

Questions and Answers for Horti-BlueC webinar 4

Q1 I would be interested in the general recommendations or lessons learned, in order to look beyond the studied crops and at the growing media in general. If the results are that promising, I would expect the sector to be (even more) proactive in substituting peat (and rock wool). In our experience so far there seems to be some reluctance in publicly setting ambitions or engagements. Sharing those promising results in a accessible way could help improving this.

A1 All results are available on the website:

- <https://ilvo.vlaanderen.be/uploads/documents/Horti-BlueC-Newsletter-3.pdf>
- <https://www.horti-bluec.eu/en/webinars>
- <https://www.horti-bluec.eu/en/decision-tool>

Q2 Is it realistic to utilize a 100 % of biochar growing media from a self-suppling pyrolysis plant on-site of greenhouses that simultaneously produced the required production heat?

Q3 Can the use of biochar as bulk material become economically feasible if present in sufficiently large volumes (price)?

A2 & A3

See results presented in Webinar1:

- <https://ilvo.vlaanderen.be/uploads/documents/Horti-BlueC-Webinar-1-TNO-Rian-Visser.pdf>
- <https://www.horti-bluec.eu/en/calendar/horti-bluec-webinar-1-large-scale-gasification-for-energy-and-biochar-production>

Q4 Which characteristics should an alternative fiber have?

A4 A “perfect” material for use in growing media should meet several criteria. To do a fast screening of fibers and other materials, we use a simple scoring system based on chemical or stability characteristics to assess the suitability of materials to replace peat, lime and fertilizers in growing media blends. Materials were scored based on 8 characteristics to assess their fit with the expected characteristics for use in growing media. Each characteristic was assigned a score of 2 (most suitable), 1 or 0 (least suitable). Summing these scores results in a maximum score of 16, the greatest suitability of a material for use in growing media blends. Three scores were based on the upper limits for organic matter and electrical conductivity or the pH range set for growing media by the Belgian federal government. For stability, the legal criterion for oxygen uptake rate in compost was used. The inorganic carbon content, the dry bulk density and the risk for N immobilisation were included as well. The last score is related to the fertilizer replacement value of the material and is based on Ammonium Acetate-extractable P. More info:

- <https://doi.org/10.1016/j.jenvman.2020.111444>
- Presentation “Optimisation of compost for use in growing media”:
<https://ilvo.vlaanderen.be/uploads/documents/Horti-BlueC-Webinar-3-Bart-Vandecasteele-ILVO-compost-optimisation.pdf>
- Information on microbial characteristics: see webinar 4

Q5 More information about the production and use of compost for GM would be interesting.

Q6 Will this research result in a list of recipes for compost preparations by growers?

A5 & A6

- **In this project we have tested these blends:**
 - For tomato, the 100% replacement of mineral wool by a peat-free and organic mixture with 40 vol% coconut fiber, 30 vol% wood fiber, 20 vol% bark and 10 vol% green compost
 - For strawberry, 40% of the peat and perlite fraction was replaced in the conventional mixture by 25% wood fiber and 15% green compost.
- **Growers or growing media producers can further optimize the blend. For the type of compost to be used, please consult this presentation:**
 - Presentation “Optimisation of compost for use in growing media”:
<https://ilvo.vlaanderen.be/uploads/documents/Horti-BlueC-Webinar-3-Bart-Vandecasteele-ILVO-compost-optimisation.pdf>
 - **Or check recording of webinar 3, starting from 24:44 (Horti-BlueC webinar 3: Spent growing media for direct reuse or as a feedstock for biochar and compost - Horti-BlueC)**

Q7 Looking beyond strawberry and tomato, to what extent can we extrapolate the results of this research to other crops? Generally, what are the lessons learned or what does this mean for the potential of reducing peat in growing media?

A7 **Tomato and strawberry were selected as test crops for the trials as they are very demanding for the growing medium due to the long growing season (up to 10 months for tomato and the continued culture of strawberry), the high nutrient need and intense rooting. On the other hand, other fertigation strategies or types of fertilizers may be used for ornamentals other crops than for strawberry/tomato, which may affect the prerequisites for the blend, or the degree in which cultivation practice (watering, fertilizer application, ...) needs to be fine-tuned for the new blends.**

Spent media from one cultivation/crop can also be reused for other crops. The results on reuse and recycling of spent media are thus relevant for ornamental (i.e., for pot plants) or other crops, but also for applying spent media as soil improvers for open field.

Q8 Might carbon credits associated with sequestration of biochar into growing mediums impact biochar economics in a positive way?

A8 Yes, the production cost of biochar urges to use this material in cascade, e.g., first as bulk replacement in growing media, and finally as source of stable C. This is the concept of using biochar in a cascade, with first valorization of biochar, e.g., as bulk material in growing media, and final use of the spent growing media with biochar in soil for C sequestration and the related financial compensations.

Q9 Did PCH ask the growers for their opinion about biochar as an additive or as a bulk replacement?

Q10 What are the practical uses of biochar and chitin in the immediate future, and are growers/farmers actually willing to adopt them?

A10 Yes, see presentation in Webinar 4:

- <https://ilvo.vlaanderen.be/uploads/documents/Horti-BlueC-Webinar-4-Maarten-Hofkens-PCH.pdf>
- <https://ilvo.vlaanderen.be/uploads/documents/Factsheet-building-blocks-for-sustainable-growing-media.pdf>

Q11 Regarding disease suppression: Has the disease suppressing effect of compost being studied in the project? And are there indications on what could enhance such an effect in terms of compost composition, compost maturity etc.?

A11 Disease suppression by different compost types was not the topic of this project, although green compost was one of the feedstocks for the new blends. Disease suppression capacity of biochar and chitin has been studied: <https://ilvo.vlaanderen.be/uploads/documents/Factsheet-building-blocks-for-sustainable-growing-media.pdf>

Q12 I am interested in the CO2 footprint of EACH substrate what is used. If not accurate calculated then a best estimate please, so we can compare this with much attention to pure coir and pure peatmoss. Our aim is to reduce our own footprint by several actions in both India and NL.

A12 See results presented in Webinar1: <https://ilvo.vlaanderen.be/uploads/documents/Horti-BlueC-Webinar-1-TNO-Rian-Visser.pdf>

The LCA on the use of biochar in growing media will be available in the beginning of 2022

There are also the guideline published by Growing Media Europe: <https://www.growing-media.eu/single-post/gme-publishes-lca-guideline-for-growing-media>

Q13 Grower testimonials?

A13 One of the growers involved in the commercial tomato trial in the UK plans to further use the Horti-BlueC blends in the next years

Q14 I would like to see more seminars, and looking forward for you info after having followed the last seminar. Thank you, maybe also links to interesting research works?

A14 Links to research papers and videos for each topic are provided in the slides of this presentation: <https://ilvo.vlaanderen.be/uploads/documents/more-info-on-building-blocks-for-sustainable-growing-media2.pdf>

The fact sheet of each webinar also provide the links to relevant documents and videos. The 4 webinars are on the website (including the recordings): <https://www.horti-bluec.eu/en/webinars>

Q15 More info on peat-free and sustainable gardening and growing for gardeners, nurseries, growers, and retailers.

Q16 Is the outcome of the project relevant for other crops, and for growing media (both professional and hobby market)?

A15 & A16

Tomato and strawberry were selected as test crops for the trials as they are very demanding for the growing medium due to the long growing season (up to 10 months for tomato and the continued culture of strawberry), the high nutrient need and intense rooting.

On the other hand, other fertigation strategies or types of fertilizers may be used for ornamentals other crops than for strawberry/tomato, which may affect the prerequisites for the blend, or the degree in which cultivation practice (watering, fertilizer application, ...) needs to be fine-tuned for the new blends.

Spent media from one cultivation/crop can also be reused for other crops. The results on reuse and recycling of spent media are thus relevant for ornamental (i.e., for pot plants) or other crops, but also for applying spent media as soil improvers for open field.

Q17 The measurement of consistency of quality for Biochar, what parameters should we measure?

A17 We suggest to look at the criteria as set by the European biochar certificate, see: <https://ilvo.vlaanderen.be/uploads/documents/Horti-BlueC-Webinar-1-TNO-Rian-Visser.pdf> slide 6-7-8

Q18 Link with hydroponics?

A18 Some hydroponic systems also use growing media to support the plant roots. Based on the results of the very intensive and demanding cultivation of strawberry and tomato, we think that the new blends can also be used in hydroponics.

Q19 Rockwool is very uniform and stable. Growers like that as it doesn't give them surprises. How to cope with heterogeneity of an organic substrate?

A19 The first step is to develop blends with equal performance as the conventional blends. This step has been finalized now within Horti-BlueC. The next step is to provide these blends at a commercial scale with a sufficient degree of standardization.

Q20 Are there any hazards relating to the use of biochar as a growing medium?

A20 Yes, the characteristics of the biochar should meet certain criteria. These biochar characteristics will determine the maximal vol% to be used in growing media blends. Biochars can be used as amendment (small amounts) or in higher amounts (bulk material), depending on the goal. See webinar 1: <https://www.horti-bluec.eu/en/calendar/horti-bluec-webinar-1-large-scale-gasification-for-energy-and-biochar-production>

Q21 Using the cost of standard peat compost as 1 what might be the multiple of cost for other replacement options?

A21 The first step is to develop blends with equal performance as the conventional blends. This step has been finalized now within Horti-BlueC. The next step is to provide these blends at a commercial scale, and to assess the price for these blends. An important aspect is the quantity and quality of peat and coir in the near future: it is expected that peat and coir will become more scarce and thus more expensive. All the more reason to look for alternatives.

- Q22 Did any-one consider vermicompost as an alternative growing media?
- A22 In Horti-BlueC only green composts were tested in the blends. Some types of compost can be used as bulk material in higher vol%, other types of composts can be used as an organic fertilizer in lower doses to avoid characteristics beyond the optimal range for pH, EC or nutrients.**
- Q23 What is the current % of peat sold by the substrate producers? And how much % can be replaced by the currently available alternatives?
- A23 Peat is still the most used material in growing media in EU. The results differ per region/country depending on availability and legislation. An overview was published in this paper: https://www.actahort.org/books/1168/1168_12.htm**
- Q24 Any experience with using biochar that has been co-composted with organic residuals? This may result in a microbial active biochar substrate.
- A24 Adding biochar into composting may have benefits for the composting process itself and for the compost produced. In Horti-BlueC biochar was directly added to the growing medium blend. When spent growing media with biochar are composted, this compost may have this benefit due to the presence of biochar.**