

Substrate with a tropical touch

From coconut to cocopeat



There are many suppliers of cocopeat all over the world and they all will claim to have the best product. Some of them will be realize what they promise. But there are exceptions. To make a better judgement, it is good to be aware of the essential parts of the production process of cocopeat.

Uko Reinders

Cocopeat is made of coconuts which grow at the tropical coasts of West Africa, Asia and South and Central America. Many palms are planted for decoration or to provide shade, but there are also huge plantations. All plantations together have an estimated area of 10 million hectares. Vegetable oil is the main reason for commercial production. Until the sixties of the past century, this was even the main source of vegetable oil in the world trade, as can be read in the manual of tropical crops by Purselglove. The oil is obtained from the white endosperm of the coconut, which can be dried and exported as copra. This is mostly used for the production of soap and animal feed. The hard stony shell is used for fuel but also to make all kind of small items.

The husk is the outer part of the coconut and contains coir or fibre. This is used for many products like mats, ropes and brooms. Lately a lot of mattresses, especially for the Chinese market, are filled with coconut fibre. The fibre is extracted by beating with wooden mallets; this can be done by hand, but usually there are machines who can do the job. When extracting fibre from the husk, the byproduct is a kind of dust or powder, called coco pith. For ages this material was not used, apart from fertilizing coconut palms. In fact, it was a problem to get rid of this material which ended up as big piles near the processing plant. But since the eighties of the past century, there is a new use for the coir by product, which is substrate for plants, known as cocopeat.





Changing characters

After it is extracted, coco pith is not ready to use as substrate for plants. First the material has to be processed, in order to change the physical and chemical characters. Regarding the physical character; without any processing, coco pith will soon degenerate and become compact. This would not be a good medium for roots. To keep a good structure for at least five years, the material has to be aged, which is the first step of the process. For minimal 4 months the coco pith is left at an outdoor terrace, where it is exposed to rain and sunshine. During this period the lignin content increases, which makes the particles more solid. At the same time the cellulose content decreases. As a result, the structure of cocopeat will not slump anymore; instead it will remain airy. Whether the aging is done properly is not easy to see, but it can be measured by a respiration test.

The chemical part of the processing is necessary to decrease the salt content of cocopeat. Coco palms are very tolerant to salt and therefore the salt content of the coconuts is high. Before processing, the EC of coco pith is mostly in between 2 and 6 mS/cm, which is too high for proper plant production. To desalt the cocopeat, the elements potassium, sodium and chloride should be removed. Fortunately this can be done fairly easy by washing these elements out by water. This should be done until the EC is getting below 1.0 mS/cm. It is important to measure the EC on the base of

the extraction method of 1:1.5. This means that the lab takes 1 part of coco pith and adds 1.5 part of demineralized water. After mixing the EC can be measured in the water which drains out. In practice these measurements are not always taking place in this way, so be aware.

Positive and negative

Buffering cocopeat is important for growers who want to apply calcium to their crops. The reason is that the positive charged

calcium elements will be attracted to the negative charged coco complex and will not become available for the plants. If cocopeat is not buffered, the complex will still contain elements like potassium and sodium. When applying calcium, this element will be attached to the complex and displace elements the potassium and sodium. These elements come into the solution and will be taken up by plants instead of calcium. Of course this is not what growers



Less risks with coco substrate

In all common used substrate materials, the crops will produce more or less the same; but for certain production systems growers will have their preferences. Costs are also an important factor. Many Kenyan rose growers for example use lava which they get from the own country. This is cheaper than cocopeat, which has to be imported from overseas. Despite the higher costs, there are still a number of growers in Kenya who use cocopeat. This is to avoid risks. This is also the reason that cocopeat is popular in new flower- and vegetable production areas, such as Eastern Europe and Turkey. Also in Mexico, most of the new growers started with substrates of cocopeat.

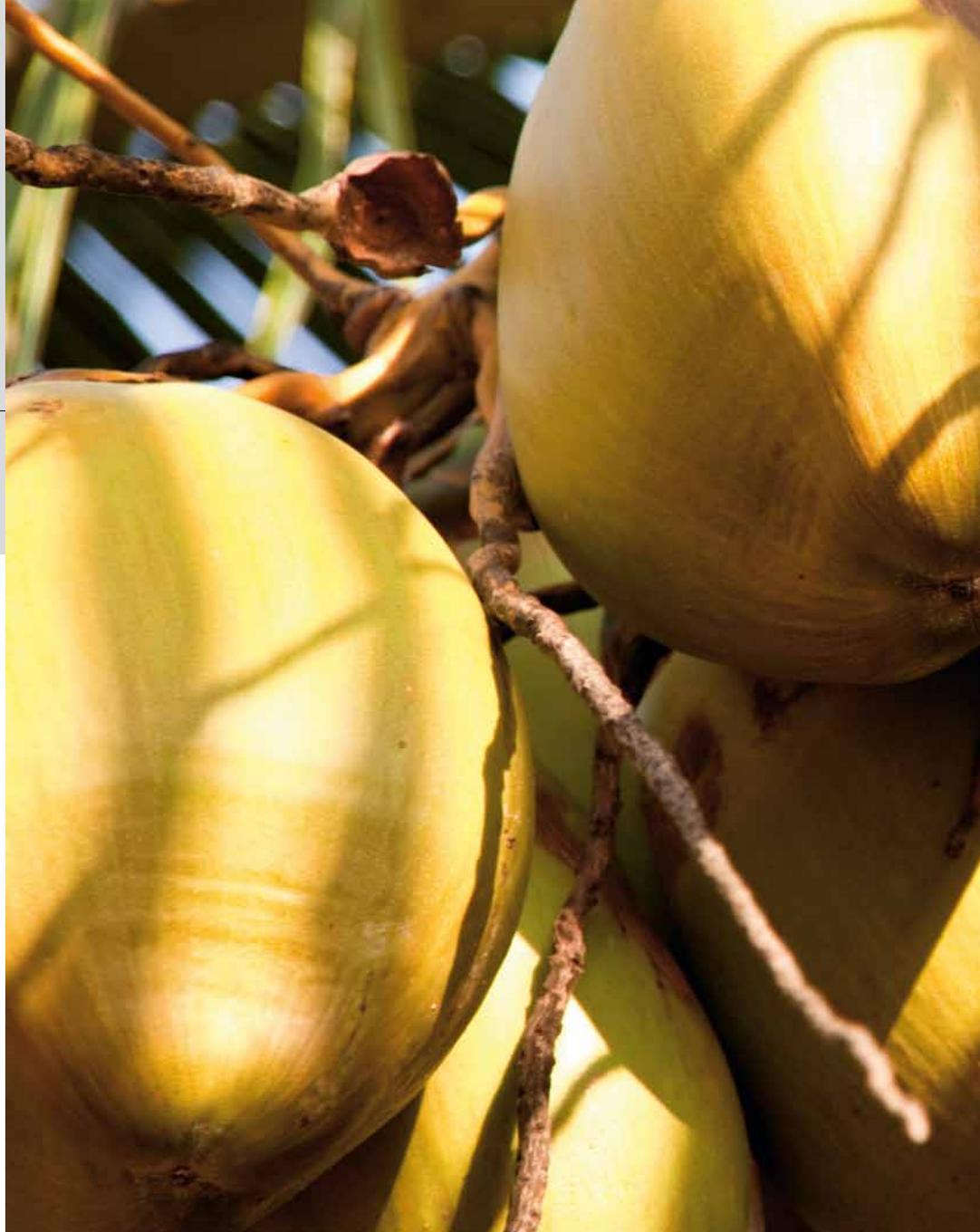
The reason that cocopeat reduces risks is that it can retain water well. As a result, a problem with the irrigation system will not directly lead to a dry root zone and damages of the crop. This is especially a risk in places with a combination of high temperatures and insecure power supply, like Africa and Mexico and at nurseries with inexperienced management.

Because of the the good water retaining capacity, coco substrate is moist all over. Roots will therefore grow through the whole substrate. Instead of close to the nozzles of the irrigation system, which happens in substrates that retain water to a lesser extent. As a result the crop will react less direct to changes in the water solution.

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want to happen, but again there is an easy solution, which is buffering. In this process, the complex will be filled with calcium, while other positive ions are getting removed and washed out. According to the standards of the Dutch label RHP for coco substrate products, a buffered cocopeat complex should contain less than 1 mmol sodium and less than 2 mmol potassium.

Buffering can be done at the processing plant or by growers themselves prior to planting. This will be a cheaper option, but growers should be aware that this process needs a lot of attention and water and thereby the drainwater should not be recirculated. Growers who recirculate their water often want buffered cocopeat. To buffer in the processing plant, water with calcium is sprayed over the cocopeat. This is done at the same location as where the aging takes place. Because the coco pith is often piled in a layer of a few meters high, it needs a lot of calcium with water to reach all the particulars; often three times more



than is required in theory. Professional companies should look for a way of buffering, which need less water and calcium. For example Dutch Plantin

developed an equipment which uses far less water and Calcium and can buffer in a much more durable way. These machines are as well used in India as in the Netherlands.

More demand for coco products

Peat is still the most import source for substrate like for pot plants. In Europe for example the substrate used in horticulture and gardens consists of peat and only 5-10 percent of coco products. This is cocopeat but also courser parts like chips, which are mixed with peat to improve the structure. This is getting done more and more, which makes the market of coco products increase by an estimated 10 percent each year. But peat will remain the main ingredient and coco additional.

One other important issue about the production of cocopeat is purity. Unfortunately there are reports from contaminated batches with sand or weed. To ensure to buy a good product there is label called RHP. This is a Dutch initiative from the foundation with the same name. <<