



Physical properties of coir products in the spotlight

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RHP - activities

- ✓ Research
 - ✓ Optimizing substrates and substrate raw materials
- ✓ Consultancy and training
 - ✓ Communication of the new knowledge
- ✓ Independed international Quality mark
 - ✓ Inspection of quality and based on new knowledge

RHP Quality mark

- Experts, users and producers develop standards
 - Standards are focused on safety and quality
 - Independent and **accredited** quality mark
-
- 10 million m³ RHP certified products
 - 422 certified production locations worldwide
 - 71 RHP participants

RHP - overview

CERTIFIED LOCATIONS

422

all over the world

CERTIFIED COMPANIES

71

60% International



CERTIFIED PRODUCT

10.0

STAN



PRODUCT ANALYSES

11 500

RHP certified substrates guarantee safety and quality regarding chemical, physical and phytosanitary aspects



1-4x

per year also unannounced



Is coir a risk free product?

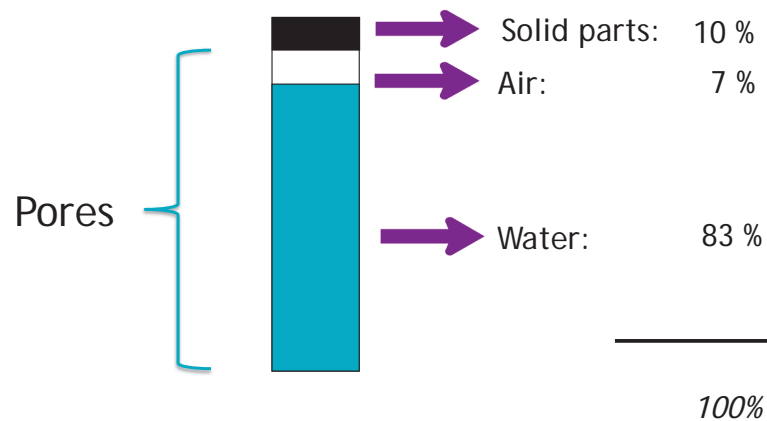
- ✓ Imbalance of K / Na / Ca / Mg (and several trace elements)
- ✓ Poor chemical quality (high EC: due to Cl and Na)
- ✓ Poor physical quality e.g. structure stability
- ✓ Poor phytosanitary quality e.g. plant diseases/weeds
- ✓ Risks of
 - ✓ Residues of pesticides / human pathogens/ saprotrophic fungi
- ✓ Pollutions



Basic physical properties water and air

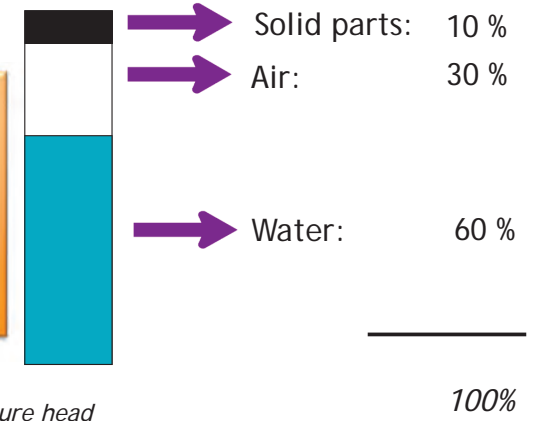


Physical aspects - low air substrate



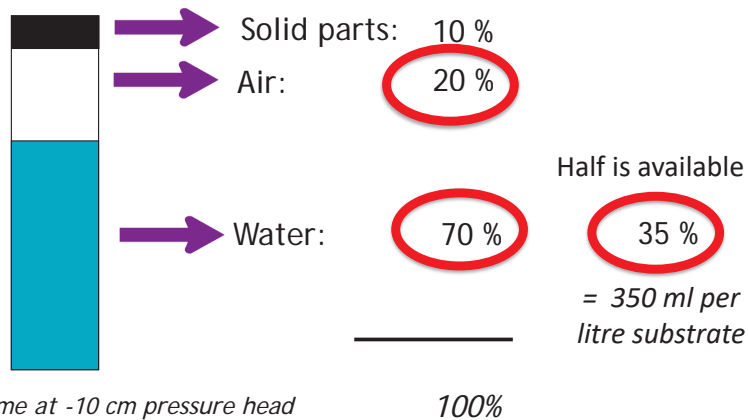
Physical aspects - high air substrate

The diameter or the pores determine how much water is retained; bigger pores release water earlier





Physical aspects - coir



* average based on volume at -10 cm pressure head

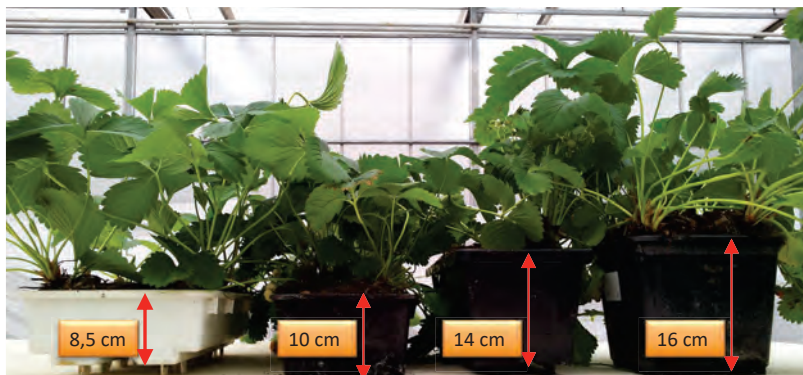


Basic physical properties

- ✓ Pores contain (just) water and air, so
water + air = pore volume
- ✓ Small pores hold water longer than bigger pores
- ✓ The finer the substrate, the more water is held and that results in less air



Height of the cultivation layer



15% air 17% air 23% air 27% air

Average air content under wet circumstances



Height of the cultivation layer

- ✓ If a container is higher, the upper pores can not hold water, so more air is available
- ✓ Irrigation is easier when the container is higher
- ✓ A lower cultivation layer asks for a more precise irrigation

Measurements with water content sensors

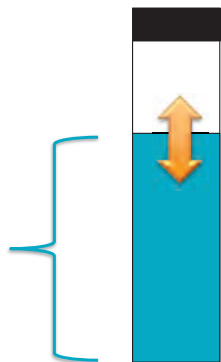
The use of water content sensors



a wide range of sensors

Physical aspects - coir

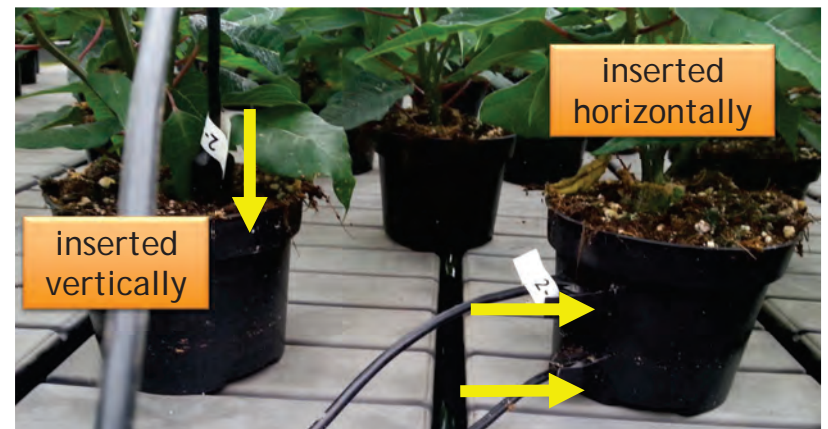
Measured by water content sensors



irrigation

- water uptake by plant
- drainage
- evaporation substrate

The use of water content sensors



inserted vertically

inserted horizontally



Position of a sensor

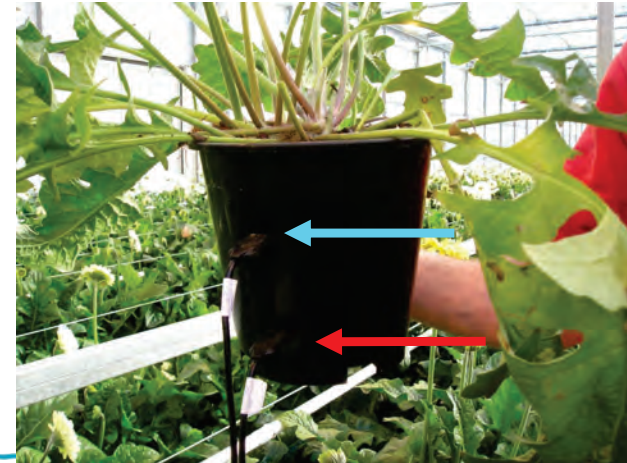
Vertical	Horizontal
Measurement of the average water content*	Measurement of water content* in a layer

* Water content as volume fraction

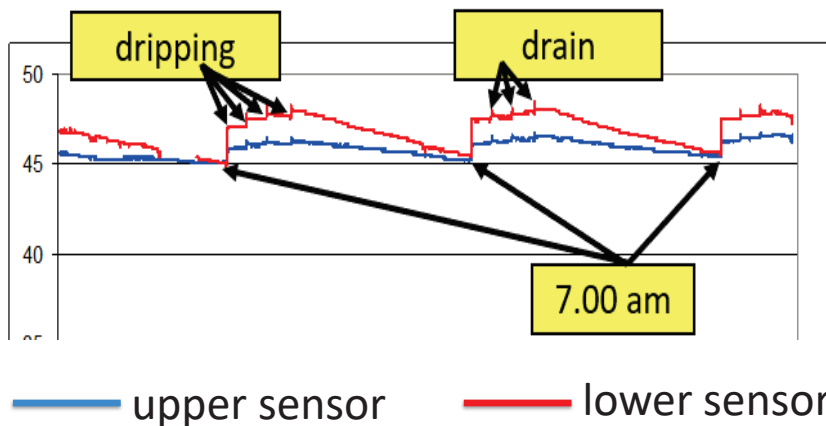
The water content is highly dependent on the height of the pot. The water content can vary greatly from top to bottom.



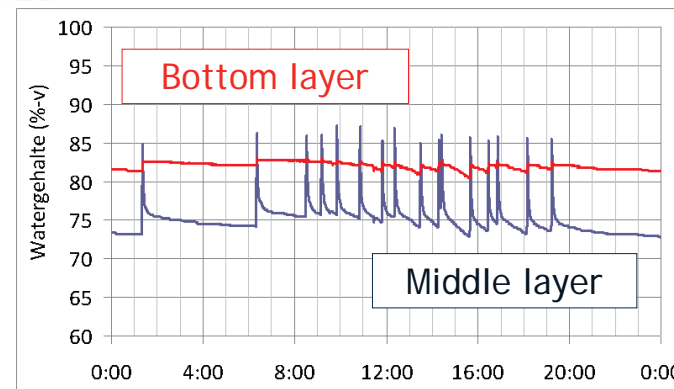
Position of the sensor



Position of the sensor



Position of the sensor



Water content measurement for strawberry in container

Container; height 16 cm; fine substrate



Sensors in strawberry cultivation

- ✓ Strawberry is in balance with a rather wet root environment and will be able to develop optimally on it.
- ✓ If the water content fluctuates too much, the plant will get into trouble (e.g. Phytophthora).

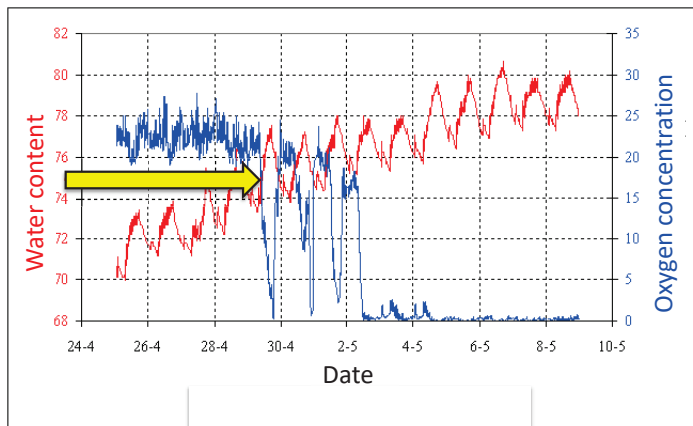


Position of the sensor

- ✓ Inserted horizontally gives better information
- ✓ Especially with regard to the substrate layer which often remains too wet after a watering
- ✓ If measured horizontally, measure at least 2 layers
- ✓ In order to have an optimal water content and optimal oxygen supply, measurement in the critical layers is necessary



Water content is in relation with oxygen



*Pore volume = 90%,
turning point for
oxygen access at 75%
water = 15% air for
this substrate*



Turning point oxygen access

- ✓ Turning point depends on pore size distribution
- ✓ Fine mixtures have a relatively low turning point
- ✓ Mixtures with less fine has a higher turning point

*In general, a water content should not be
above 70% for too long!*



Summary about the use of sensors

- ✓ Water content sensors can be used in coir substrate with success
- ✓ placing them in separate layers gives much more information
- ✓ It gave good insight in irrigation and water uptake. It can improve the irrigation strategy
- ✓ There is a good relation with oxygen



Of course, a grower must
always keep thinking!!
A sensor is a tool,
not a manager



Basic physical properties

structure stability



Poor physical quality - Stability

- ✓ When coir is too young it is physically instable.
- ✓ There is a risk of decomposition during use as a substrate. This reduces the air content and causes problems around the roots
- ✓ A method (respiration) is developed to measure the physical stability for coir. Coir is aged to meet the concerned RHP standard



Poor physical quality - Stability



Physically unstable coir with Phytophthora as a consequence



Poor physical quality - Stability



Poor physical stability of coir pith. Air capacity drops and root diseases as a consequence



Poor physical quality - Stability

RHP research shows a relation between storage (ageing) and physical stability



To know coir is stable, RHP checks the quality with the RHP respiration method



Thank you for your attention !!