



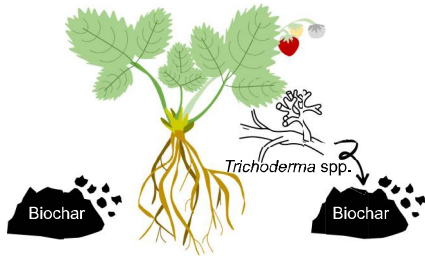
Peat replacement for strawberry substrates 100% peat-free for victory?

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INTRODUCTION

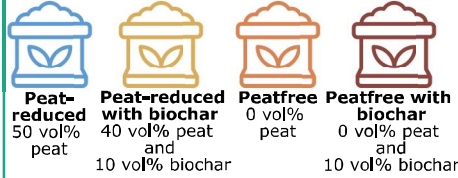
Horticultural growing media for strawberry cultivation mainly consist of peat, which is unsustainable. In this research, we aim to find **sustainable growing media** and reduce the use of chemical crop protection products by creating growing media blends with **biochar** and **Trichoderma-product**.



Biochar can be used as **bulk replacement for peat**, but can also play a positive role in **disease suppression** when added at low concentrations to growing media. Biochar can **directly** support disease suppression or **indirectly** as a carrier for biocontrol agents (BCA).

GROWING MEDIA BLENDS

Four basic growing media blends created:



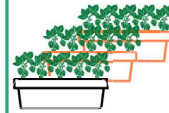
Additional treatments added for direct or indirect disease reduction



- Biochars low concentration**
- Wood-based 1
 - Wood-based 2
 - Manure-based
- Commercial Trichoderma product with or without straw-like biochar carrier**
- *Trichoderma* with straw-like biochar
 - *Trichoderma* inoculated on straw-like biochar

Resulting in 28 unique growing media blends

STRAWBERRY TRIAL

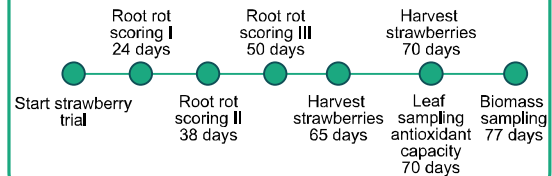


For each of the 28 growing media blends: Four replicates containing three trays with five strawberry plants: 2 infected trays with *Phytophthora cactorum* 1 uninfected tray

Measurements:

- Root rot caused by *P. cactorum*
- Strawberry yield (number of strawberries and weight per plant)
- Fresh biomass of the strawberry plant
- Antioxidant capacity in leaves and strawberries

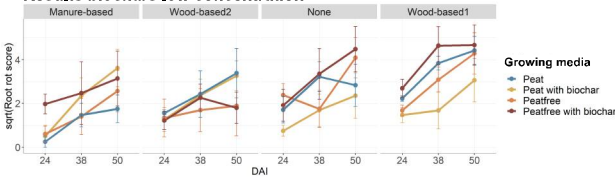
Strawberry trial 2021 @PCFRUIT



ROOT ROT P. CACTORUM

Root rot caused by *P. cactorum* was evaluated 24, 38 and 50 days after infection (DAI).

Results biochars low concentration



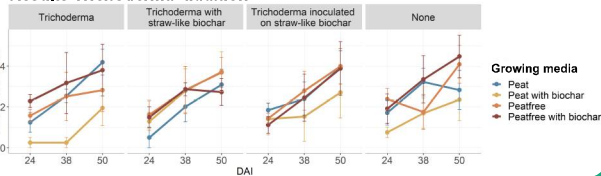
Results biochars low concentration

- Bulk biochar addition (10 vol%) causes decrease in root rot in Peat-reduced, but increase in root rot in Peatfree
- Manure- and Wood-based2 biochar had lower root rot score compared to Wood-based 1 ($P < 0,05$)
- **Root rot development:**
 - Delayed in manure-based by 1.5 week
 - Delayed in wood-based2 for 1 week
 - Accelerated in wood-based1 by 2 weeks

Results Trichoderma:

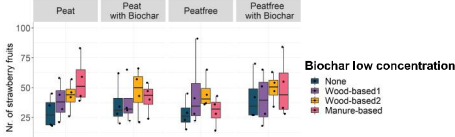
- Significant interaction between the *Trichoderma* application and growing media used,
- Growing media without *Trichoderma* had the highest root rot score.
- *Trichoderma* without the use of the straw-like biochar carrier had the lowest root rot score in peat with biochar.

Results Trichoderma addition

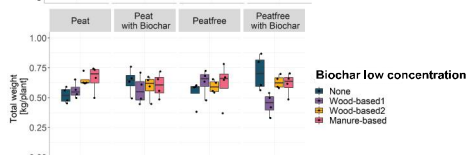
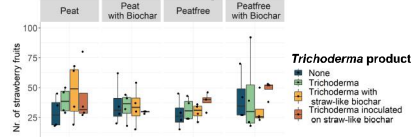


STRAWBERRY YIELD

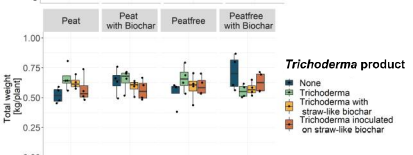
Results biochars low concentration



Results Trichoderma product



Number of strawberries were higher in manure and wood-based2 compared to the control ($P < 0,05$). Total weight of the strawberries was lowest in the wood-based1 compared to the control, but only in the peatfree with biochar blend.



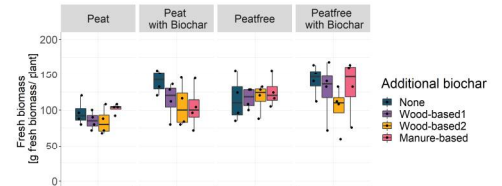
No significant effects for the number of strawberries. A trend was observed for a higher strawberry weight in the *Trichoderma* product without additional biochar carrier.

TAKE HOME MESSAGE

- Peatfree growing media blends similar results as peat-reduced
- Bulk replacement of peat with biochar has contrasting results on root rot and increases antioxidant capacity
- Low concentrations of manure and woody2-based biochar can delay root rot development
- *Trichoderma* application directly mixed in the growing media blends decreases root rot and increases weight strawberries

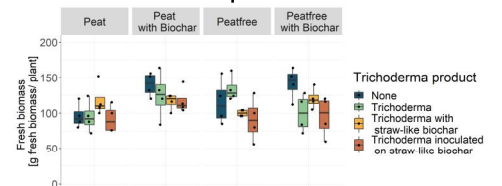
FRESH VEGETATIVE BIOMASS

Results biochars low concentration



- No significant effect of the biochars added in low concentrations.
- Peat-reduced had a general lower fresh vegetative biomass

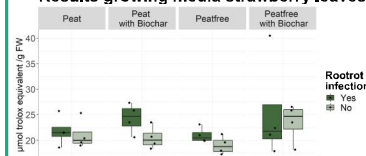
Results Trichoderma product



- Fresh biomass was lower in the *Trichoderma* inoculated on straw-like biochar
- Peat-reduced had a general lower fresh vegetative biomass

ANTIOXIDANT CAPACITY

Only measured in the four main growing media blends. Results growing media strawberry leaves



- Bulk replacement of biochar (10 vol%) causes increase in antioxidant capacity in both strawberries and leaves.
- Infection increases antioxidant capacity in strawberries.

Results growing media strawberries

