

Advice Sheet 14: Selenium in Soil

Introduction

Selenium is important in the nutrition of animals. As such it is advisable to analyse plant tissue if animal nutrition is the principal concern and our sister laboratory Sciantec will be able to assist with this. Please request contact details if this is the case. This will determine whether there is sufficient selenium for animal needs. If however, the plant tissue (i.e. grass) is shown to be deficient then it is necessary to turn to the soil and investigate soil supply to the plant.

Selenium requirement by higher plants has not been established. The great interest in plant selenium is due to its importance in nutrition, especially domestic animals, since selenium can act as a micronutrient and a toxin.

Levels found in the soil

The concentration of selenium in the soil is inherited from the parent materials. The selenium content of surface soils usually ranges between 0.02 to 0.60 mg/kg. Soil selenium is very insoluble in moist soils and so the level in crops and plants tends to be low. There is also great concern regarding soluble selenium in soils leading to increased bio-availability of selenium as a direct risk to livestock.

The following soil test levels, expressed as mg/kg (ppm) of the element on a dry basis, are given as general guidelines.

Soil Type	Soil Total Selenium
Podzols and Sandy soils	0.5 to 3.5
Clay and Clay Loamy soils	0.1 to 1.9
Soils over volcanic rocks	0.1 to 0.5
Organic light soils	<0.01 to 1.5
Metal processing/mining areas	92 to 230

Soil analysis for total selenium does not give an indication of plant uptake. There is a correlation between soil selenium levels and that of plants but it tends to be more related to pH (strongest influence), rainfall, temperature and presence of sesquioxide in the soil. Plant analysis can be used to confirm field diagnosis.

How to sample

The soil sample should be taken at a depth of 15 cm (6") for arable land and 7.5 cm (3") for grassland. Sample using a 'W' pattern, avoiding areas such as trees, gateways and headlands. See Advice Sheet 4: How to take a soil sample.

The selenium test is carried out on the same sample as submitted for routine pH, P, K, Mg measurements.

Additional Notes

Selenium in plants is positively correlated with pH, salinity and calcium carbonate levels in soil. High levels may occur in coastal areas where return of selenium to land surfaces may be higher due to sea spray. Toxicity of selenium to plants has not been reported.