0.25334	50	197.36	11.280	0.25	2.23	2.00	98.70
Rep-5	0.26331	50	189.89	11.239	0.22	2.13	2.00	95.62
Rep-6	0.27512	50	181.74	11.281	0.22	2.05	2.00	91.60
					Mean	2.23		100.12
					SD	0.13		6.81
					% of RSD	6.04		6.80
					Result	Pass		Pass

Result: a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @4LOQ (Copper)								
Spike 4LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 4LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 4LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.26131	50	191.34	330.063	41.83	63.16	24.00	88.87
Rep-2	0.24385	50	205.04	333.349	40.47	68.35	24.00	116.15
Rep-3	0.23076	50	216.68	331.246	41.44	71.77	24.00	126.40
Rep-4	0.25334	50	197.36	331.268	47.31	65.38	24.00	75.28
Rep-5	0.26331	50	189.89	330.356	41.64	62.73	24.00	87.88
Rep-6	0.27512	50	181.74	333.377	41.49	60.59	24.00	79.56
					Mean	65.33		95.69
					SD	4.11		20.72
					% of RSD	6.30		21.65
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @4LOQ (Arsenic)								
Spike 4LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 4LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 4LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.26131	50	191.34	4.746	0.10	0.91	0.88	92.40
Rep-2	0.24385	50	205.04	4.756	0.09	0.98	0.88	100.09
Rep-3	0.23076	50	216.68	4.734	0.09	1.03	0.88	105.88
Rep-4	0.25334	50	197.36	4.691	0.11	0.93	0.88	92.68
Rep-5	0.26331	50	189.89	4.700	0.09	0.89	0.88	90.71
Rep-6	0.27512	50	181.74	4.669	0.09	0.85	0.88	85.80
					Mean	0.93		94.60
					SD	0.06		7.19
					% of RSD	6.76		7.60
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @4LOQ (Tin)								
Spike 4LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 4LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 4LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.26131	50	191.34	135.370	2.840	25.90	24.00	96.09
Rep-2	0.24385	50	205.04	137.849	2.702	28.27	24.00	106.51
Rep-3	0.23076	50	216.68	137.599	2.795	29.81	24.00	112.58
Rep-4	0.25334	50	197.36	138.646	3.187	27.36	24.00	100.74
Rep-5	0.26331	50	189.89	139.056	2.840	26.41	24.00	98.19
Rep-6	0.27512	50	181.74	136.904	2.788	24.88	24.00	92.05
					Mean	27.11		101.03
					SD	1.77		7.44
					% of RSD	6.52		7.36
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @4LOQ (Cadmium)								
Spike 4LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 4LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 4LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.26131	50	191.34	6.590	0.135	1.26	1.20	93.86
Rep-2	0.24385	50	205.04	6.633	0.129	1.36	1.20	102.58
Rep-3	0.23076	50	216.68	6.652	0.133	1.44	1.20	109.00
Rep-4	0.25334	50	197.36	6.550	0.154	1.29	1.20	94.88
Rep-5	0.26331	50	189.89	6.609	0.131	1.26	1.20	93.64
Rep-6	0.27512	50	181.74	6.553	0.135	1.19	1.20	87.96
					Mean	1.30		96.99
					SD	0.09		7.52
					% of RSD	6.80		7.75
					Result	Pass		Pass

Result :a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.

Accuracy @4LOQ (Mercury)								
Spike 4LOQ	**Sample wt(g)**	**vol(ml)**	Dilution factor	**Spike 4LOQ Conc. (ppb)**	**Sample Conc(mg/kg)**	**Spike 4LOQ Conc. (mg/kg)**	**Spike Conc. (mg/kg)**	**Recovery(%)**
Rep-1	0.26131	50	191.34	4.439	0.081	0.85	0.80	96.00
Rep-2	0.24385	50	205.04	4.562	0.075	0.94	0.80	107.52
Rep-3	0.23076	50	216.68	4.578	0.089	0.99	0.80	112.86
Rep-4	0.25334	50	197.36	4.603	0.108	0.91	0.80	100.04
Rep-5	0.26331	50	189.89	4.643	0.098	0.88	0.80	97.92
Rep-6	0.27512	50	181.74	4.636	0.099	0.84	0.80	92.90
					Mean	0.90		101.21
					SD	0.06		7.54
					% of RSD	6.27		7.45
					Result	Pass		Pass

Result: a) The RSD of Six sample preparation is not more than 20.0%.
b) The % Recovery is not less than 70 % and not more than 130 % of spiked amount.