

Summary of the Horti-BlueC full scale greenhouse trials for tomato and strawberry

This project has received funding from the Interreg 2 Seas Programme 2014-2020 co-funded by the European Regional Development fund under subsidy contract No 2S03-046 Horti-BlueC



Innovative growing media blends

Peat-reduced organic growing media for strawberry



Peat-free, 100% organic growing media for tomato



Peat-reduced blends for strawberry

Test whether the blends developed by the Horti-blueC project could offer comparable if not greater performance than current industry standards in **full scale trials**



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Tested blends:

- Horti-BlueC **peat-reduced** blend with wood fiber, coir and compost
- Horti-BlueC **peat-reduced** blend + **2 g/L chitin** amendment
- Horti-BlueC **peat-reduced** blend + **3 vol% biochar** as bulk replacement



Reference:

- Control blend: conventional **peat/coco**/perlite mix

Performance blend characterized by parameters e.g.

- Yield
- Fruit quality (grading)
- Post harvest characteristics (brix, firmness, shelf-life)
- Plant resilience against pests and diseases



Peat-reduced blends for strawberry



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| Reference 'control blend' (peat/coco/perlite) | Year - location | Yield | Fruit quality | Post harvest charact. |
|---|--|-------|------------------|-----------------------|
| Horti-BlueC peat-reduced blend with wood fiber, coir and compost | 2020-2021 Trial 2 Research Center Hoogstraten | = | = | = |
| Horti-BlueC peat-reduced blend + 2 g/L chitin | | = | = | = |
| Horti-BlueC peat-reduced blend + 2.84 vol% biochar | | = | = | = |



Peat-reduced blends for strawberry

Qualify the benefit of substrate **amendment** with either biochar or chitin or **bulk replacement** with biochar in comparison with an unamended peat reduced substrate control in **full scale trials**

Tested blends:

- Horti-BlueC **peat-reduced** blend + **amendment 2 g/L chitin**
- Horti-BlueC **peat-reduced** blend + **amendment 2 g/L biochar**
- Horti-BlueC **peat-reduced** blend + **bulk replacement biochar**

Reference:

- Horti-BlueC **peat-reduced** blend with wood fiber, coir and compost

Performance blend characterized by parameters e.g.

- Yield (kg, fruit number)
- Fruit quality (grading, fruit sugars)
- Post harvest characteristics (brix, firmness, shelf-life, fruit rot, bruising sensitivity)
- Plant resilience to pests and diseases



Peat-reduced blends for strawberry

| Reference Horti-BlueC peat reduced | Year - location | Yield | Fruit quality | Plant resilience |
|--|---|-------|---------------|------------------|
| Horti-BlueC peat-reduced blend + 2 g/L chitin | 2019 trial 1 Research Center Hoogstraten | = | = | = |
| Horti-BlueC peat-reduced blend + 2 g/L biochar | | = | = | = |

| Reference Horti-BlueC peat reduced | Year - location | Post harvest charact. |
|--|--|-----------------------|
| Horti-BlueC peat-reduced blend + 2 g/L chitin | 2019-2020 trial 2 Research Center Hoogstraten | = |
| Horti-BlueC peat-reduced blend + 2 g/L biochar | | = |
| Horti-BlueC peat-reduced blend + 10 vol% biochar | | = |

| Reference Horti-BlueC peat reduced | Year - location | Yield | Fruit quality | Plant resilience |
|--|---|-------|---------------|------------------|
| Horti-BlueC peat-reduced blend + 2 g/L chitin | 2020 trial 1 Research Center Hoogstraten | = | = | = |
| Horti-BlueC peat-reduced blend + 2 g/L biochar | | = | = | = |

| Reference Horti-BlueC peat reduced | Year - location | Yield | Fruit quality | Post harvest charact. |
|--|--|-------|---------------|-----------------------|
| Horti-BlueC peat-reduced blend + 2 g/L chitin | 2020-2021 trial 2 Research Center Hoogstraten | = | = | = |
| Horti-BlueC peat-reduced blend + 2.84 vol% biochar | | = | = | = |



Peat-reduced blends for strawberry

| Reference Horti-BlueC peat reduced | Year - location | Nutrient input | Marketable yield | Fruit number | Total fruit sugar cnt |
|--|------------------------------------|---------------------|---------------------|--------------|--------------------------|
| Horti-BlueC peat-reduced blend + 2 g/L chitin | 2020 - conventional grower 1 | Full strength | - | = | = |
| | | Reduced strength | = | = | = |
| Horti-BlueC peat-reduced blend + 2 g/L biochar | | Full strength | - | = | = |
| | | Reduced strength | + | + | = |



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General observations

Greenhouse trials for strawberry

- The sustainable new growing media blends perform well in the greenhouse (for optimisation some technical and management adaptations may be required)
- Biochar can be used for bulk replacement, without great implications
- Fertigation/watering schemes don't need to be adapted
- When nutrient inputs are reduced, biochar and chitin may improve the nutrient balance, helping to mitigate the impact of reduced inputs.

100% organic blends for tomato

Tested blends in **full scale trials**:

- Horti-BlueC 100% organic blend with wood fiber, coir and compost (peat-free!)
- Horti-BlueC 100% organic blend + **chitin (2 g/l)** amendment
- Horti-BlueC 100% organic blend + **biochar (2 g/l)** amendment
- Horti-BlueC 100% organic blend + **biochar (4 g/l)** amendment
- Horti-BlueC 100% organic blend + **chitin (2 g/l) + biochar (2 g/l)** amendment
- Horti-BlueC 100% organic blend + **bulk replacement with biochar (10 vol%)**

Reference:

- Conventional **Peat/coir**
- Conventional **Rockwool**

Performance blend characterized by parameters e.g.

- Yield (kg, fruit number)
- Fruit quality (sorting, fruit weight)
- Plant parameters (plant length, stem thickness, truss height/setting, leaf length)
- Post harvest characteristics (brix, firmness)
- Resilience to pests and diseases



100% organic blends for tomato

| Reference Peat/coco growbag | Year-location | Yield | Fruit quality | Vegetative responses | Plant resilience |
|--------------------------------------|---|-------|------------------|----------------------|------------------|
| Horti-BlueC peat-free blend | Short 2019 Research Center Hoogstraten | - | = | = | = |
| Peat-free blend + 2 g/L chitin | | = | = | = | = |
| Peat-free blend + 2 g/L biochar | | = | = | = | = |
| Peat-free blend + 10 vol% biochar | | = | = | = | = |
| Reference Rockwool | Year-location | Yield | Fruit quality | Vegetative responses | Plant resilience |
| Horti-BlueC peat-free blend | Short 2019 Research Center Hoogstraten | - | = | = | = |
| Peat-free blend + 2 g/L chitin | | = | = | = | = |
| Peat-free blend + 2 g/L biochar | | = | = | = | = |
| Peat-free blend + 10 vol% biochar | | = | = | = | = |



100% organic blends for tomato

| Reference Peat/coco growbag | Year-location | Yield | Fruit quality | Vegetative responses | Post harvest charact. | Plant resilience |
|------------------------------------|--|---------------------|---------------|-------------------------|--------------------------|------------------|
| Horti-BlueC Peat-free blend | 2019-2020 Research Center Hoogstraten | - (fruit number) | = | = | - (firmness) | = |
| Peat-free blend + 2 g/L chitin | | = | - | = | - (firmness) | = |
| Peat-free blend + 2 g/L biochar | | = | = | = | - (firmness) | = |
| Peat-free blend + chitin + biochar | | = | = | = | - (firmness) | = |
| Peat-free blend + 4 g/L biochar | | = | = | = | - (firmness) | = |

| Reference Rockwool | Year-location | Yield | Fruit quality | Vegetative responses | Post harvest charact. | Plant resilience |
|------------------------------------|--|---------------------|---------------|-------------------------|--------------------------|------------------|
| Horti-BlueC Peat-free blend | 2019-2020 Research Center Hoogstraten | - (fruit number) | = | = | - (firmness) | = |
| Peat-free blend + 2 g/L chitin | | = | - | = | - (firmness) | = |
| Peat-free blend + 2 g/L biochar | | = | = | = | - (firmness) | = |
| Peat-free blend + chitin + biochar | | = | = | = | - (firmness) | = |
| Peat-free blend + 4 g/L biochar | | = | = | = | - (firmness) | = |



100% organic blends for tomato



| Reference Rockwool | Year-location | Yield | Vegetative responses | Post harvest charact. |
|--|---|-------|----------------------|-----------------------|
| Peat-free blend + 2 g/L chitin + 2g/L biochar | 2020-2021 Research Center Hoogstraten | = | = | = |
| Peat-free blend + 4 g/L biochar | | = | = | = |
| Peatfree + biochar 4g/L + 2 vol% Trichoderma preparete | | = | = | = |



100% organic blends for tomato

| Reference Commercial standard coir | Year - location | Yield |
|--|--------------------------------------|-------|
| Horti-BlueC peat-free blend + 2 g/L biochar | Season 2020 conventional grower A | = |

| Reference Commercial standard rockwool | Year - location | Yield |
|--|--------------------------------------|-------|
| Horti-BlueC peat-free blend + 2 g/L biochar | Season 2020 conventional grower B | - |



100% organic blends for tomato

| Reference Commercial standard coir | Year - location | Yield | Post harvest charact. | Root Mat Disease Development |
|--|--------------------------------------|-------|--------------------------|---------------------------------|
| Horti-BlueC peat-free blend + 2 g/L biochar | Season 2021 conventional grower A | + | = | - |



General observations

Greenhouse trials for tomato

- The sustainable new growing media blends perform well in the greenhouse (for optimisation some technical and management adaptations may be required)
- Biochar can be used for bulk replacement, without great implications
- The fertigation in the trials was adapted to conventional cultivation on rockwool (different treatments in one greenhouse)
 - Further research: blend-specific adaptation of fertigation scheme

Thank you!

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