

METHOD STATEMENT

Determinand:

Determination of metals: Sb, Se, Tl
Only Antimony is UKAS accredited.

Matrix:

Sample Type: soils, sludge and other materials

Principle of Method:

Metals are determined by ICP-MS after dissolution by a boiling aqua regia digestion. The digestion is used to bring as much of the sample into solution as possible, prior to analysis. The method is used for solid samples such as soils and for sludge samples where the solids present require an aggressive digestion to ensure dissolution.

Acidified samples are nebulised and the aerosol that is produced is transported to the plasma torch where excitation of the metal atoms occur. Excitation is due to the high temperatures (up to 6,000K) produced by the radio frequency inductively coupled plasma. The metal ions thus produced pass through an interface region into the mass spectrometer. There the ions are separated by a quadropole where only ions having a specific mass to charge ratio are passed through at any moment in time. The dual mode detector then detects these ions and the resulting electrical signals are processed into digital information that is used to indicate ion intensity and subsequently elemental concentration.

Interferences:

Careful choice of isotopes, the use of reaction gas, interference equations and optimum plasma conditions are all used to minimise any potential interferences.

Performance of Method:

Range of Application:

Sb – LOD to 50 mg/kg

Se - LOD to 50 mg/kg

Tl - LOD to 50 mg/kg

All analytical ranges may be extended by sample dilution.

Limit of Detection, Recoveries of Compounds and Uncertainty of measurement:

	LOD µg/l	MRV mg/kg	CRM Recovery	% RSD	% Uncertainty
Se	0.1896	0.35	100.71	12.88	26.47
Sb	0.0599	0.9	101.4	9.23	19.81
Tl	0.0903	0.25	100.5	12.58	25.65

References:

Perkin Elmer User Training course.

Perkin Elmer SCIEX Elan DRC-e Hardware Guide.

