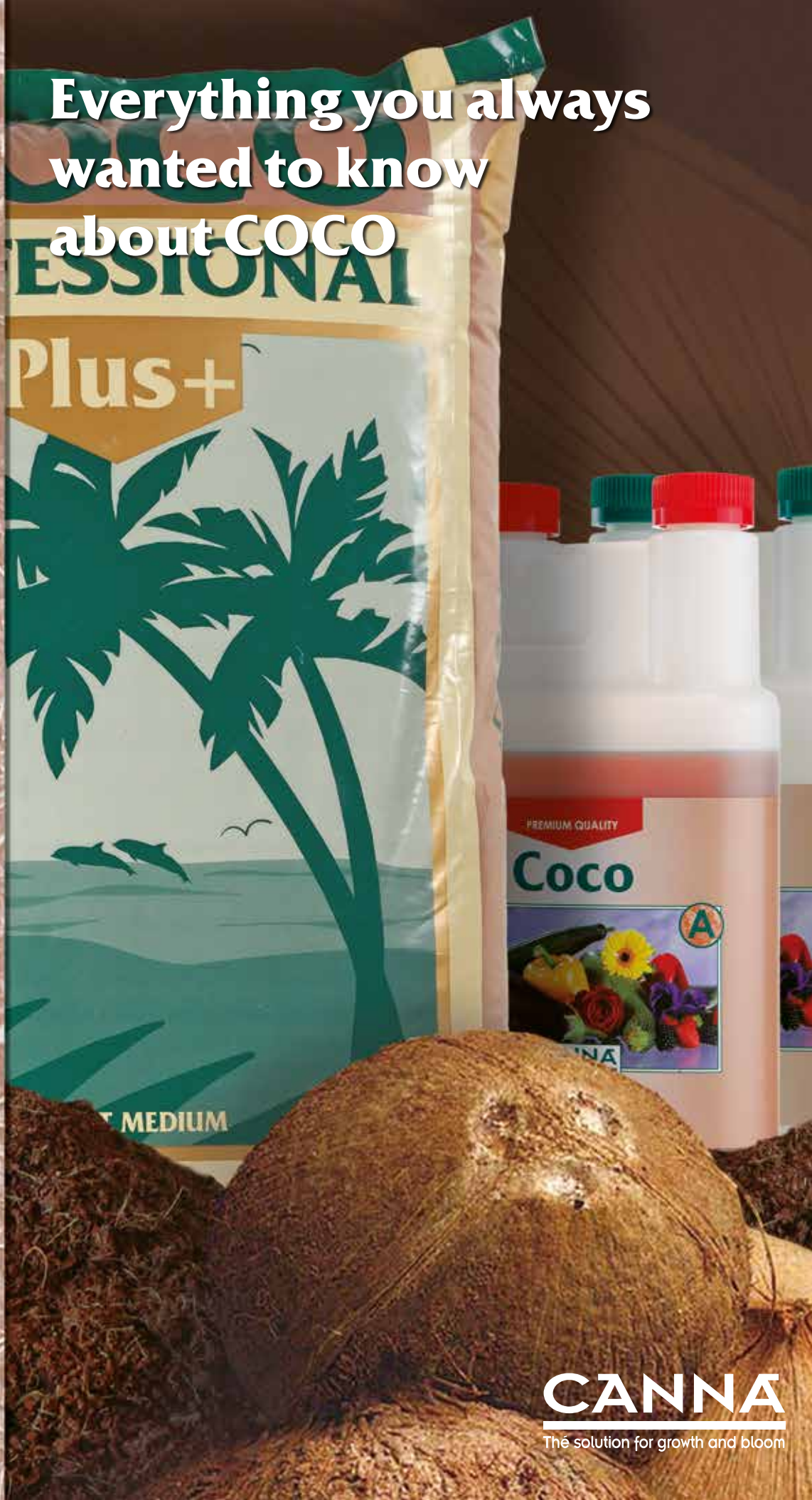
Everything you always wanted to know about COCO



CANNA

The solution for growth and bloom

History

Coco peat is the leftover material after the fibres have been removed from the outermost shell (bolster) of the coconut. It took 10 centuries to make this waste the medium of the future. The first description of the coco process dates from the 11th century and was recorded by Arabian traders. In 1290, Marco Polo described the process of extracting fibres from coconuts. For centuries, this process remained unchanged. Coco peat was a waste product from factories that used coco fibre as a raw material for making sailing ropes, chair seats and mattress fillings.

In 1862, John Lindeley, botanist, gardener and secretary of the Royal Horticultural Society, introduced coco peat as a growing medium to English horticulture. After successful experiments in the gardens of the Society, complications appeared due to harmful substances naturally present in the material and the fact that knowledge regarding the application was still in its infancy. Ultimately its poor quality caused too many problems for various crops in such a way that the use of coco declined in agriculture. It took another 100 years before coco was rediscovered as a potential growing medium. New techniques and analysis methods meant coco could be turned into a valuable growing medium. From this moment it became possible to grow many crops successfully on coco.

CANNA, a notorious pioneer, was impressed by the potentials of this product. After many years of research, CANNA successfully
created a new medium complete with a special coco nutrient solution. During its launch, CANNA was the first company to introduce RHP certified CANNA COCO to the market.

Environmentally friendly & professional!

CANNA COCO is a 100% natural grow and flowering medium, which has proven its value across years and years. CANNA, the coco pioneer from Holland, has played an important role in the current status of coco in horticulture. CANNA COCO is not only a high quality product, but also an honest and environmentally friendly product. For many years the raw material was considered waste material, and enormous useless "Coco Mountains" appeared in the landscapes of countries like Sri Lanka and India. By developing a special biological composting process this "waste" was transformed into a high quality product.
This innovation was, and still is, an important contributor to the local economy of India and Sri Lanka. This and the unique growth characteristics ensure CANNA COCO is the medium of the moment and the future!

Higher yields! 6 to 10%

Apart from water, air is essential for the plant's roots system. Research across various medium types show that more air leads to quicker and more intensive rooting, 6 to 10% higher yields and lower fertiliser use. Quicker and more intensive rooting means better root function in taking up water and nutrients, keeping up with the plants requirements. A way of achieving a higher air level in the substrate is to drip irrigate less often. More water is taken up from the substrate, the root system develops stronger, and moisture saturation occurs less often. The tests revealed that drip irrigating only once a day meant 3% more air was present in the substrate. You drip less with
CANNA COCO.

The rise of COCO in hydroponics

After its introduction to rose cultivation in 1986, it became clear that coco could be an ideal growing medium for root development, resulting in stronger crops. Unfortunately, the success with roses could not be repeated with all crops. The quality of the coco material was not constant and there was an enormous lack of coco cultivation knowledge.

In 1993 the need for alternatives for peat moss and other media, like rockwool, increased, CANNA started its first experiments with coco. This did not directly result in a marketable product, the insights of "specialists" appeared to be conflicting and there was no answer to practical coco cultivation problems. To determine the coco potentials in an objective way, the only option for CANNA was to do the pioneering work itself. Two years later, CANNA launched CANNA COCO and this initiated the first coco product on the consumer market (Germany, 1996).

After the positive introduction of CANNA COCO to the German market being a great success, CANNA COCO was launched in the Netherlands in 1997. After the results had been published, the rise of coco was unstoppable and the market share in the horticultural sector increased tremendously. At the end of 2000, almost 35% of the rose acreage and 40% of the strawberry acreage in the Netherlands was cultivated on coco substrate.

We can confirm that coco has acquired a definitive place among the other mediums. CANNA sees a growth pattern of 15% per annum untill 2015 for the total coco market. For an increased number of potting mix mixtures, the characteristics of coco are favourable due to the ease of rooting, the large water-retaining capacity in combination with a good drainage, and the high stability of the material.

The plants 'burst' out of the coco

A skilled potting mix gardener about his experiences with CANNA COCO: "The strawberries are much thicker and heavier than I'm used to. And they are not swollen and watery, but really juicy. The way it looks now, I'm expeacting a higher yield than I ever had. I just grew the plants for a week as I did with the potting mix and they literally 'burst' out of the coco. The roots grow like weeds and the plants themselves fill the area much faster than normal. My plants have never looked so healthy. The best thing is that you can't make a mistake with coco."

Switzerland grows at high level

At the end of the nineties, the former Grow Centre in Schlieren (close to Zürich) was one of the first to show interest in CANNA COCO at the time of its introduction. Heinrich and Gabriel, two employees from the very beginning of the store, took over the business and continued under the name Growhaus. Since the launch of CANNA's COCO substrate, they have entirely changed their minds about this tropical fibre.

Until recently, the cellar of the business contained a trial set-up, which was used to compare various popular mediums with each other. After intensive tests, Heinrich and Gabriel confirmed that CANNA COCO was, the most efficient medium. "CANNA is our favourite supplier", Heinrich frankly said. This grower, who won his spurs at the legendary Gärtnerei in Enetbrugg, praises the consistent high quality of CANNA's product range. "But especially the ease-of-use makes CANNA COCO superior over other mediums. Cut the slabs, soak for an hour, and it's ready. Although we have customers using the same slab six times, we set the limit at three harvests", Heinrich says with a smile on his face. In addition, the Growhaus team recognizes a higher resistance against potting mix fungi. Enough reason for successful businessmen 'to push' CANNA COCO and its associated nutrient range to its customers. Depending on the plant species, an average yield increase of 10% is seen as easily achievable with CANNA COCO for the average Growhaus gardener.

COCO measuring method

The most reliable method for measuring the nutrient levels in coco is using the 1: 1.5 extraction method.
EC and pH of the root environment can be determined by using this method. The pH and EC of the drain water generally deviates from the actual root situation, as coco is able to retain and release elements.

1) Take a sample of CANNA COCO from the slabs or pots (photo 1). This can be done with a soil core sampler or a trowel. To get a representative sample the coco must be collected from as many places as possible.
2) Collect the sample in a bowl and determine whether it contains the right amount of moisture. The coco has the right amount of moisture if moisture disappears between your fingers when you squeeze it (photo 2). Add demineralised water if necessary and mix the coco.
3) Take a 250 ml measuring jug and fill it with 150 ml of demineralised water. Add coco to the 250 ml mark (photo 3). Fully mix and allow the slurry to settle for at least two hours.
4) Mix again and measure the pH
5) Filter this material and measure the EC.

A 1:1.5 analysis can preferably be done after 3 to 4 weeks. The target values for EC are between 1.1 and 1.3, for the pH, between 5.5 and 6.2. Very high EC values increase the risk of burning symptoms. To limit the risk of burning symptoms, the coco can be rinsed with acidified water (pH 5.8: acidify with CANNA pH - growth).


1


2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Holland's leading grocer sells vegetables grown on COCO

Hartman BV is the largest market gardener in the Netherlands with a total area of 21 ha. Albert Heijn (parent company - AHOLD) has been their sole customer for 20 years.

Willem Hartman grows all the cucumbers, peppers and tomatoes, as well as many of the exotic vegetables presented on the shelves of the store. After a number of years of testing various natural substrates, Hartman has switched to coco substrate for virtually his whole company. "The problems we encountered with thick roots on two hectares of cucumbers have sped up this decision", Hartman says, "Our cucumber plants are even grown in pots made of coco! The pot is consumed slowly while the roots are growing through".

Apart from a better visual appearance the root development is easier and superior in coco compared to the development on rockwool. "Due to a healthier root development a better growth is obtained and fewer problems occur. This results in a longer shelf time, as well as a better colour and taste", claims Hartman.

His company aims at maximum quality. This is of vital importance since the client only wants the highest quality. The excellent rooting on coco substrate combined with biological control measures will even raise this quality according to Hartman. The leaves of the pepper plants feel strong and turn slightly upward. "Isn't this what every grower wants", he says.

CANNA COCO easy to use

Because of the high costs of nutrients and the complexity of sophisticated hydroponic systems, more and more growers turn to CANNA COCO for their personal needs. One satisfied customer stated: "Although I've already grown a few harvests, I must honestly say that I still haven't got a clue about growing. With potting mix everything always went wrong. First, too much water, and then too little. But that's history since I've been using CANNA COCO. I'm the perfect example that coco substrate is idiot proof."

Risky quality differences in COCO substrate

In 1998 the popularity of coco rose enormously causing a shortage of its raw material. As the leading potting mix and substrate producers could no longer ignore the product, they started to use raw material from new sources without considering the quality aspects. This resulted in huge crop damages, especially in France and the Netherlands. In order to prevent delivery problems in times of high needs CANNA went overseas and made substantial investments in local infrastructure. Concrete bunkers were built for controlled storage, mechanization took place and contracts were signed with selected farmers. Advantages: controlled supply and an ideal size (0.5 inch sifting), harvesting without potting mix contact, and controlled ripening/composting. All this effort results in an insect, seed, weed and disease free product, which was the first one awarded with the RHP standard in the Netherlands.

CANNA RHP Quality mark, above and beyond

The RHP Foundation (Quality Mark for Substrates) is a well-known concept within the potting mix sector in the Netherlands for controlling substrates and raw materials. The inspection is not limited to the finished product but covers the sourcing and processing of raw materials all the way to the CANNA Coco Professional Plus 50 litre bag. The RHP quality mark has been included in the certification package of ECAS (European Certification body for the Agricultural Sector). ECAS monitors CANNA's entire production from the factory in India to the end user, to ensure that all requirements for CANNA COCO substrate certification are satisfied.

RHP products meet the highest chemical and physical demands and are free from weeds and pathogenic organisms. RHP standard can be met in two ways; either by steam sterilizing the coco materials or by completely controlling the production process. A disadvantage of a steam-sterilized product is its inability to naturally protect crops against harmful moulds, like pythium. Steaming also converts plant usable Nitrate nitrogen to plant toxic Nitrite nitrogen. CANNA went the hard way and decided to refrain from steam sterilizing its coco. Our buffering process allows us to 'pre-program' the medium to a certain age. This ensures you get the same consistent, high quality material time after time.

Additives

CANNA COCO allows the cultivator to include the exact quantities of nutrients in the growth and blooming phases of fast growing plants. Other CANNA products, such as RHIZOTONIC (e.g. root development, stress relief), CANNAZYM (e.g. healthy root environment) and PK 13-14 (e.g. stimulating flowering) give additional support during various specific phases of the plant's development.

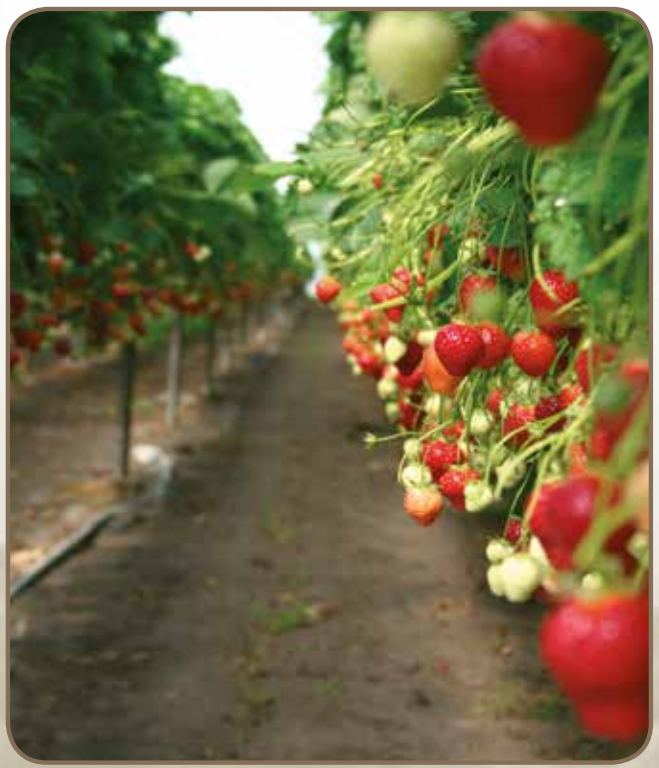
Combined with these CANNA products, the plant can optimally focus on growing and blooming, guaranteeing high yields.

Less growth due to water saturation

CANNA's COCO is made up of thousands of capillary micro-sponges that retain almost 1000 % of their own weight in water. Therefore coco retains an enormous buffer of water and nutrients. It is recommended that the grower keeps the medium a bit dry rather than soaking wet. Wet circumstances form an ideal basis for fungal diseases like Pythium. A drier substrate passes more air through to the roots stimulating them to absorb water and nutrients more actively. This results in a faster growth and higher yields. Another important instrument is timing. Once the coco has become too wet, reduce or pause watering until the coco has dried out and then start normal watering again. Check the moisture content of the coco by hand or by determining its weight by lifting the pot or slab. A rule of thumb for watering fully-grown plants is 4 to 6 litres per m2 a day. By decreasing the dripping frequency and by increasing the amount of nutrients per watering, the best use is made of available water and nutrients. This will also improve drainage. The frequency of watering depends on the evaporation and the water supply in the coco. A common rule is that one daily watering is sufficient during the first few weeks under normal circumstances; then increase up to 2 times a day; 2 hours after the lamps have been turned on and 2 hours before they are switched off again. Please keep in mind, smaller root volumes per plant (small pots or many plants per slab) will make coco dry out quickly. Therefore it is critical to water these plants more often.

Damage

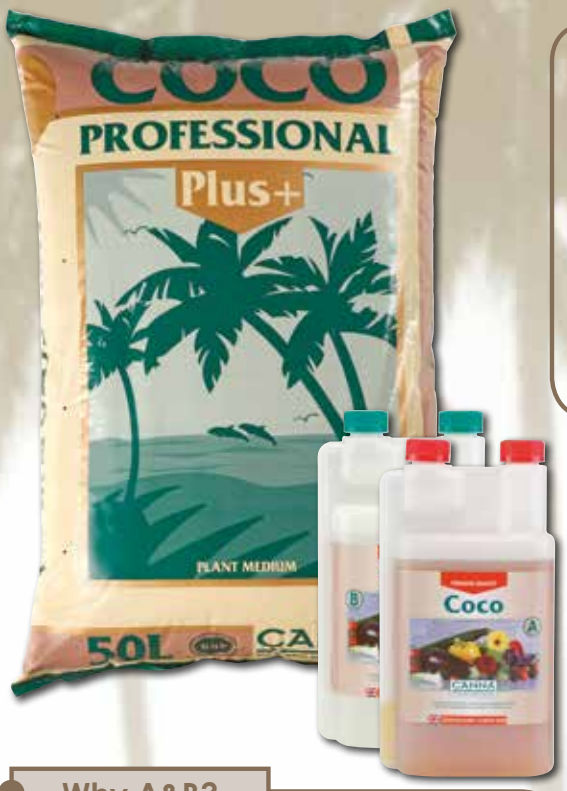
In case the crop is damaged by hard water PK13/14 and CANNA COCO nutrients can be used together. However, in case the tap water is very hard, this combination can cause problems. Very hard water contains high amounts of calcium and the amount of acid necessary to set the pH is relatively high. This is due to a high bicarbonate level in the water. When PK 13/14 is used under such circumstances the risk of precipitation in the water tank increases, and this can cause blocked drippers. If you use very hard water for irrigation it is recommended to use pH–grow (nitric acid) instead of pH–bloom (Phosphoric acid) to set the pH.



Once you get to know it...

Martin and Gerhardt are two Swiss growers who have been growing since the early nineties. Since they grow in CANNA COCO products, they never want another medium to enter their greenhouse. Two years ago, when they switched from COCO to COGr they easily produced six harvests a year with one hand tied behind their backs.

On top of this, many professional growers tip their hats when they see and taste the harvested results of Martin and Gerhardt. "Personally I think the main advantage of COGr is the possibility to manage three harvests in a row, smoothly. In the past we used potting mix, it has almost ruined my back!" COGr boards are light as a feather and stiff, which makes them easy for transport. "It only takes an hour to harvest and plant 250 new plants. Gerhardt cuts out the old plants; I follow him and put new cuttings in the empty holes. No need for carrying new slabs or heavy bags of potting mix. There is no easier way." Apart from the user-friendliness and cost savings this medium produces a superior, mouth-watering quality. Thanks to the lightness of coco the root development is extremely fast. It is striking that plants grown on COGr are better resistant to high temperatures. "Last summer temperatures were as high as 38˚C for many weeks. Still we harvested a perfect crop."



Why does COCO need special nutrients?

Because CANNA COCO is 100% organic it has a relatively high Cation-Exchange Capacity (CEC). This means the substrate has the ability to hold and retain certain nutrients vigorously thus requiring these nutrients to be supplied in a special form that remains available to the plant. Due to the special coco characteristics in combination with the unique pre-buffering process, it is possible to combine vegetative and flowering nutrients in one nutrient mix. The medium and the plant itself control which nutrients are released to the plant at just the right times. This means the grower doesn't have to worry about the proper point to convert from grow to bloom nutrients!

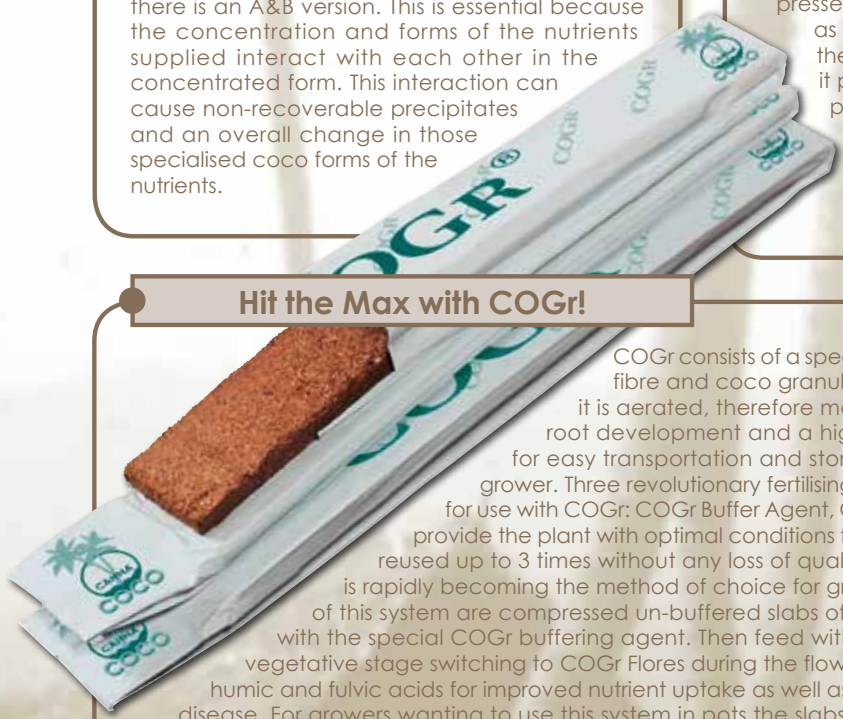
CANNA Coco Plus vs. COGr

Let's start by telling you that CANNA Coco Plus is far easier to use and is also available in 50 litre bags, this makes it possible to grow in pots. A second advantage of CANNA Coco Plus lies in the fact that it's pre-buffered for you. Thirdly we developed a feed that is universal for the growth stage as well as the flowering stage. In other words: Easy to use, is the key word regarding COCO.

COGr on the other hand is only available in slab form. Perfectly fitting the trays used in the industry. They are not pre-buffered so don't contain the moist needed for successful buffering. Instead they are pressed, making it easy to setup your grow space as they are light to carry. Earlier we mentioned the complete line of fertilisers for COGr, making it possible for the grower to precisely feed the plants. This makes COGr not as easy to use as CANNA COCO, but if used correctly it will bear its fruits in final yields. In other words: CANNA COGr is especially designed for experts!

Why A&B?

CANNA COCO is a two-part nutrient; hence there is an A&B version. This is essential because the concentration and forms of the nutrients supplied interact with each other in the concentrated form. This interaction can cause non-recoverable precipitates and an overall change in those specialised coco forms of the nutrients.



Hit the Max with COGr!

COGr consists of a specially formulated mixture of coco husks, coco fibre and coco granulate. This medium offers the advantage that it is aerated, therefore making it easier to control. This results in faster root development and a higher yield! COGr is compressed and dried, for easy transportation and storage. This makes it ideal for the demanding grower. Three revolutionary fertilising products have been developed especially for use with COGr: COGr Buffer Agent, COGr Vega and COGr Flores. These products provide the plant with optimal conditions for rooting, growth and bloom. COGr can be reused up to 3 times without any loss of quality. The COGr range is a proven system that is rapidly becoming the method of choice for growing in coco slabs in Holland. At the heart of this system are compressed un-buffered slabs of coco that require you, the grower, to soak with the special COGr buffering agent. Then feed with a dedicated COGr Vega feed during the vegetative stage switching to COGr Flores during the flowering period. These nutrients contain added humic and fulvic acids for improved nutrient uptake as well as silicon for increased resistance to pests and disease. For growers wanting to use this system in pots the slabs are simply buffered in the normal way and then the contents are emptied into pots. Each slab makes between 21 - 25 litres of coco when decompressed. A 1 Litre pack of COGr Buffering Agent dilutes to 500 Litres, one application per crop. A 2 Litre pack of CANNA COGr nutrients (1 Litre A, 1 Litre B) makes up 250 Litres of full strength nutrient. This is a universal formulation for hard and soft water.

Cultivation Tips

WATERING
It is not necessary to water with CANNA COCO in advance of planting. It is recommended to drip the coco with nutrient solution (2 ml Coco A and 2 ml Coco B /litre; pH 5.2-6.2) until drain appears. The coco now contains enough nutrients and water for a couple of days. Furthermore the right temperature (20-25 °C) and high air humidity will guarantee an optimal start.

LARGE PLANTS
Do not place too many plants per square meter; plants will generally become larger on CANNA COCO and will need more space than on e.g. rockwool or potting soil.

MIXING NUTRIENTS
Measuring the nutrient reservoir works as follows: Take EC as the starting point, measure it and determine whether it should be higher or lower, based on the values shown in the instructions. Only then should you adjust the pH using pH- or pH+, if necessary. Try to get the nutrient solution's pH value correct at the first attempt. Using too much pH + and pH - with each other disturbs the bicarbonate concentration and the water's buffering capacity. Also, the mutual balance between the different nutrient elements will be influenced and deficiencies could arise. Adding too much pH - or pH + can be prevented by first diluting the pH - with water before adding it to the solution.

KEEP YOUR NUTRIENTS DARK
Light breaks down iron chelates! Because of this, it is very important to ensure that no Ultra Violet light falls on the nutrient solution. Light also causes algae to grow in the nutrient solution, which can lead to blockages. Furthermore, algae can take up nutrient elements and cause nutrient deficiencies to occur.

COGR
When cultivating in plant trays with a sealable drainage system, it is easier to begin by making the drainage incisions, then turning over the COGr and filling the plant container with the buffering solution.

Growguide

CANNA COCO

		Cultivation period in weeks	Light / Day in hours	COCO ml/ 10 litres	RHIZOTONIC ml/ 10 litres	CANNAZYM ml/ 10 litres	CANNABOOST ml/ 10 litres	PK 13/14 ml/ 10 litres	EC + in mS/cm	EC Total in mS/cm
	VEGETATIVE PHASE									
GROWTH	**Start / rooting (3 - 5 days)** Make the substrate wet	<1	18	15-25	40	-	-	-	0.7-1.1	1.1-1.5
GROWTH	**Vegetative phase I** Plants develop in volume	0-3[1]	18	20-30	20	25	-	-	0.9-1.3	1.3-1.7
FLOWERING	**Vegetative phase II** - Up to growth stagnation after fructification or appearance of the formation of flowers	2-4[2]	12	25-35	20	25	20[5]	-	1.1-1.5	1.5-1.9
	GENERATIVE PHASE									
FLOWERING	**Generative Period I** - Flowers or fruits develop in length. Growth in height achieved	2-3	12	30-40	5	25	20-40	-	1.4-1.8	1.8-2.2
FLOWERING	**Generative period II** - Development of the volume (breadth) of flowers or fruit	1	12	30-40	5	25	20-40	15	1.6-2.0	2.0-2.4
FLOWERING	**Generative Period III** - Development of the mass (weight) of flowers or fruit	2-3	12	20-30	5	25	20-40	-	1.0-1.4	1.4-1.8
FLOWERING	**Generative Period IV** - Flowers or fruit ripening process	1-2	10-12[3]	-	-	25-50[4]	20-40	-	0.0	0.4

1. This period varies depending on the species and number of plants per m2. Mother plants remain in this phase until the end (6 – 12 months).
2. The changeover from 18 to 12 hours varies depending on the variety. The rule of thumb is to change after 2 weeks.
3. Reduce hours of light if ripening goes too fast. Watch out for increasing Relative Humidity
4. Double CANNAZYM dosage to 50 ml/10 litres, if substrate is reused.
5. 20 ml/ 10 litres standard. Increase to a maximum of 40 ml/10 litres for extra flowering power.

EC: EC+ value is based in mS/cm when EC water = 0.0 at 25ºC, pH 6.0. Add the EC of the tap water that is used to the recommended EC! The EC total in the example is with tap water with an EC of 0.4.
pH: Recommended pH is between 5.5 and 6.2
Adding pH- can increase EC.
Use pH- grow in the vegetative as in the generative phase to lower the pH.

The guidelines in the table aren't an iron law, but can help novice growers to develop a sophisticated fertilisation strategy. The optimum fertilisation strategy is further determined by factors such as: temperature, humidity, plant species, root volume, moisture percentage in substrate, water dosage strategy, etc.

Make your personal feeding growschedule at www.canna.com

CANNA, a source of information
If this leaflet has been of use to you, you may also find the other sources of information interesting: CANNA General Brochure and the CANNA product leaflets for CANNA COCO, CANNA RHIZOTONIC, CANNAZYM, CANNA PK 13/14 and CANNABOOST. Also available online.