

	ACCREDITATION DOCUMENT	F-06/02 Issue Date: 26/05/08 Rev. No: 05 LAB 012
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Testing Laboratory.

Accreditation Scope of Neutron Activation Analysis Laboratory, Nuclear Chemistry Division, PINSTECH, Nilore, Islamabad

Permanent laboratory premises

Materials/ products tested	Types of test/ Properties measured	Range of measurement	Minimum detection limit	Uncertai nty of Measure ment (where applicable) MU(±)	Standard specification/ Techniques/ equipment used
1 .Environmental/ Geological Materials a) Air particulates b) Dust c) Soils d) Sediments e) Rocks f) Ores g) Coal h) Coal fly ash i) Oils j) Vehicle emissions k) Industrial emissions 1) Industrial effluents	Types of test Elemental analysis using Instrumental Neutron Activation Analysis (INAA) I. Elements measured by very short-lived nuclides II. Elements measured by short- lived nuclides III. Elements measured by intermediate-lived nuclides	a) Al ≥ mg/g b) V [µg/g-mg/g] c) Ti ≥ mg/g a) Mn ≥ µg/g a) Na ≥ µg/g b) K ≥ µg/g c) As ≥ µg/g d) Br [µg/g-mg/g] e) La [µg/g-mg/g] f) Sm [µg/g-mg/g] g) U ≥ µg/g	30 µg/g 10 µg/g 700 µg/g 8 µg/g 200 µg/g 80 µg/g 2 µg/g 7 µg/g 3 µg/g 1 µg/g 1 µg/g	10% 20% 20% 5% 5% 10% 0% 15% 20% 20% 20%	QM/MNSR, Section 5.4 TM/MNSR, SOP 36/MNSR I. Sequential INAA II. INAA (Short) III. INAA (Intermediate)

Date

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Materials/ products tested	Types of test/ Properties measured	Range of measurement	Minimum detection limit	Uncertai nty of Measure ment (where applicable) MU(±)	Standard specification/ Techniques/ equipment used
2. Biological Materials and Food Products A) Vegetable Products	IV. Elements measured by long- lived nuclides	a) Ce [$\mu\text{g/g-mg/g}$] b) Co [$\mu\text{g/g-mg/g}$] c) Cr $\geq \mu\text{g/g}$ d) Cs [$\mu\text{g/g-mg/g}$] e) Eu [$\mu\text{g/g-mg/g}$] f) Fe $\geq \mu\text{g/g}$ g) Hf [$\mu\text{g/g-mg/g}$] h) Lu [ng/g-mg/g] i) Rb [$\mu\text{g/g-mg/g}$] j) Sb [$\mu\text{g/g-mg/g}$] k) Sc [$\mu\text{g/g-mg/g}$] l) Ta [$\mu\text{g/g-mg/g}$] m) Tb [$\mu\text{g/g-mg/g}$] n) Th [$\mu\text{g/g-mg/g}$] o) Yb [$\mu\text{g/g-mg/g}$] p) Zn $\geq \mu\text{g/g}$ q) Zr $\geq \mu\text{g/g}$	3 $\mu\text{g/g}$ 1 $\mu\text{g/g}$ 4 $\mu\text{g/g}$ 1 $\mu\text{g/g}$ 0.1 $\mu\text{g/g}$ 80 $\mu\text{g/g}$ 0.5 $\mu\text{g/g}$ 40 ng/g 10 $\mu\text{g/g}$ 1 $\mu\text{g/g}$ 0.2 $\mu\text{g/g}$ 0.4 $\mu\text{g/g}$ 0.3 $\mu\text{g/g}$ 0.5 $\mu\text{g/g}$ 1.5 $\mu\text{g/g}$ 15 $\mu\text{g/g}$ 70 $\mu\text{g/g}$	10% 10% 10% 10% 20% 5% 20% 20% 20% 20% 10% 20% 20% 20% 20% 20% 10% 20%	IV. INAA (Long)
	I. Elements measured by very short-lived nuclides II. Elements measured by very short-lived nuclides	a) Al [$\mu\text{g/g-mg/g}$] b) V [$\mu\text{g/g-mg/g}$] Mn [$\mu\text{g/g-mg/g}$] a) Na $\geq \mu\text{g/g}$	5 $\mu\text{g/g}$ 1 $\mu\text{g/g}$ 1 $\mu\text{g/g}$ 10 $\mu\text{g/g}$	10% 20% 5% 5%	TM/MNSR, SOP 3,5,6/MNSR I. Sequential INAA II. INAA

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Materials/ products tested	Types of test/ Properties measured	Range of measurement	Minimum detection limit	Uncertai nty of Measure ment (where applicable) MU(±)	Standard specification/ Techniques/ equipment used
B) Animal Products	III. Elements measured by intermediate-life nuclides	b) K \geq $\mu\text{g/g}$ c) As [$\mu\text{g/g}$ - mg/g] d) Br [$\mu\text{g/g}$ - mg/g] e) La [ng/g - mg/g] f) Sm [ng/g - mg/g]	100 $\mu\text{g/g}$ 0.01 $\mu\text{g/g}$ 0.01 $\mu\text{g/g}$ 0.1 $\mu\text{g/g}$	10% 10% 15% 20% 20%	(Short) III. INAA (Intermediate)
	IV. Elements measured by long- lived nuclides	a) Co [ng/g - mg/g] b) Cr [$\mu\text{g/g}$ - mg/g] c) Cs [ng/g - mg/g] d) Eu [ng/g - mg/g] e) Fe \geq $\mu\text{g/g}$ f) Rb [$\mu\text{g/g}$ - mg/g] g) Sc [ng/g - mg/g] h) Th [$\mu\text{g/g}$ - mg/g] i) Zn \geq $\mu\text{g/g}$	0.01 $\mu\text{g/g}$ 0.1 $\mu\text{g/g}$ 1 $\mu\text{g/g}$ 0.01 $\mu\text{g/g}$ 5 $\mu\text{g/g}$ 10 $\mu\text{g/g}$ 0.01 $\mu\text{g/g}$ 1 $\mu\text{g/g}$ 1 $\mu\text{g/g}$	5% 10% 10% 20% 5% 20% 10% 20% 15%	IV. INAA (Long)
	I. Elements measured by short- lived nuclides	a) Mn [$\mu\text{g/g}$ - mg/g]	\sim 70 $\mu\text{g/g}$	5%	TM/MNSR SOP
	II. Elements measured by intermediate-life nuclides [Range of measurement]	a) Na \geq $\mu\text{g/g}$ b) K \geq $\mu\text{g/g}$ c) As [$\mu\text{g/g}$ - mg/g] d) Br [$\mu\text{g/g}$ - mg/g]	\sim 50 $\mu\text{g/g}$ \sim 500 $\mu\text{g/g}$ 0.1 $\mu\text{g/g}$ 0.3 $\mu\text{g/g}$	5% 10% 10% 15%	3,5,6/MNSR I. INAA (Short)
	III. Elements measured by long- lived nuclides	a) Co [ng/g - mg/g] b) Cr [$\mu\text{g/g}$ - mg/g] c) Cs [ng/g - mg/g]	4 ng/g 0.02 $\mu\text{g/g}$ 3 ng/g	10% 10% 10%	II. INAA (Intermediate)

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		d) Fe $\geq \mu\text{g/g}$ e) Sc [$\mu\text{g/g}$ -mg/g] f Zn $\geq \mu\text{g/g}$	3 $\mu\text{g/g}$ 0.5 $\mu\text{g/g}$ 0.3 $\mu\text{g/g}$	5% 10% 10%	III. INAA (Long)

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