

Application note Analysis of soil samples



Abstract:

The approach to soil sampling depends on the reasons for soil analysis. Soil is not a homogeneous mass. Plant life, topography, agronomic practices etc. affect the uniformity of the soil. The accuracy of the soil analysis data depends on accuracy with which the soil samples are prepared.

PROCESS DESCRIPTION

Drying:

Do not dry at high temperatures.

The working sample must be dried at **35°C** at least overnight. (See picture1) Alternatively air drying usually takes one week.

Crushing:

And the soil lumps of up to 100mm should be disaggregated using a Jaw Crusher LMC-100D which gives easily access to the grinding chamber and can be easily cleaned.

(See picture 2)

Pulverizing:

Not all samples require pulverizing. The sub sampling error is a function of the ration between the average weight of the subsample. If the subsample being analyzed is small (i.e. for total nitrogen and organic carbon analysis) the sample has to be pulverized and homogenized to a fine powder (less than 0,5 mm).

Heavy Metals

Heavy Metals are metallic chemical elements with a high density and they are toxic at low concentrations. It is important to know the effects of heavy metals for soils samples and the environment.

Effects of Chromium/Nickel/Copper/ for the environment

Nickel

Nickel is harmless in small amounts but large amounts can become toxic.

Chromium

Chromium is used in metal alloys, pigments and paints and long term exposure must be avoided.

Copper

Copper is essential for human life but large amounts must be avoided. Pre-condition for neutral to analysis pulverization Laarmann has developed a 1000cc. grinding bowl made from silicon nitride which assure the contamination free sample preparation of large soil samples including homogenization. For the sample prep. App.. 1000 gr. of soil will be used for the test. (See picture 3)



Picture 1



Picture 2



Picture 3

Feed size

The input feed size of the soil lumps is up to 30mm. (See picture 4) The silicon nitride ceramic bowl consists of 3 parts.

Steel bowl with ceramic liner Steel Lid with ceramic liner Solid Ceramic grinding disc. (Useful capacity 1000cc) The Pulverizer Type LM2000 can handle volumes from 50ml of up to 2000ml. (See picture 5)

The bowl is designed that it simultaneously grind and homogenize the sample using the "Flying saucer principle".

After 4 minutes of milling time 1000 gr. of soil sample is homogeneously milled and does not need any further mixing or dividing process.

(See picture 6)

Sieving

Sieve the soil through a 2mm sieve made of brass, steel or of plastic. Use plastic sieves with nylon wire when micronutrients are analysed.

(See picture 7)

Storage

The samples should be stored in clean closed containers (i.e. polyethylene bags or bottles). Label the bags or containers for identification. (See picture 8)

Conclusion:

Each of these stages helps to ensure that the subsample analyzed is **representative of the whole**; water is driven off so that all samples can be compared on the same (dry) basis, coarse particles are removed so that all samples can be compared by analysis of the same specified size fraction, methodical sub-sampling ensures **homogeneity** and the sample is milled to ensure that the analytical aliquot is taken from a



Picture 4



Picture 5



Picture 6



Picture 7



Picture 8