

Interreg 2 Seas Horti-BlueC:
Biochar, compost and value for reuse
(webinar 3)



Feedstock versus biochar

Poll:

In your opinion, what is the effect on **electrical conductivity** if you convert spent media into biochar?

Electrical conductivity:

1. Higher in biochar than in spent media
2. Lower in biochar than in spent media
3. No effect on EC



Feedstock versus biochar

Material	pH-H2O	EC	IC	OC	P	K	CEC
	-	μS/cm	% / DM		g / kg DM		cmolc / kg
Spent peat 1	6,3	599	0,06	46	0,8	3,0	112
Spent coir 1	4,2	431	0,01	46	1,7	3,7	84
Spent peat 2	5,7	912	0,08	43	0,8	3,2	109
Spent coir 2	5,7	882	0,08	45	1,1	2,5	101
Biochar, spent peat 1	8,7	718	0,08	78	2,4	8,3	18
Biochar, spent coir 1	9,7	556	0,08	85	3,5	13,1	37
Biochar, spent peat 2	9,6	747	0,72	71	2,1	9,7	14
Biochar, spent coir 2	9,3	479	0,53	68	2,6	7,3	20



Porosity, CEC, Interaction

CEC: cation exchange capacity (cmolc/kg DM)

- Peat: 130
- Spent media (coir, peat): 85-115
- Biochar based on spent media: 15-60
- Biochar based on woody biomass: 30-95

Porosity (volume%):

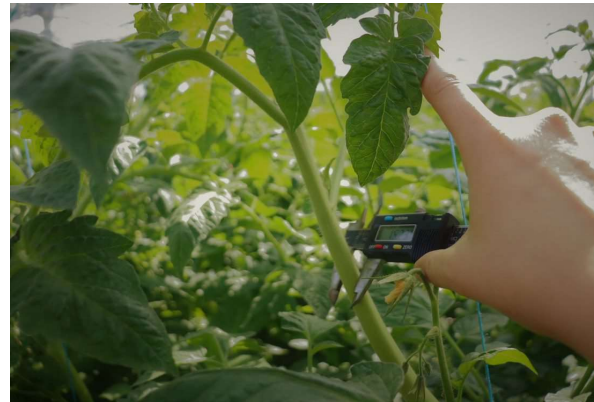
- Peat: 95
- Biochar: 94-97

Interaction with nutrients (fertigation):

- Peat: K retention
- Biochar: no retention, source of P, K, salts



Peat-free organic growing media for tomato



Peat-reduced organic growing media for strawberry





Biochar from spent peat

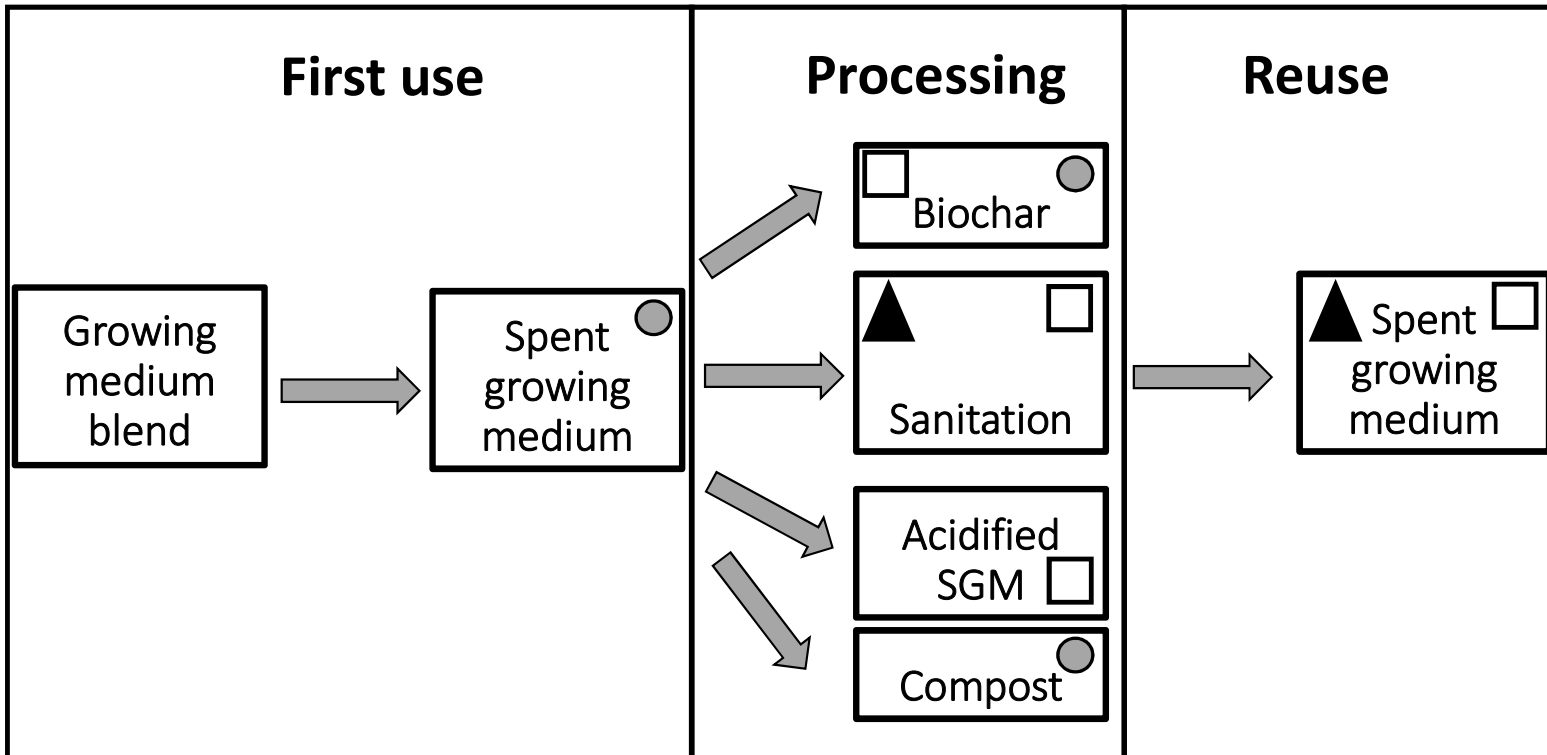
trial	scale	Fruit Number	Yield	Fruit Size	Fruit Total Sugars/Brix	Sorting	Fruit weight
PCH	commercial	=	=		=	=	=
ADAS1	commercial		=				
ADAS2	experimental	=	=	=	=		
ADAS3	experimental	+	+	+	=		



Biochar from spent coir

Trial	Scale trial	Fruit Number	Marketable Yield (kg)	Fruit Size	Fruit Total Sugars	Fruit dry matter
ADAS	commercial	+	+		=	
ADAS	experimental	+	+	=	=	=

- **Speat: alles bij 2g/L**
- PCH_2020_T1 4g/L
- ADAS_2020_T1: at grower
- ADAS_2020_T2: at grower
- ADAS_2020_T3, 4g/L
-
- **Scoir**
- ADAS_2020_S1
- ADAS_2020_Commercial
- NIAB_2020_S2
- ADAS_2020_S2



○ scoring for use in growing media

▲ effect of reuse on nutrient content

□ P use efficiency

Step 1. Scoring the suitability for growing media

LOW

1

Suitability score for use in growing media blends:
Peat, fertilizer and lime replacement value

HIGH

16

Score = pH + EC + OM + nutrients + IC + OUR + Nimmob + Bulk dens.



Score: 12-13



Score: 10-13

Nutrient
content:
x 2



Score: 9-12

Step 2 & 3. Nutrient availability for crops

Nutrients for crop uptake: Total content x availability

Total P and K content: biochar = compost > spent growing medium

K availability: high for biochar, compost and spent growing medium

P availability: high for spent growing medium > compost > biochar = spent growing medium reused twice

N release: compost > spent growing medium > biochar



Conclusions: circular use of nutrients?

Nutrients in spent growing media: relevant!

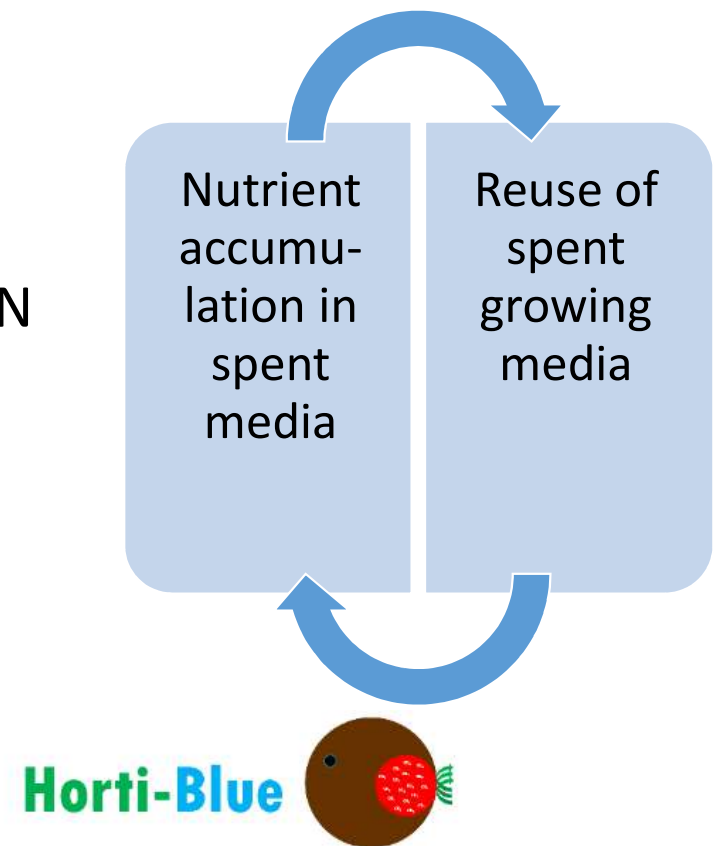
- High P and K availability

Circular use of nutrients = repeated use?

- Nutrient specific:
 - N mineralisation is always low: add mineral N
 - K sufficient for 1 extra cycle
 - P relevant for > 1 extra cycle

From spent growing medium to biochar:

- No effect on EC
- strong increase of pH, C, P, K
- decrease of CEC



Work-in-progress

Effect fertigation on nutrient levels in spent media? => ongoing
New blends => reuse, upcycling? => ongoing



Horti-BlueC webinar 3

Spent growing media: legislation



Nutrients versus carbon

Poll:

In your opinion, what is main aspect for spent media to be taken into account for direct reuse, or use as feedstock?

1. Spent media as a source of (stable) C
2. Spent media as a source of nutrients
3. Pathogens in spent media
4. All three aspects are equally important



Legislation

Case for Flanders/Belgium

Important aspects for reuse (regional)

End-of-waste vs. waste treatment

Location of cultivation vs. location of reuse

Transport/Processing into compost/biochar

Trade as a fertilizer (national/EU)

Royal Decree or specific exemption

EU: Criteria for CE mark on product:

Under construction



Reuse of spent organic growing media at the grower's site (Flanders, B)

Use on own parcels
(aim: added value for the soil)

Direct use as a soil improver



Environmental permit for installation

-  Bulking agent for composting
-  Feedstock for biochar production
-  Direct reuse after steaming

Reuse of spent organic growing media at other site (Flanders, B)

**Waste => End-of-waste certificate
for user**

Direct use as a soil
improver

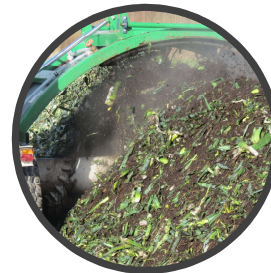


Direct reuse after
steaming



**Waste => Waste transport +
processing at certified facility**

Bulking agent for
composting



Feedstock for biochar
production



Thanks for your kind attention!



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