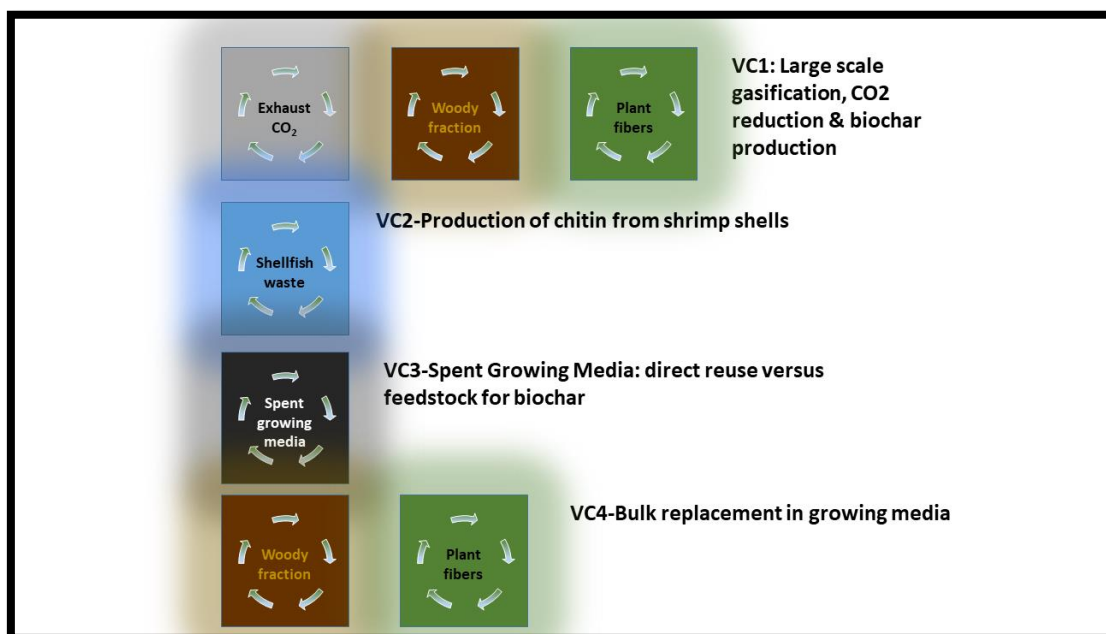


Horti-BlueC, WP4: Collaborative platform and Policy action plan

I. Intro WP4: Collaborative platform for 4 valorization chains, and Policy action plan

A. From WP3 to WP4

- new solutions provided by Horti-BlueC:
 - upcycling of waste streams
 - use in greenhouses, new greenhouse concept
 - improve current situation using new solutions
- WP3 = feasibility of these solutions: economic and technical vs. WP4 = collaboration between target groups and policy
- Focus of WP3/WP4: valorization chains (VC)
 - VC1-Large scale gasification (biochar & CO₂)
 - VC2-Production of chitin from shrimp shells (shell fish waste)
 - VC3-Spent Growing Media: direct reuse versus feedstock for biochar
 - VC4-Bulk replacement in growing media (green waste & fibers)



Link between the waste streams processed in WP1 and the 4 valorisation chains developed in in WP3 and WP4.

B. Focus of WP4

Action 4.1 of WP4 will start for the 4 VCs for the Collaborative platform, while for the policy action plan, Action 4.2 of WP4 will focus on Adoption of the 5 new solutions of Horti-BlueC:

1. Reuse of spent growing media:

- Direct reuse
- As a feedstock

2. New additives: biochar & chitins

3. New blends for strawberry/tomatoes

- T: peat-free blends
- S: Peat-reduced blends

4. New technology

5. New Greenhouse concept

Policy action plan

II. Workplan: development of an action plan in 4 steps

D4.2.1: 30/09/20, Draft set-up of the action plan

D4.2.2: 30/12/20, Draft action plan

D4.2.3: 31/05/21, Evaluation of action plan

D4.2.4: 31/05/21, action plan after project life

III. D4.2.3: 31/05/21, Evaluation of action plan

Three ways of making the evaluation:

- Draft action plan: update
- Consultations 2021
- Other actions or events

A. Draft action plan: update

The focus of this deliverable is on providing **an update** of the draft action preparation to be implemented in year 3 and 4 of the project. The specific actions in the draft plan are further defined. These are a.o. related to measuring the stability of materials to be used in growing media, the opportunities for fast screening of materials with NIRS, the end-of-life of renewable growing media versus growing media based on peat or coir, providing flowcharts and criteria for reuse and recycling of spent growing media, ... Based on these topics, 13 **specific actions** are planned, and these actions are executed and monitored in 2021 (i.e. during the 2 Consortium Meetings):

Action 1: Update SWOTs

- For all VCs: the SWOTs developed in WP3 are also a starting point for this action: we can further elaborate the W and T defined for each of the valorization chains, either on a regional or international level.

- Feedback on the SWOTs was asked during the 4 Horti-BlueC Webinars
- OVAM: efficiency of energy recuperation from residual material can be an important criterion to evaluate the process (e.g. pyrolysis)
- Definitions used by OVAM: residual waste stream = side stream (non-edible) + food loss (edible)

Action 2: Strategies for CO₂

- Follow-up of the evolution of different strategies for CO₂
 - Current scenario: flue gases from natural gas
 - Cato: capture CO₂, to be used as pure CO₂ source
 - ECN>TNO: Flue gases from biomass installations: remaining N-gases are removed by Dnox (conversion to N₂, legal obligation), with only ethylene as remaining potential issue (Dutch National project)
 - link with trial at PCHoogstraten

Action 3: New materials in growing media blends

- New materials in growing media blends: provide a summary of properties and legislation
 - Current trend: From more standardized towards more variable feedstocks for growing media blends
 - Overview: Summary Table "Building blocks for sustainable growing media"
 - Fact sheet with summary table of building blocks on website
 - Explain the difference between amendment, organic fertilizer, and bulk replacer
 - Chitin: check the legal status
 - Chitin can be used in growing media blends
 - Legislation in each region (e.g. FOD Belgium)
 - End-of-waste status of shellfish waste? Certificates needed? EU legislation is in its implementation phase

Action 4: Life Cycle Assessment (LCA)

- LCAs are important in policy-related decisions, and will be covered in D4.2.3 by these activities:
 - Provide a LCA on biochar production (ECN>TNO)
 - Give input for and feedback on the LCA of growing media blends (GMEurope):
 - Growing Media Europe (GME), the European association of producers of growing media and soil improvers, has developed a LCA (Life Cycle Assessment) methodology in accordance with the European Commission's PEFCR (Product Environmental Footprint Category Rules) with the purpose of defining sector wide rules for the calculation of the environmental impact of growing media mixes as well as important constituents throughout their whole life cycle.
 - Compare results with Strubias report on the use of biochar, including LCA (strubias_jrc117856_jrc117856_electronic.pdf, 476 pages)
 - Use the standardized LCA tool of (GMEurope) to calculate the LCA score of the growing media blends developed in Horti-BlueC => update on this process? Jeroen will contact Nele.
 - See presentations during the Policy workshop on 26/10/2021 at GrowingMedia2021
 - Is linked with the programme of VC4/webinar 4:
 - Fall 2021
 - Legislation on growing media; regional, national, EU

Action 5: Measuring the stability of materials in growing media

- A comparison of methods for measuring the stability of materials to be used in growing media has been made (ILVO)
 - measuring the stability of plant/wood fibres: regional, national (Belgium: FOD) and European methods:
 - Methods used for quality labels?
 - Criteria and interpretation
 - Scientific paper: Respiration rate for stability assessment of woody materials with high C:N ratio versus green composts: need for a clear differentiation in criteria
 - OUR is not the best stability method for (soft) plant fibers: reed straw, miscanthus straw, flax shives
 - Draft version of new CEN method => has not yet been released
 - Is linked with the programme of VC4/webinar 4
 - Manuscript in preparation

- Interaction between new growing media blends and organic fertilizers, and the value of the microbial biomass versus the the initial mineral N concentration as indicator of N release:
 - o For composts, the initial mineral N concentration is more indicative of N release than the microbial biomass, even when an organic fertilizer was added.
 - o In contrasts, for blends with or without composts the microbial biomass is more indicative of N release than the initial mineral N concentration. This was tested when an organic fertilizer was added.
 - o In collaboration with Observer Partner Vlaco
 - o Manuscript in preparation

Action 6: Horti-BlueC blends versus the legal criteria and certification

- Check composition of the blends versus the legal criteria and criteria imposed by quality labels (Agaris):
 - o EU fertilising product regulation: will only be implemented in 2022 as a framework
 - o National legislation: is an exemption for biochar and chitin needed?
 - o RHP quality label for feedstocks: certificate, label, check at batch level => blends did not always meet the criteria
 - Additional criteria for chitin or biochar for use in growing media?

Action 7: NIRS as a tool for fast screening of materials

- Current trend: From more standardized towards more variable feedstocks for growing media blends: more batches of materials to be screened
- Check if Near-infrared reflectance spectroscopy (NIRS) can be used for time- and cost-efficient assessment of chemical properties
- Dried and ground samples of different materials are scanned with NIRS to test opportunities for fast screening of materials
- See ISHS paper: Vandecasteele, B. and Van Waes, C. (2021). NIRS as a fast screening technique for total nutrients in strawberry leaves and in spent growing media. Acta Hortic. 1309, 963-970, DOI: <https://doi.org/10.17660/ActaHortic.2021.1309.137>
 - o Promising for nutrient concentrations in strawberry leaves
 - o Promising for composts and plant fibers for biochemical composition and nutrients
 - o Not applicable yet for spent growing media (biochemical composition and nutrients)

Action 8: System for scoring the suitability of composts, woody materials and biochars for peat, lime and fertilizer replacement

- Development and testing of a simple system for scoring the suitability of composts, woody materials and biochars for peat, lime and fertilizer replacement
- Materials are 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.
- The simple scoring system can be used for different purposes:
 - o to assess the suitability of materials to replace peat, lime and fertilizers in growing media blends (select the most promising materials)
 - o to measure the need and focus of further optimization of materials
 - o to quantify the net effect of additional treatment of materials (i.e., does a specific treatment result in a clear increase or decrease of the suitability score)
 - o to assess in what volume rates a material can be used in the blend (with higher volume rates for higher scores)
 - o to compare different treatment options of a material (e.g., the processing of spent growing media for reuse) and the potential for reuse
- See ISHS paper: Bart Vandecasteele, F. Amery, Liesbet Blindeman, R. Visser, 2021. Circular use of nutrients in soilless strawberry cultivation: spent growing media as key element. Acta Horticulturae, 1309, DOI: <https://doi.org/10.17660/ActaHortic.2021.1309.73>

Action 9: End-of-life of (new) growing media blends

- For the use of new blends with new materials, the End-of-life of these (new) growing media blends will be documented
 - o Focus: end-of-life op renewable growing media versus growing media based on peat or coir
 - o Spent media for the Horti-BlueC trials are collected and analyzed

- Chemical composition and stability of new growing media blends is compared with the reference blends (i.e., growing media based on peat, coir, mineral wool)
 - Results are reported in a scientific paper
- Relation with C storage in soil?
 - ECN>TNO: composition of the gaseous products (GC-MS),
 - ILVO: Measurements ongoing for spent growing media of different blends (also blends with biochar) of strawberry and tomato for C mineralization, C-stability and stability.

Action 10: Biochar and the microbiome of growing media

- Large interest in the microbiome of the growing medium (e.g. UK User Group during December 2020 Meeting)
 - is part of the Table planned in Action3 (Summary Table “Building blocks for sustainable growing media”)
 - Summarize available data:
 - Comparing peat versus new blends
 - Comparing blends with/without biochar
 - Effect of biochar on Microbial activity
 - Effect of biochar on Microbial biomass
- ISHS Paper on the different methods to assess microbiological properties available: Debode, J., Vandecasteele, B., Ommeslag, S. and de Tender, C. (2021). Identification of microbial life in sustainable and disease suppressive growing media: the role of beneficial microorganisms. Acta Hort. 1305, 115-124, <https://doi.org/10.17660/ActaHortic.2021.1305.17>
- Biochar: stable house = is not a food-source, but a place to life – “microrefusia”
- WUR: food source should be added to have survival

Action 11: Reuse of new growing media and risk for diseases/pests

- Reuse of spent growing media: summarize data on risk for diseases when SGM are only stored versus sanitized spent media
 - Based on the trial at NIAB (mildew trial ongoing): see deliverable report and ISHS paper

Action 12: Legislation and reuse of new growing media

- VC3: Assess the link between legislation and reuse of new growing media
 - Reuse within one farm: focus on informing growers
 - Local reuse => regional legislation
 - Belgium: criteria for a “generic” rather than a farm-specific feedstock declaration for spent growing media
 - Biochar: see VC1
 - ILVO is involved in an Operational Group on reuse of spent growing media: “Re-Peat: Reuse of growing media for a circular horticulture (01/01/2022 → 31/12/2023)”

Action 13: Stimulation of the use of new growing media

- VC4: Legislation and stimulation of the use of new growing media: assess the opportunities
 - Focus of the webinar of VC4 in fall 2021
 - Grower checklist for sustainable growing in Belgium: growing medium can be an important topic for this list: a meeting with the Department agriculture and fisheries of the Flemish Government is planned for 1/12/2021
 - GAP => IPM-list, not related to the “responsibly fresh” label