TECHNICAL PAPER

COCO COIR

WHAT IS COCO MADE OF?

Coco coir is extracted from the intermediate husk surrounding a coconut, derived from the coconut processing industry. Coco coir primarily consists of the coir fiber pith or coir dust obtained by processing coconut husk and removing long fibers. In some places the husk is left in the fields as a mulch or a source of potash for the soil. India and Sri Lanka are the main countries that process the husk into various commercial products, including growing media.

The chemical constituents of coco coir include cellulose, lignin, potassium, phosphorus, chloride and sodium. There are also trace amounts of nitrogen, magnesium, calcium and micronutrients found in coir. The concentrations may vary based on regional location and processing methods.

HOW IS IT PROCESSED?

Coco coir fibers are the result of harvesting coconut fruit from the outer shell. The fibers are then gathered into large piles to be rinsed. Sometimes the fibers are bleached with chlorine or peroxide to obtain a lighter color. Because coconuts grow in a tropical climate, rain during monsoon season typically rinses the fibers more thoroughly but makes it necessary to utilize drying equipment. After drying it is compressed into bricks before shipping to processing facilities. Those facilities may then rehydrate the coir, add other components such as perlite, maybe steam treat to kill any potential pathogens, then repackage as a ready to use growing medium.

WHY COCO? WHAT SHOULD GROWERS LOOK FOR IN COCO?

Unlike stone wool or peat moss substrates, coco coir may be a more sustainable choice for a growing medium. It is a byproduct of coconut harvesting, made of entirely organic substances, has good moisture retention and is a biodegradable and renewable resource.

Quality coco will have a low EC and a medium CEC. This implies that the coco has been well rinsed and will hold onto cations more efficiently than a substrate with lower CEC. Coco that has been sterilized will reduce the risk of pests and pathogens being introduced into the growing environment. This can be done with heat or chemicals, with heat being the preferred method. Heat sterilization can be done with dry heat or steam heat.

Storage is an important factor to consider when determining the quality of the coco. The highest quality will be protected from the elements during transport, and stored indoors at all times. Outdoor storage increases the risk of exposure to pests and pathogens.

WHAT DO CEC AND EC MEAN?

Cations are positively charged elements in a solution, while anions are the negatively charged elements. Cation exchange capacity is a calculated value that is an estimate of a substrate's ability to attract, retain, and exchange cation elements. This is an important factor in plant health, as higher CEC will provide more available nutrients to plants. The major cations associated with CEC are potassium, magnesium, calcium and sodium.

CEC is reported in millequivalents per 100 grams of soil (meq/100g). The higher the organic matter in a substrate, the higher the CEC. For example, sand has a CEC of approximately of 2 meq/100 g., while organic matter will have a CEC range of 250-400 meq/100 g. Coco coir has a CEC range of 30-100 meq/100 g. with 30-40 being most common. Substrates with very low CEC are more likely to develop deficiencies of the major cations, while higher CEC substrates will have less leaching of nutrients. However, with hydroponic cultivation, leaching is less of a concern when frequent hydroponic nutrient feeds are applied to plants. A substrate with high CEC will also hold more water, making it a less desirable choice for hydroponic cultivation.

EC is the electrical conductivity of a solution, typically measuring the concentration of dissolved salts in a solution or adhered to solid particles. The measurement reads in milliSiemens per centimeter, or mS/cm. A high EC in growing media is not desirable as it may interfere with nutrient availability to the plants, and may offset the ratios of nutrients available in a solution. Coco coir processed during monsoon season may have a lower EC, due to increased rinsing from rain water. Coco rinsed multiple times with fresh water will also have a lower EC, and is an ideal quality control measure to seek when choosing a coco coir growing media.

WHAT IS BUFFERING?

Buffered coco is a commonly used word, but it is not always well understood. Buffering is intended to displace the sodium or potassium ions from the coco by replacing them with calcium or magnesium. Calcium nitrate rinses are typical, but other formulas may be used. If the EC of a coco coir medium is over 0.5 mS/cm, buffering may be necessary in order to displace the sodium ions bound to the particles. Buffering with a calcium or magnesium base will often displace any excess sodium or potassium levels, balancing the ratios of cations in the media.

WHEN IS BUFFERING NOT NEEDED?

If the substrate EC is below 0.5 mS/cm, buffering is not necessary as the concentration of sodium and/or potassium ions is much lower and will not cause nutrient antagonism with other cations, such as calcium and magnesium.

HOW TO MANAGE PLANTS IN COCO:

Growing media with a mid to high CEC should flushed with plain water at regular intervals. This will help to displace any excess ions from the substrate, preventing salt buildup and nutrient lockout. If a high EC feed is used, runoff should be at 20%. If a low EC feed is used, runoff can be minimal.

Plants potted in a coco substrate that are fed a high EC nutrient solution may experience salt stress if the media is not rinsed throughout the growing cycle or allowed to drain more freely. If one or more daily feedings are utilized, the EC should be lowered accordingly and weekly plain water feeds should be applied.