

Wood fibres as an alternative to peat in substrates

2023 04 25: OFF THE PEAT PATH Webinar. Fachagentur Nachwachsende Rohstoffe e.V. (FNR)

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Wood Fiber



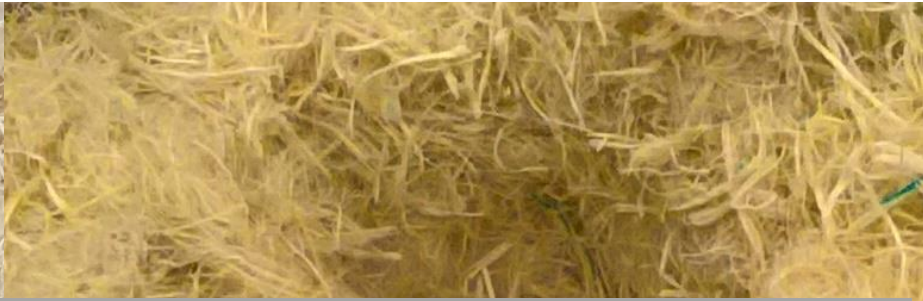
Dutch situation: covenant to reduce peat use

Overarching goal: decrease the environmental impact

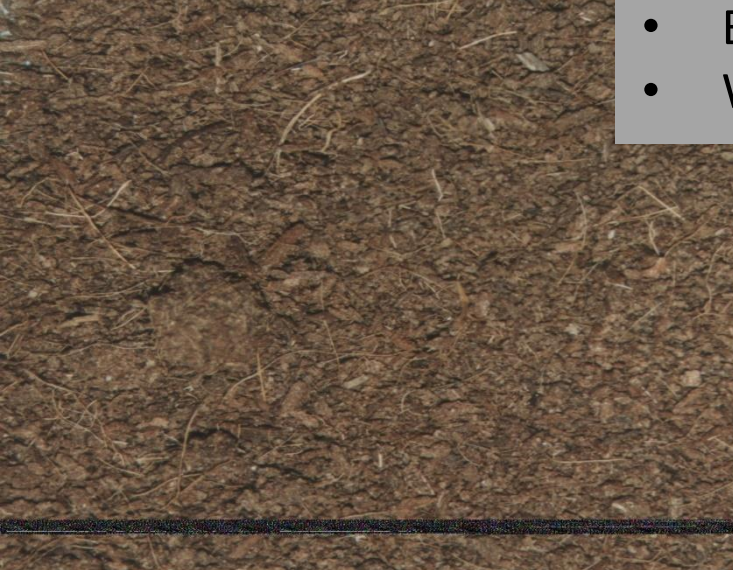
- 2023 Goals for 2030 (pending research)
- 2025 Professional market 35% renewable
- 2025 Consumer market 60% renewable
- 2025 100% het RPP-label and > 600.000 m³ compost.
- 2030 Further differentiation in submarkets.
- 2030 Consumer market 85%.
- 2050 Climate neutral
- 2050 >90% renewable.

Conditions: No unfair/undesirable competition for raw materials. No low quality/low circular international competition. Harmonized EU rules. Speeding of the process when possible.

Alternatives for 100% applications



- Coir, fully developed
- Wood fibre in development
- Sphagnum starting development
- Biochar, not yet started dev.
- Water culture: partial mixed market



Why wood fibres?

- Large volumes ($\gg 100.000 \text{ m}^3/\text{yr}$)
- Dry storage
- Compressible
- Homogeneous in time
- Safe
- EC < 0.5 ; pH 5.0-6.5; Stability OUR < 12
- N-immobilisation $< 20\%$
- Possible role in resilience



New Growing Media Project

BACKGROUND: export UK 2003-2005

- 16 growers
- 2 export companies
- 2 research and certification
- 4 potting soil producers
- Ministry of Economic Affairs

GOAL:

Less peat in mixtures

No price or quality effects



Results New Growing Media Project 2005

Parameter	Unit	Standard	New
		Average	Average
pH	$-\log(\text{mmol.L}^{-1})$	5.4	5.8
EC	dS.m^{-1}	0.8	0.9
WC pF-31	%-v/v	52	44
DBD std	Kg.m^{-3}	125	138

Yield / quality:

- 2 higher;
- 5 equal;
- 8 less but acceptable;
- 1 worse and no clue until years after

Cultivation problems;

- pH (too high)
- Nitrogen (immobilisation)
- Irrigation (dryer medium)

Results Wood Fibre Slabs 2005



Tests 2021

% v v ⁻¹	Control1	WF1	WF2	WF3	Control2	WF4	WF5	WF6
Milled peat	85	70	60	50	30			
Peat fraction >10mm	15							
Coir < 5mm					70	70	60	50
Wood Fiber		30	40	50		30	40	50

Total N	Unit	Control1	WF1	WF2	WF3	Control2	WF4	WF5	WF6
wk 31	mmol L ⁻¹	5.0	4.2	5.4	5.0	4.0	4.5	4.4	3.8
wk 39	mmol L ⁻¹	5.0	5.0	4.6	4.2*	4.3	3.5*	3.2*	2.5*

* In hindsight still higher level of Ca(NO₃)₂ required

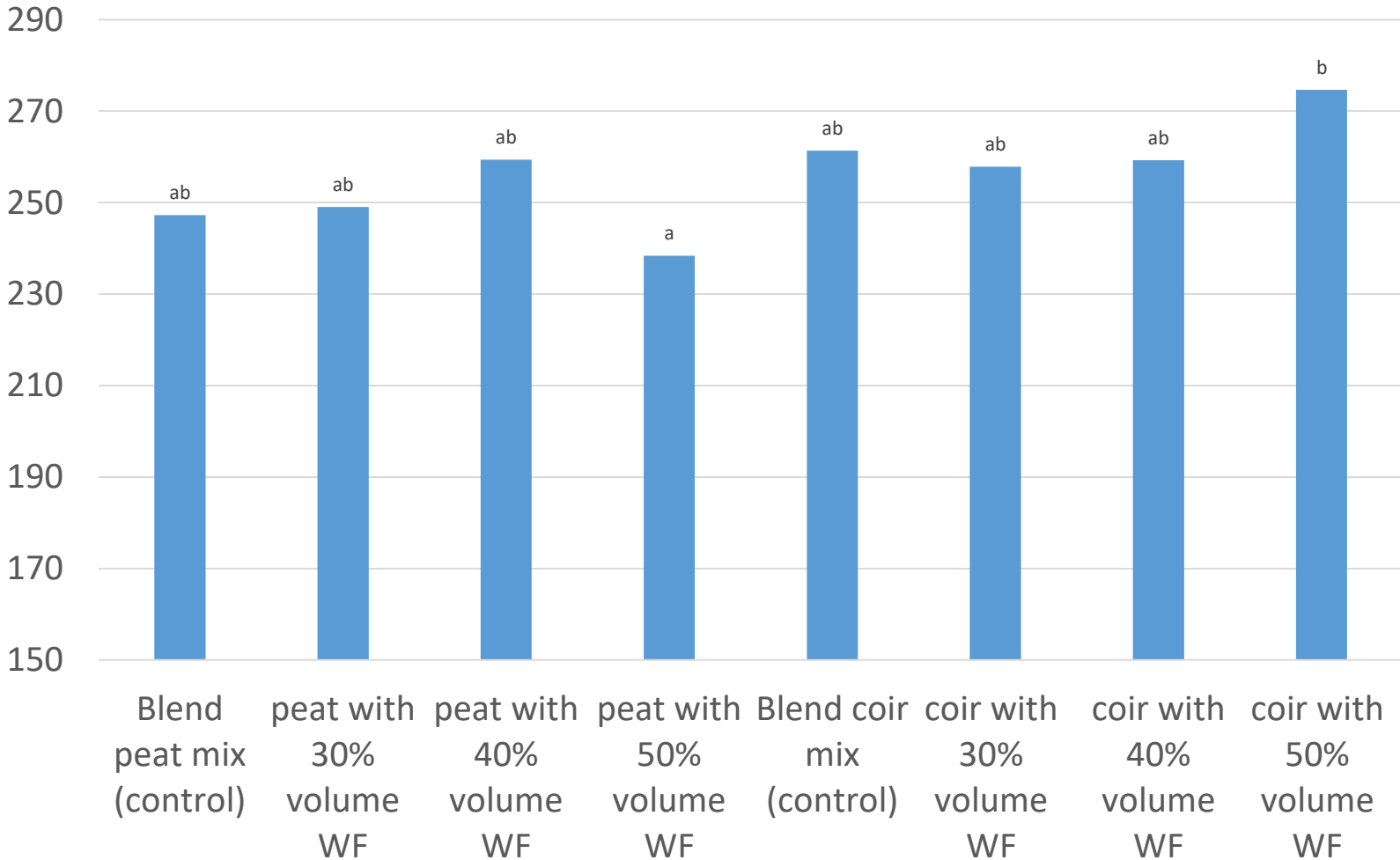
Total nitrogen (mmol L⁻¹) in potting soil (1:1,5 analysis) at start and end of the experiment.

Veenmosveen



Results 2021

weight leaves and stem (g)



Propagation causes problems in cultivation



2017 and 2022; but there are already better products..



Fresh weight

Tests 2022

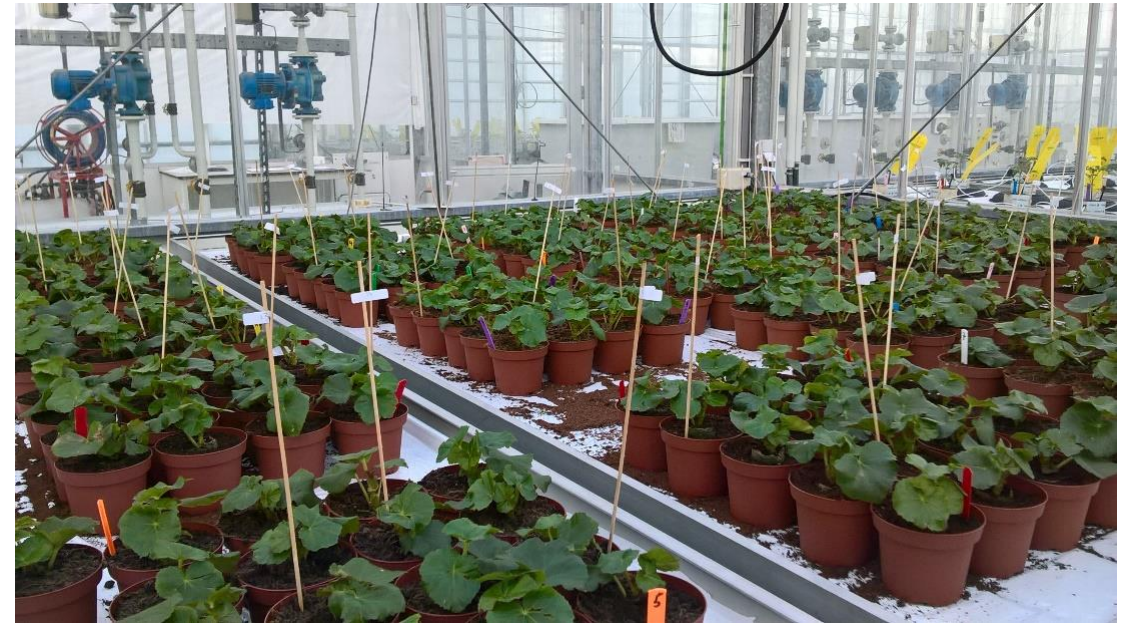
Experiment

Begonia, White Netja

3 plots (20 plants)

3 ebb and flood benches

13 cm pots (0.75 L).



HF/veen	DBD	CC-water	CC-lucht	EC	pH	OUR
	Kg/m ³	%-v/v	%-v/v	dS.m	pH	mmol/h/kg
HydraFiber	35-70	65-85	21-3	<0.1	5.2	6.0-8.0
Veen	100			<0.5	4.5	1.0-2.5
Kokos	120			<1.0	6.5	2.0-3.5

Basis eigenschappen

Behandeling	EC	pH	DBD	EAW	TPS	N-oogst
	dS/m	pH	Kg/m ³	%-v/v	%-v/v	Mmol/L
1 Controle-veen	0.71	5.4	143	21.9	90.9	5.0
2 (special)	0.58	5.1	99	18.1	93.8	3.4
3 FV/HF30	0.60	5.1	123	25.5	92.2	5.0
4 FV/HF40	0.79	5.1	102	24.5	92.9	4.6
5 FV/HF50	0.72	4.9	125	27.5	96.6	4.2
6 Controle-kokos	0.62	4.8	125*	23.7	92.2	4.3
7 KK/HF30	0.68	5.3	70	17.8	95.6	3.5
8 KK/HF50	0.68	5.3	72	17.2	95.5	3.2
9 KK/HF70	0.60	5.2	65	16.6	95.9	2.5



*Coir was unusually fine;

OUR Peat 2.5; Coir., 2.1; Woodfiber 7.7 mmol (O₂ /h/kg DOM)

Tests 2022

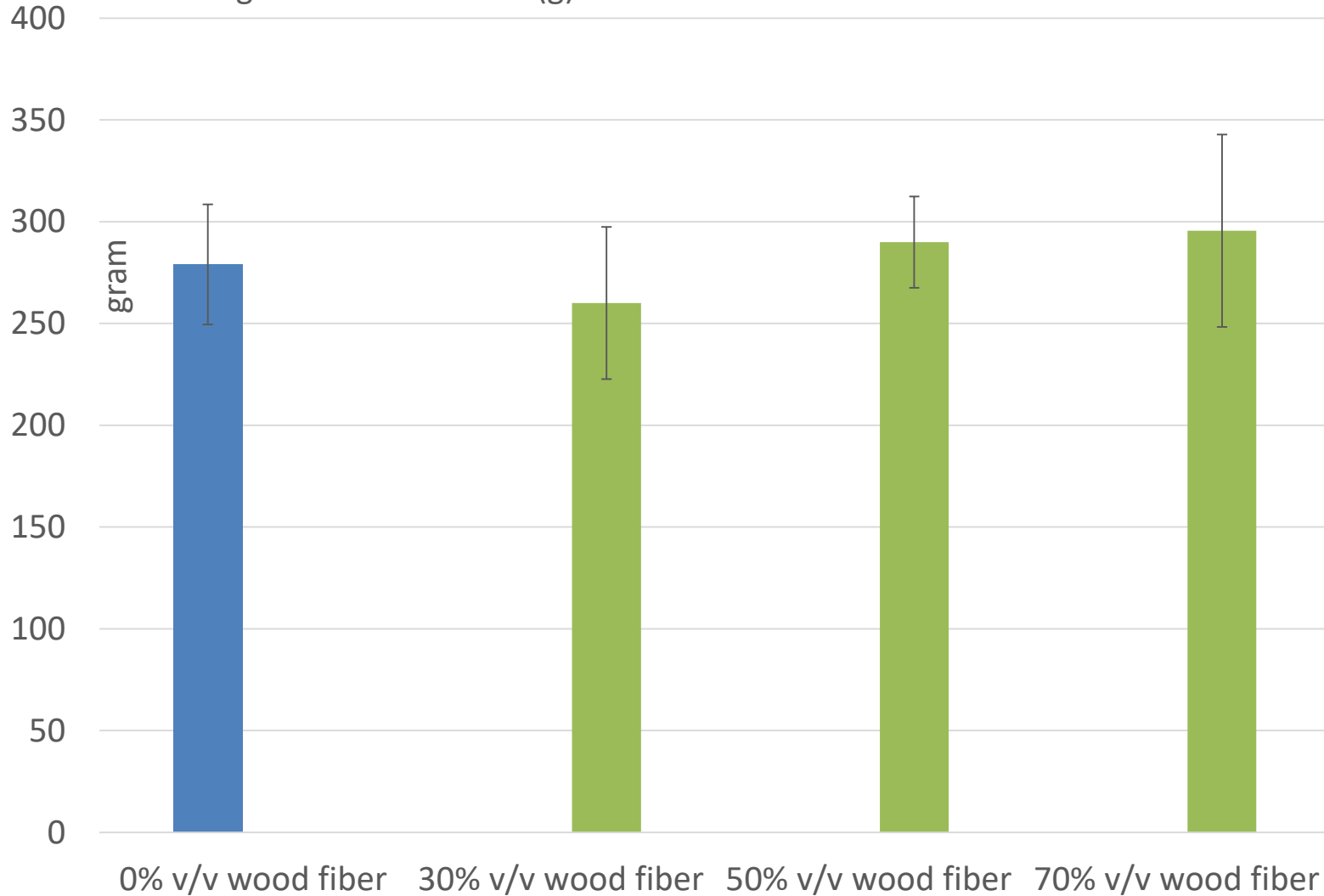
Description	Control1	WF1	WF2	WF3
Milled peat	100	70	50	30
Wood Fiber		30	50	70

Total N	Unit	Control1	WF1	WF2	WF3
wk 15	mmol L ⁻¹	7.5	8.3	9.1	7.5
wk 25	mmol L ⁻¹	5.8	3.9	5.4	4.6

Total nitrogen (mmol L⁻¹) in potting soil (1:1,5 analysis) at start and end of the experiment.

Fresh weight

fresh weight leaves and stem (g)



Plants after trial on wood fiber from left to right control; 30; 50; 70 %v/v



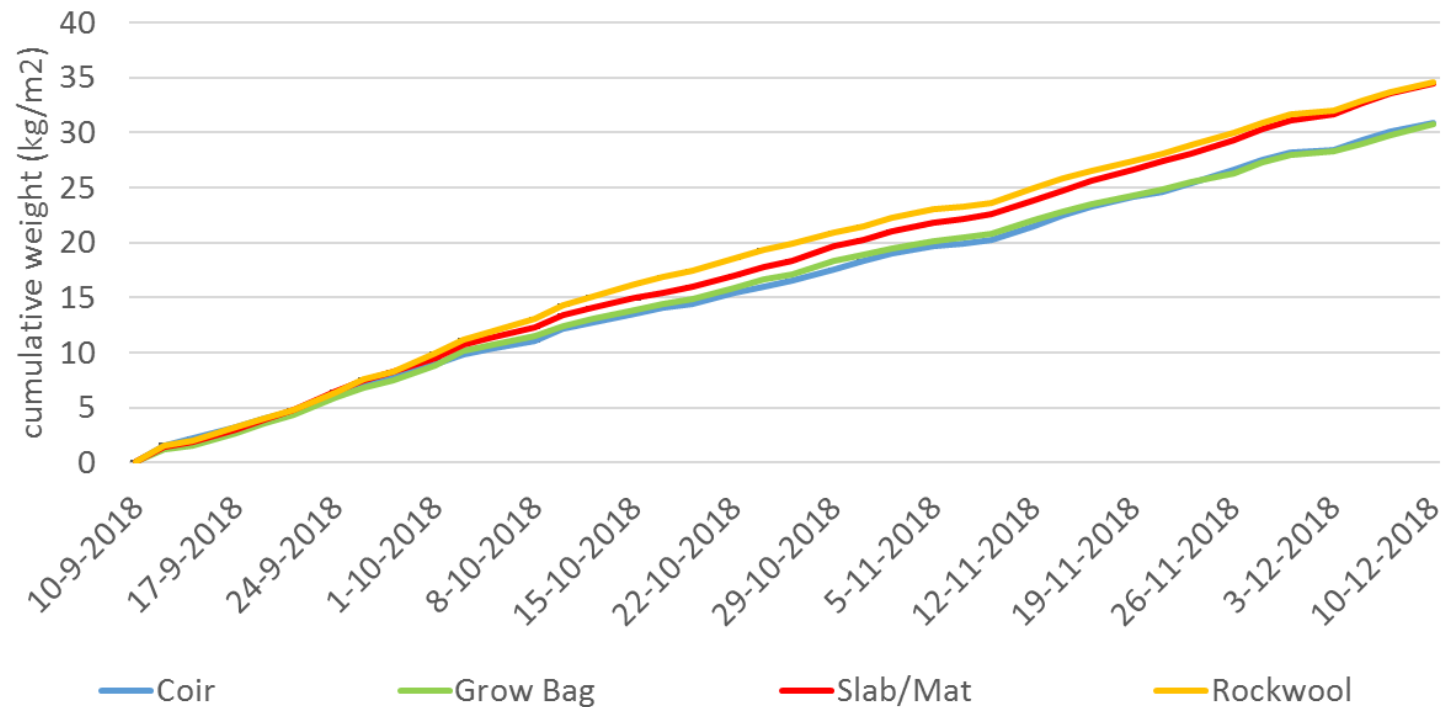
Wood fiber mixes from left to right 30; 50; 70 %v/v wood fiber

Photos slabs with tomato



Wood fiber in slabs, loose fill and pre-shaped

Growing Medum	Supply	Cycles	Per cylce	Drain	Start time	Stop time	Length
	ml/dag	# per 24 uur	ml	%	Uur na zonop	Uur voor zononder	uur
Stone wool slab	2000	15	133	30	1.5	2	10.5
Wood Fibre slab	2000	15	133	30	1.0	1.5	11.5
Wood fibre bag	2000	18	110	30	1.5	2.5	10.0
Coir slab	2000	10	200	30	1.5	3.5	9.0



Adaptations in cultivation when using >30-50% wood fibre

What	How	Measuring	Technology
Propagation	Suction force < in cultivation	Suction force	Adapted plug/block
Irrigation	Radiation sum starts, Start-stop time >, Volume per cycle<, Evening cycles (summer)	Water content, drain%, EC , pH	All meters, sufficient meters, 1.2 L drippers
Nutrient store (start solution)	NO ₃ (immobilisation), less K, more Fe, Sometimes EC>	1:1,5 analyses before, after	A+B dosing system, Single fertilisers
Nutrient maintenance (fertigation solution)	NO ₃ in the first weeks/months	Analyses	A+B dosing system, Single fertilisers, Adapting recipe based on analyses = (Nutrient Recommendation System)

Composts (aerobic bacterial transformation) and wood fiber



Chances or threats?

Diversify:

- Propagation plugs;
- Pot plant constituent;
- Loose fill (bags);
- Slabs;
- Compost constituent;
- Co-compost constituent;
- Re-use GM improver...

New materials for fibre processing;

- Bark;
- Coir fibre;
- Deciduous wood...

Non fibre processing;

- Wood chips;
- Shavings;
- HTC;
- Biochar;
- Torrefaction...



Chances or threats?

More knowledge:

- No more miracle recipes: mixing model to aim for an application dedicated target based on material properties
- Other NH_4/NO_3 ratios
- No more PG-/Peters/Kristalon
- Using meters
- Using NRS (nutrient adaptation)
- Training advisors / growers
- Advisory support for growers
- Documentation
- Experienced users

Chances or threats?

Finding added values:

- Reuse finding positive values
 - Nutrients to soil
 - Carbon to soil
 - Carbon credits
- Combinations with circular fertilisers
- Co-creation of microbial resilience
- ...



End

Thanks for your attention!

