Coir and Peat: an Optimum Rooting Substrate for Propagation©

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An optimum rooting substrate for propagation should always consist of the proper levels of air and water (balanced levels), along with an adjusted proper pH level for nutrient uptake. The base of this substrate can be peat, coir or a combination of both. By providing an optimum rooting substrate for cuttings or finished growing containers, it will ensure that these items will get off to a strong start, while reducing or minimizing cultural issues that may arise over time in production due to the compaction of the substrate.

As with hydroponics, this holds true to the popularity that coir has gained in today's greenhouse and nursery industry, not only as a standalone growing medium for vegetables and cut flowers, but for production and propagation due to its organic origin. It is produced around the world in locations like Mexico, Dominican Republic, India, Sri Lanka, and Central South America. Coir in its raw form must be treated differently than other growing components. In its raw form, coir can have EC levels up to 8.0 mmhos·cm^{-1}. This is why proper care and treatment must be taken to reduce the amount of excess elements that can be harmful to crops, eventually leading to higher input costs. These elements must be balanced to provide an optimum level of guarantee that crop performance will be maximized.

Coir and peat in their raw forms are vastly different as seen below (Table 1), and as such they must be treated differently when being used as a growing substrate.

Table 1. Comparison of coir and peat in their raw forms.

Coir: raw form (non-treated)	Peat: raw form
• pH 6-7 • Electrical conductivity (EC) 2-5 (can be 7-8 in non-treated coir • Byproduct that must be processed to remove high salt content based on type • RHP coir from Jiffy is treated • Organic Materials Review Institute (OMRI) coir is washed • Used heavily in hydroponics • Can be used as a wetting additive to peat moss or growing alternatives • Several types of coir available: pith, chunk and blended, shredded husk, or KG blocks	• pH 3.9-4.1, can vary based on locations throughout the world • EC 0.10 • Considered a natural resource in parts of the world • After harvesting, ready for storage and soilless mix production • Wetting additive needed • Several types available based on harvesting method and processing • Seedling, container mixes, coarse mixes/blends, bedding flats, etc.

The unique physical properties of stable coir provide added benefits in production that are positive when handled, harvested, composted, and stored in a strict quality control environment, as with Jiffy's RHP market offer in Jiffy-7C® pellets, Growblocks®, and Growbags®. Coir is easily re-saturated with water, and when mixed with peat, acts as a wetting agent. It becomes a very stable substrate if thoroughly composted and has high air content even when finely structured. In addition to finely structured coir, the addition of chunks or shredded husk to peat provides additional porosity to ensure proper root development of plants. This added benefit of water/air content remains positive compared

to peat as seen in Figure 1 (A) coir particle and coir fiber cross section (B). Water can enter the coir open structure, but cannot compress the air inside. This allows roots to enter the space of the particle so they have access to the oxygen inside. Because the structure is mainly lignin, it acts as a stable growing medium. Regarding easily available water (EAW), the more coir a substrate contains, the less EAW that is available to the plant, and conversely, the more peat a mix contains, the wetter the mix will be unless a component such as perlite is added for increased porosity. Organic substrates have a large volume of water buffer, which is not directly available to the crop. When adding water back to the substrate, only a small amount may be needed to be available for the plant again. With a lot of crops, little to no air in the root zone is not good, just as too much air is not good.

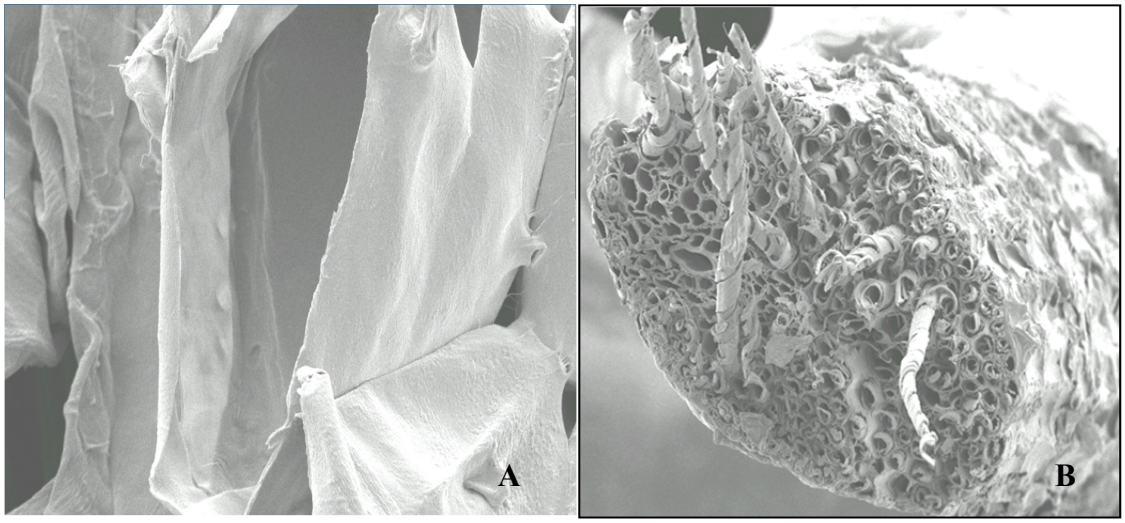

Fig. 1. (A) image coir particle. (B) image coir fiber in cross section.

RHP has developed an analytical method that provides "clear information on water uptake characteristics (WOK) of coir. This WOK analysis indicates the rate of water uptake of air dried samples. It also helps you get a grasp on crop management and growth" (Jiffy International: Superb quality of RHP coir. From water uptake characteristics (WOK) analysis as published with RHP: Certified for Horticulture. Jiffy International, Moerdijk Netherlands: Jiffy International B.V.). This can be seen in the water uptake characteristics (WOK) Figure 2.

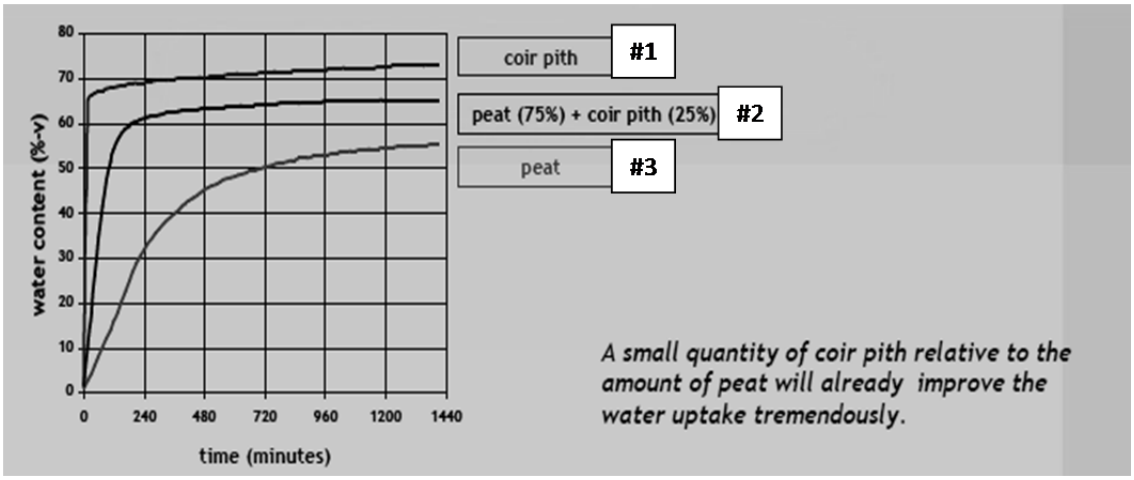

Fig. 2. Water uptake characteristics (WOK) by Jiffy International.

Based on water content, this clearly shows the speed of the three types of substrates over time verses the rate of absorption. Coir alone will absorb water much faster, as shown above (Fig. 2) on coir pith line #1, in comparison to peat (75%) + coir pith (25%) (#2), and 100% peat (#3).

When used in propagation, stable coir is best for cultivation that: when treated properly will achieve the desired level of nutrients. Without proper treatment and handling, unbalanced levels of potassium, sodium, calcium, and magnesium will lead to increased cultivation problems. This instability is very hard to correct.

Stable RHP coir also ensures a low weed content that is "moreover free of plant pathogens." If the product is stored in a non-controlled (contaminated) area for the aging process, it can lead to a high weed infestation, as shown in Figure 3.

Fig. 3. Weed contamination of coir from non-controlled (contaminated) area used for the aging process. (Jiffy International: *Superb quality of RHP COIR*. From WOK analysis as published with RHP: Certified for Horticulture. Jiffy International, Moerdijk Netherlands: Jiffy International B.V.).

Therefore, you need to control the aging process by keeping the area clean, and store it in bunkers for protection, not in fields.

In summary, clean, stable and buffered RHP coir can provide added benefits either as a standalone growing substrate, or when incorporated into mixes that will minimize the risks associated with coir from unknown sources. This is essential when growing unrooted cuttings in the propagation stages as well as hydroponics, tissue culture material, vegetables and perennials, based on the percentage within the substrate. It can easily be resaturated, and based on the percentage of incorporation with peat, acts as a wetting agent related to fast water uptake. Pith, chunk, or blends of coir as well as shredded husk can be used to increase the stability of a growing media that will not shrink under normal use over time.

The above information is based on the following:

- Personally conducted telephone interview: Van Leest, Arjan interview, by John Bonin. Jiffy International B.V. and PowerPoint data. China presentation. Jiffy's Global Product Manager. Hydroponics.
- Personally conducted telephone and interview: Gamalath, Sandeeptha. Interview by John Bonin.
- Jiffy. International B.V. known JSL data. Interview by John Bonin. Sri Lanka, Managing Director.
- Personally conducted telephone and interview: Roelof Buisman. Interview by John Bonin. Jiffy International B.V. and email data. Interview by John Bonin. Substrate Manager, Manufacturing. JBV.

- Jiffy International: *Superb quality of RHP COIR*. From WOK analysis as published with RHP: Certified for Horticulture. Jiffy International, Moerdijk Netherlands: Jiffy International B.V.
- Jiffy International: *Hydroponic Brochure:* 40 pg-EU-12 11LR, Moerdijk Netherlands: Jiffy International B.V.
- Jiffy Products International: Godfrey, 2014, personnel communication.