

## SUBSTRATE ANALYSIS REPORT

Test of 6 latest batches

**Product: CANNA Terra Professional Plus**

Latest batchnr: 2013123

### Sample taken

Sampling date: 24-12-2013

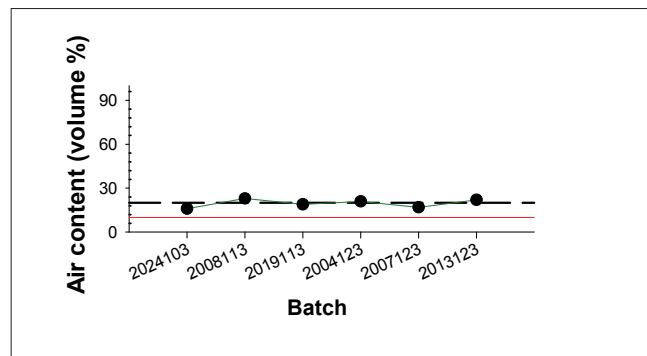
Analysis date: 27-12-2013

Researcher: J. Steeman, BSc

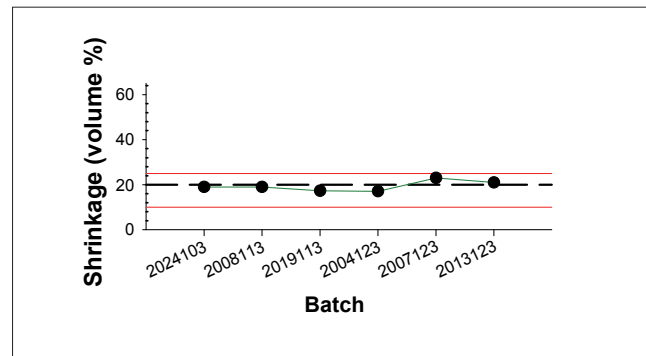
### Comments

Please refer to CANNA Sales for future batch analysis

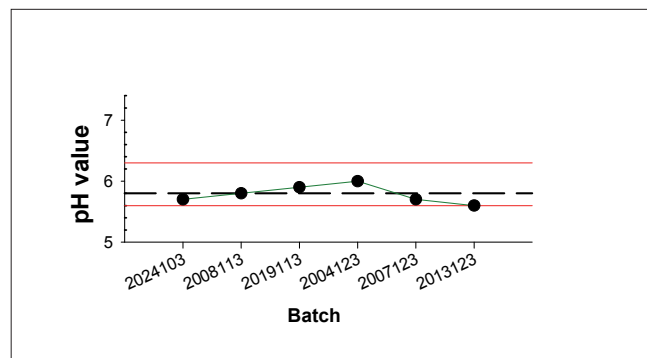
## Air content



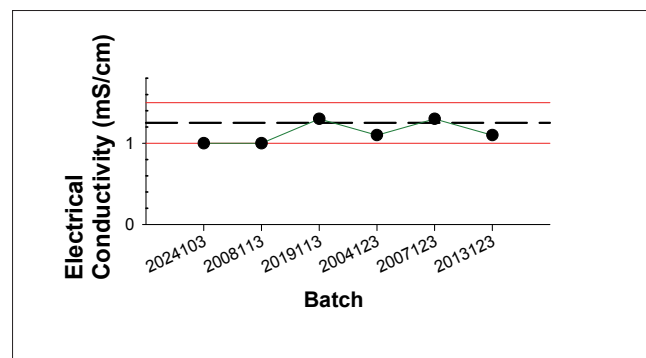
## Shrinkage



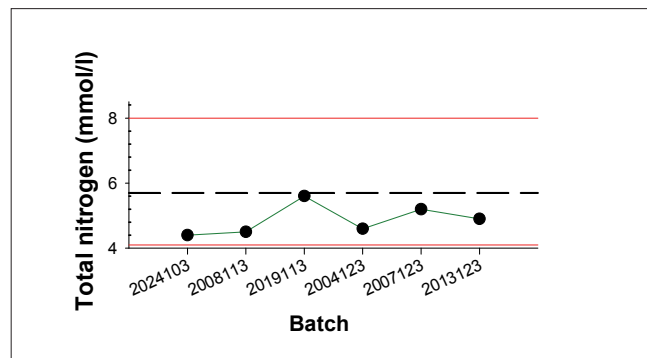
## pH-value



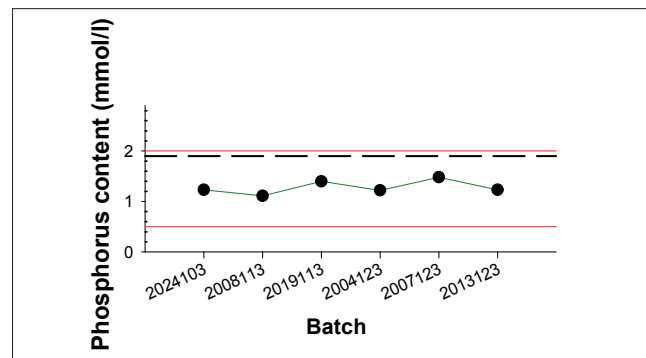
## EC-value



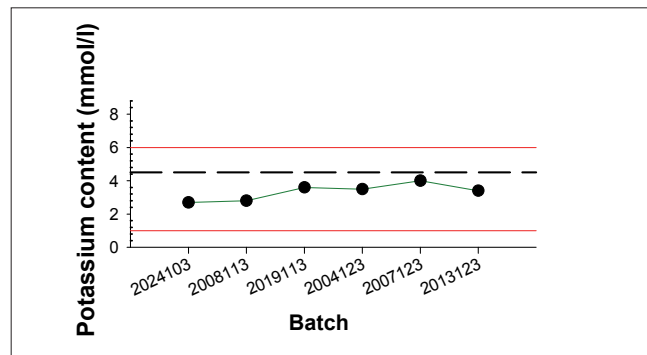
## Nitrogen (N)



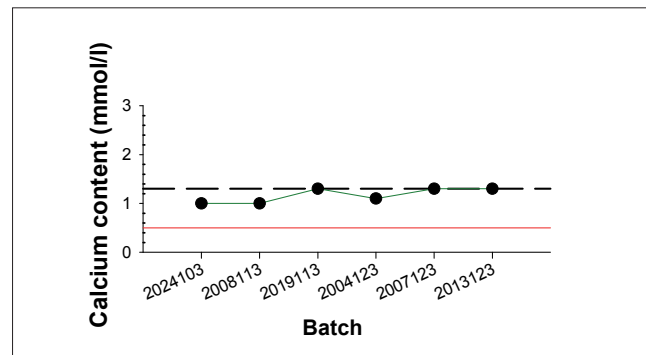
## Phosphorus (P)



## Potassium (K)



## Calcium (Ca)



# Clarification

## General

CANNA Research has been monitoring the quality of the CANNA products for many years now. This analysis report presents graphs showing the results for the last 6 production batches of 50L bags of CANNA Terra Professional Plus soil mix. The following properties were investigated: air content, shrinkage, pH, EC, nitrogen, phosphorus, potassium and calcium. The red lines indicate the range within which these properties should fall. CANNA Research places stricter demands on its own products than RHP. This report will enable you to make up your own mind about the consistency of CANNA quality.

## Air content

This is an indication of the amount of air in the soil mix. For the customer, a high air content means the plants will start growing in the soil quickly and root easily. It will also prevent suffocation of the roots during later stages of cultivation. Soil can also be fluffed up to increase its air content, but after it has been wetted it will sink again, losing its airiness. This phenomenon is called settling. Settling in CANNA Terra Professional Plus will be a maximum of 20%. This means that if a customer fills a pot with soil, including a surplus amount on top (120%), the soil will not sink to more than 1 centimetre below the rim of the pot. The bark in the mix will further ensure sufficient air content during cultivation.

## Shrinkage

If the soil becomes too dry, shrinkage will become 'irreversible'. This means that the soil can no longer take up as much moisture as it could to begin with. This is often referred to as 'water-repellent' or hydrophobic soil. The volume of the soil also decreases. The soil will sink further in the pot and sit loose in the pot, making it harder to water the plants. Of course, this is undesirable in potting soil. The choice of peat varieties used in CANNA Terra Professional Plus ensures that shrinkage cannot exceed 25%. Below this percentage, most growers will not experience any problems with watering the plants, and cultivation results will therefore be unaffected.

Growers who use bottom-watering systems will experience shrinkage in the top layer of the growing medium. However, due to its low rate of shrinkage, CANNA Terra Professional Plus will be a suitable potting soil for them as well.

## pH value

pH is a measure of the acidity of the medium or water. It is a determining factor for a healthy root environment and the availability of nutrients to the plant, or in other words: whether or not the plant will be able to take up nutrition. Potting soil is composed of a mixture of different peat varieties. Peat is naturally acidic. At these low pH values, plants will not be able to grow. The peat is made suitable for growing plants by enriching it with natural lime. In addition to acting as a pH buffer, the lime also gives off calcium and magnesium, making these essential elements available to the plants. The uptake of nutrients by the plant from an organic substrate is best if the pH of the substrate is between 5.5 and 6.5. CANNA Terra Professional Plus is prepared with a pH of 6.2 (+/- 0.2).

## EC value

CANNA Terra Professional is pre-fertilised with readily absorbable fertilisers. This fertilisation facilitates the plant's growth. Apart from that, the grower remains in control of the extent to which the plant is fed. This means that the grower can feed the plant immediately with CANNA Terra Vega and later on with CANNA Terra Flores. By using readily available fertilizers, we can also guarantee a constant EC, independent of the potting soil's production date and age. The potting soil is delivered with an EC of 1.2 (+/- 0.2). The pre-fertilisation must include a good balance of the nutrient elements that are described below.

## Nitrogen (N)

Nitrogen plays an important role in the energy metabolism and protein synthesis. Thus, nitrogen is required for the production of chlorophyll (the green pigment found in almost all plants), DNA and other secondary protein metabolites.

## Phosphorus (P)

Phosphorus plays an important role for all organisms and is an essential component in plant (and animal) nutrition. It has a key position in dissimulation processes at the cellular level and in the plant's overall energy transfer. Moreover, phosphorus is used as a building block for cell walls (the plant's skeleton), DNA and various proteins and enzymes.

## Potassium (K)

Potassium is required for various activities throughout the whole plant that are related to (water) transport. Possibly the most important aspect is the closing mechanism of the stoma. Moreover, potassium contributes to the plant's strength (weight) and quality, and governs a multitude of other processes, including carbohydrate management.

## Calcium (Ca)

Along with phosphate, this element is used for the creation of the skeleton. In animals, this takes the form of bones and (egg) shells, for instance, but in the plant world the 'skeleton' is part of each cell in the cell wall. Particularly as the plant increases in volume (the growth period), calcium is essential. Furthermore, calcium plays a regulatory role within the cells and thus contributes to the stability of the plant.