

Plant and flower growers in The Netherlands have discovered that - environmental considerations aside – it makes good commercial sense to find viable, alternative growing media to peat. They have, therefore, welcomed coconut-fibre (coir) compost as a new soil conditioner. Especially in the pot plant sector, cocos is experiencing explosive development in its use as a substrate. However, because its application in this field is relatively new, some caution is called for.

Cocos as a growing medium

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Multi use

Besides its use as an indoor plant, the coconut palm (*Cocos nucifera*) has a thousand uses. Almost all parts of the plant can be used, thus giving the coconut tree great economic value. Planks can be sawn from the trunk and the leaves are useful as roof covering. The flower juice can be made into Toddy, cocos wine, and Arak is a strong liquor distilled from it.

The coco nut is the big nut-like fruit, of which the husk is fibrous. The nut consists of edible white fruit flesh and clear drinkable 'water', surrounded by a hard shell. The dried fruit flesh, 'copra', contains coconut oil. Spoons can be made from the hard shell. Furthermore the shell serves as fuel and as raw material for active coal (carbon). The outer husks of coconuts provide a valuable fibre called coir, used for manufacturing rope, brooms, matting and brushes.

After the straining of the fibre, there is waste left over - small coconut-husk panicles, shorter fibres and dust. This is partly used as soil improver and as substrate, the base on which an organism lives (in this case soil, on which most seed plants grow).

Usually dust

If in professional gardening one talks about cocos as substrate, it mostly concerns dust (waste after straining of the fibre), but the shell and the fibres are applied as a growing medium for roots. The shell can be cut into so-called substrate cubes, and the fibres provide substrate mats. The coco grit or dust is not immediately suitable as substrate. The coco palm easily absorbs salt (natrium, potassium, chloride), which it stores in the nut, so the salt content is (too) high. Therefore, the salt has to be removed by rinsing. This applies also to phenol-like compounds, which might be present in the dust. The rinsing mostly takes place in a natural way, by the monsoon rains.

Before the coco dust is transported to The Netherlands, it will be dried in the sun and pressed into blocks. On arrival the blocks will be saturated again with clean, low-salt water. After saturation and addition of fertilizers, it arrives at the grower. Coco cubes and fibres also have to be washed before use.

Cubes, dust and fibres

The three types of coco (cubes, dust or grit and fibre) have totally different physical properties. The coco fibre can hold only a little water and for that reason contains much air. Because of this the fibre can only be used in combination with a very high watering

frequency or in very thin layers, as is the case with the thin-mats growing system. It is less suitable as a pure material for substrate growing.

Coco dust or grit can hold a lot of water and the air content is sufficiently high. The coco cubes combine a high air content with a high water percentage. A marked distinction of coco is that also after shrinkage the material absorbs water very well. This has as a consequence that the water distribution in the substrate can be better too.

Standards

Physically, coco dust has to meet a number of basic standards with regard to air, moisture and organic matter (see Provisional Quality Standards for Coco as a Growing Medium).

Moreover, there might be product specific norms per producer in the exporting country. But for the grower it is very important that he receives a 'constant' product: if he orders a batch of coco dust, he has to receive a product of the same properties as he bought last year. This is in order to avoid that once he receives materials containing 10% air (at a pressure height -10 cm) and another time with 30% air. Both products are good substrates, but absolutely incommensurable.

This means that the physical qualities of all batches supplied are only permitted to vary within restricted boundaries. These physical parameters are: bulk density, shrinkage, pores volume and water and air percentages at a pressure height of -10cm.

Little is, as yet, known about the stability and the digestibility of coco, but in view of the durability of other coco products prospects are hopeful. A four-year experience with rose growing shows that there is no evidence of physical alterations in the coco dust.

Free of bacteria etc.

It is self-evident that coco products have to be uninfected and without diseases. In the Dutch research up until now, only in some batches of coco dust were tropical weeds spotted, which might give problems in the culture. The hygiene at the company in the country of origin in this case is very important. The product has to be carefully inspected before shipping as otherwise the coco products cannot be supplied under a quality mark.

Experiences

Only small, orientating growing test are executed at the research stations so far. A test examines the germinating and growth of radish and onion in seed trays. In a test with potplants, the development of Saint Paulia (ionantha) on coco is investigated and the results have been encouraging. Research into cut flowers on coco has already been going on for four years; here too the results are encouraging.

Test results in other countries are known from the United Kingdom, Germany, Sri Lanka and Australia. Germany reports both positive and negative findings on the growing of anthurium and Saint Paulia on coco. These can possibly be explained by the use of a too-high salt or pH-level of the coco used, the plants in question being especially salt-sensitive.

Strong growth of use of coco as substrate

In The Netherlands, there is an enormous growth to be seen of coco as substrate. It is estimated that 15,000 tons (about 200,000 m³) is imported per year. At the moment, in the ornamental plant cultivation sector, about 16 ha is standing on coco and in the potplants sector around 30 ha. Coco cubes are used in the growing of orchids and anthurium. Some companies sometimes shift from one day to the next completely from the traditional pot soil to coco dust.

Substitute for peat

Traditionally, more than 2,500,000 m³ peat is used by the growers, which undermines the environment, as peat is hardly replaceable. Coir fibre on the other hand is a continually renewable resource since coconut palms crop year-round and grow widely throughout the tropics.

English tests, comparing coir products with peat, showed better results with coir as a growing medium, stating: "it is not fair to say that plants root quicker, but once roots emerge they establish very quickly through the (coir) substrate".

In The Netherlands one of the most important arguments stated is often that "a colleague is doing so well with it too. They say that the coco dust is easy to work with and the plant grows easily and well in it".

Coconut export perspectives for developing countries

The main producers/exporters of coco products like dust, fibre, cubes, coir pith as soil conditioners, among the developing countries are at the moment Sri Lanka and India, where numerous people are involved in trading coir fibre and coir fibre products.

In both countries, however the export market is dominated by only a few companies. Some of these companies have marketing offices in Europe. The current coir fibre production in Indonesia and the Philippines is limited, even though they are the two principal coconut-growing countries; they jointly account for about 50 % of the global coconut production.

Investments in equipment

At present, in all coconut growing countries most coconut husks are used as cheap biomass fuel, as a soil improver or just left to rot. Even in India and Sri Lanka only about 25-30% of the husks is used for fibre extraction. Therefore, theoretically, huge quantities of coir fibre could be produced worldwide. Yet, for several reasons, mainly related to the husk and fibre price, which is relatively high because of not efficient enough cropping and producing methods, it is not likely that the entire potential can be made available, without investments for more sophisticated equipment.

Nevertheless, assuming that about 50% of the total husk potential can be used for fibre extraction, the potential quantity could still be significant. Compared to the present situation, an additional quantity of 2-3 million metric tons could be made. Sri Lanka and India would probably be the first to benefit from growing demands on export markets. If/when demands become so high that these countries can no longer supply at reasonable prices, other coconut-growing countries will get better opportunities to increase their export.

Requirements

Based on the present knowledge, some provisional requirements are set for coir products for horticulture and amateur gardening use, with which they have to comply in order to be permitted to carry the quality mark of the Stichting Regeling Handelspotgronden (RHP). Negotiations are in progress with various importers, who have requested permission to use the RHP quality mark.