

## Testing Methods for Coco peat

The following are the methods of testing some important properties of Coco Peat. Some suppliers may follow a different method from the methods described below. Unless specified otherwise in the quotation, the testing methods for different major properties of Coco Peat shall be as below.

There is no standard specified for testing Coco Peat, however the following methods describe industry accepted methods of testing.

### **I. Electrical Conductivity:**

The following describe two major methods of testing Coco Peat.

#### **1. Wet method:**

This is the method followed by us generally. It is also comparatively stringent than the dry method. This method is followed by suppliers to European countries. It is also referred to as 1:1.5 methods.

Take samples of the Coco Peat, either from a single block or from a number of blocks. Crush the compressed Coco Peat by hand to powder it. Rub between the palms to separate the Coco Peat from the fiber.

Measure the EC of demineralized water or RO water (EC<sub>w</sub>) using a calibrated hand held EC meter. Mix the Coco Peat with just the right amount of demineralized water to fully expand the compressed particles. One way is to mix three times the weight of the Coco Peat to be tested (30ml of water with 10g of Coco Peat). Take 100 ml of this mixture and to it add 150 ml of demineralized water.

Stir well and allow soaking for about 15 minutes. (Usually for Coco Peat the EC doesn't change much after one minute. But for coconut husk chips the soaking is very important and the recommended time is 30 minutes). Strain the Coco Peat and collect the solution in a glass or plastic container. The Coco Peat may be pressed during straining using a spoon.

Measure the EC of the solution with the EC meter (EC<sub>c</sub>). Ensure that there is sufficient quantity of the solution to completely immerse the measuring tip of the EC meter; otherwise the readings will be erroneous.

- The EC of Coco Peat is measured by the formula  $EC_c - EC_w$  (mS/cm)

#### **2. Dry method:**

This is the method specified by Korean buyers. It is also known as 1:5 methods.

In this method after the fiber is separated, the dust is not wet with water. One part of dry dust is mixed with five parts of demineralized water by volume (100 ml to 500 ml). Stir, soak and strain the solution and measure the EC (EC<sub>c</sub>).

- The EC of Coco Peat is measured by the formula  $EC_c - EC_w$  (mS/cm)

Apart from this there are other methods followed such as 1:2 wet method and 1:3 dry method. Some buyers in India use 1:10 gravimetric method. However, volumetric method is always preferred over gravimetric method as sand content can affect results in gravimetric method.

While measuring the raw materials for quality control, less water should be used for measuring EC as EC increases with drying and compression.

## II. PH (Potential Hydrogen):

pH is measured in the same method as EC using hand held pH meter. The most popular method for pH however, is 1:5 dry methods. But 1:1.5 wet methods give a more realistic pH reading. Ensure the water used for measuring pH is neutral (7.0). The pH reading of the solution directly gives the pH of the Coco Peat.

Another method of measuring pH would be to add pH neutral water 5 times the weight of the Coco Peat (500 ml to 100 grams). This quantity of water would completely soak the Coco Peat imitating growing conditions. Allow to soak for 15 minutes, squeeze the material and measure the pH of the solution. This method usually gives a lower pH reading than other methods.

## III. Moisture content:

Moisture content is important as it shows how much water you are purchasing for the price of Coco Peat. The moisture content of sun dried Coco Peat blocks is typically between 15 to 20%. It is not possible to dry Coco Peat to below 15% moisture without external heating as Coco Peat tends to retain some moisture just like seasoned wood. The moisture content helps in the compression of the Coco Peat dust into blocks. Coco Peat of zero moisture content and Coco Peat of very high moisture content will not form properly compressed blocks. However when Coco Peat is sold in uncompressed loose form in bags, the moisture content can be very high.

To measure the moisture content, take 100 grams of crushed and powdered Coco Peat and heat in a hot air oven at 100 deg. C till all the moisture is removed. Measure the fully dried Coco Peat when it is hot (W). Moisture content is given by the formula

- Moisture content =  $(100-W) \%$

Moisture content can also be directly measured approximately in Coco Peat blocks using a hand held moisture meter. The reading of the moisture meter directly gives the moisture content, But this method can only be used for blocks or large chips. Simply press the pins of the moisture meter into a blocks and note down the moisture content readings.

When buying Coco Peat in loose, moist condition, much of the weight of the Coco Peat could be in the form of water. This is illustrated by the Moisture to Dry Matter ratio. It shows how much of the purchased product was water. The moisture: matter ratio is determined by the hot air oven method described above and is simply arrived at by the following formula.

- moisture: matter ratio =  $(100-W):W$

For fully sun dried Coco Peat of 15% moisture, the moisture: matter ratio would be 15:85 or 1:5.7 (i.e., 1 part water for 5.7 parts Coco Peat). However, for moist loose Coco Peat specifying 60% moisture, it would be much higher. The 60% moisture mentioned here would be the moisture that would be removed by sun drying and not hot air oven drying. So in reality, the total moisture would be 60% (sun drying) + 15% (hot air oven drying) = 75% moisture. For 75% moisture, the moisture: matter ratio would be 75:25 or 3:1 which means there are 3 parts water for every 1 part Coco Peat. Note that Coco Peat can easily absorb 5 parts water to 1 part Coco Peat and three times moisture would not appear very wet to the user. However, in certain cases, buying loose moist would be unavoidable such as when the Coco Peat is amended with bio active agents which would die if the Coco Peat were to be sun dried.

#### IV. Fiber content:

Break a large piece of Coco Peat from a single block. Weigh the Coco Peat ( $W_c$ ). Crush the Coco Peat by hand into dust. Then rub the Coco Peat powder between the palms of the hand so that the dust falls down and the fiber stays in the hand. In this way, separate all the fiber from the dust. Some tiny fibers may be allowed to fall down with the Coco Peat. Repeat till the fiber and dust are separated satisfactorily. Weigh the fiber ( $W_f$ ). The fiber content is given by the formula

- Fiber content =  $W_f/W_c \times 100\%$

Fiber measured by sieving can give varied results as there is no standard for mesh size, wetness and due to Coco Peat particles clinging to clumps of fiber during sieving.

#### V. Sand content (Impurities):

Break off a slice of the Coco Peat block so that the slice measures 1 kg. In a large tub filled with water immerse the 1 kg slice till it completely expands and floats in the water. The floating Coco Peat is removed first by hand and later by carefully decanting the tub. Repeat till all the floating Coco Peat and fiber are removed. The sediment contains heavy husk particles and heavier sand particles. Slowly swirl the sediment with a small quantity of water and pour out the swirling heavy husk particles with the water. Repeat till only the sand is left in the tub. Dry and measure the weight of the sand ( $W_s$ ) in grams.

- Sand content is given by  $W_s/1000 \times 100\%$

#### VI. Expansion (or) Breakout Volume:

Break off a slice of the Coco Peat block so that the slice measures more than 1 kg. Break and crush the slice by hand into dust particles. Remove the fiber by rubbing between the palms.

Measure one kg of the dust and add to a large tub. To the dust slowly mix three liters of water and completely expand all the Coco Peat particles. Measure the volume of the loose expanded fluffy Coco

Peat without compacting on a liter by liter basis. The number of liters gives the expansion or breakout volume.

## **VII. Water retention:**

Break off a 1 kg slice of the Coco Peat block. Place it in a tub and add water slowly to completely expand the Coco Peat. Continue adding water till water is no longer absorbed by the Coco Peat. Transfer the Coco Peat on to a mesh so that the excess water is drained. Measure the weight of the wet material after one hour (W kg).

- Water retention is given by  $(W-1)/1 \times 100\%$