

Alternatives to peat as growing media

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Jordbruksverket

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Benefits of peat as growing medium

1. Uniformity
2. Nutrient economy manageable (excl P)
3. Airiness and its persistence
4. Good water retention
5. Supporting phytosanitary — purity, antimicrobiality

Enabling high yields in greenhouses

Finnish Glasshouse Growers' Association 2022:
2/3 of Finnish greenhouse
production is based on peat



Future materials in growing media?

Continuous increase in demand of growing media

Table 4. Total estimated market in 2050 based on the expected market increase (Table 2) and a more realistic estimate of the potentially available materials (Table 3).

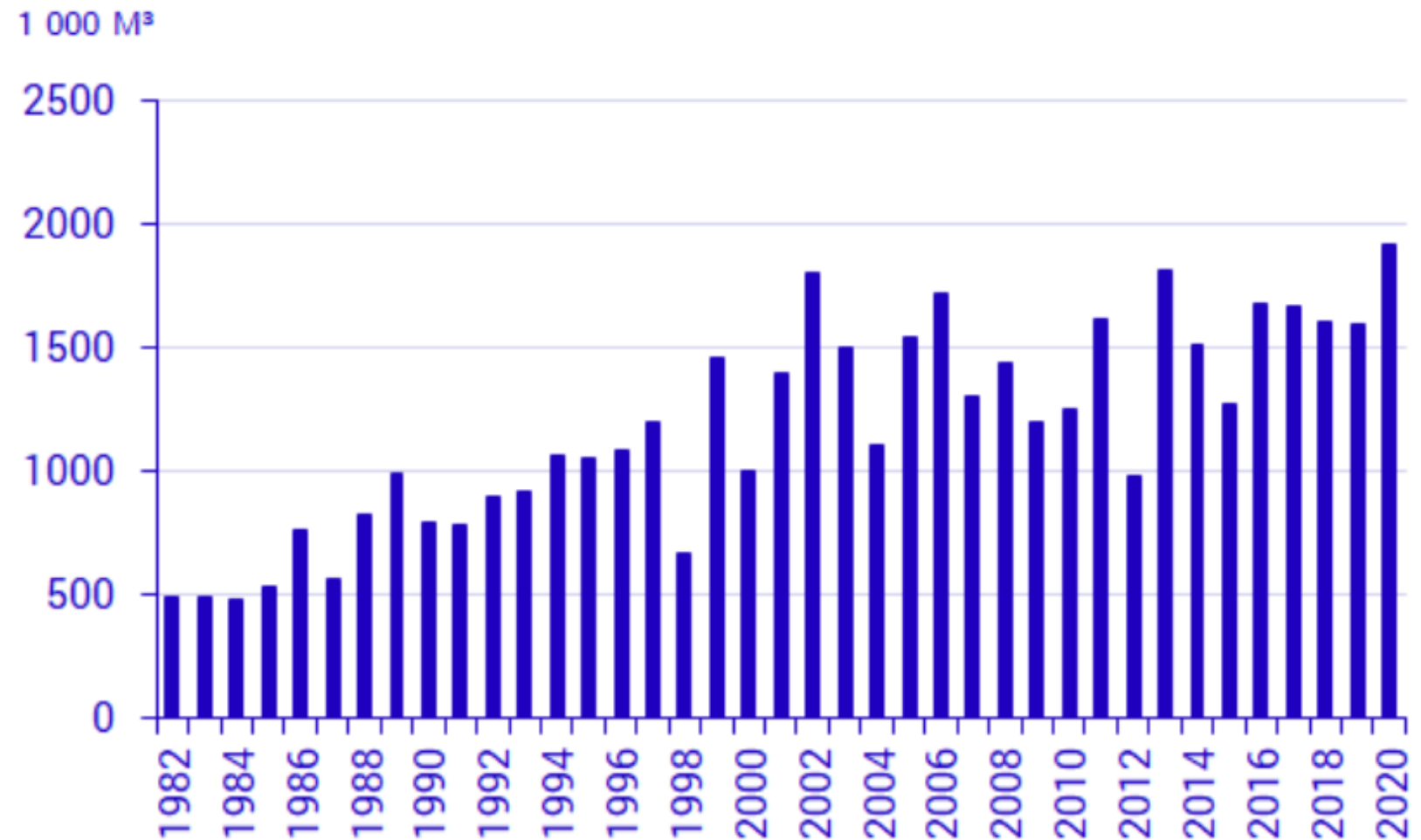
	2017 (Mm ³ y ⁻¹)	2050 (Mm ³ y ⁻¹)	Increase %
Peat	40	80	200%
Coir	11	46	418%
Wood fibre	3	30	1000%
Bark	2	10	500%
Compost	1	5	500%
Perlite	1.5	10	667%
Stone wool	0.9	4	433%
Soils / tuffs	8	33	413%
New		65	23%!
Total	67	283	



Lähde: Blok, C., Eveleens, B. and van Winkel, A. (2021). Growing media for food and quality of life in the period 2020-2050. Acta Hort. 1305, 341-356
<https://doi.org/10.17660/ActaHortic.2021.1305.46>

Harvesting of peat for growing media in Sweden

Skörd av odlingsstovv 1982-2020



<https://www.scb.se/hitta-statistik/statistik-efter-amne/miljo/markanvandning/torv-produktion-anvandning-och-miljoeffekter-torv/pong/statistiknyhet/torv-2020-produktion-anvandning-och-miljoeffekter/>

Statistiknyhet från SCB 2021-06-17 9.30 14.10.2022

Renewable growing media materials – in market



J. Heiskanen

Moss



www.bvb-substrates.nl/

Pine wood fibers



Coconut fibers

Peat moss

Drying - Screening

- + air volume/lightness
- + easily plant available water
- + plant nutrition
- + fungistasis
- water retention

In peat mixtures 10-50%

Pine wood fibers

Hot rubbing

- + air volume
- compaction
- low WHC
- Increased need for N-fertilization

Mixed with peat 10-30%

- + structure
- + watering properties

Coconut fibers

Crushing - Separation
- Washing - Soaking -
Drying - Screening -
Squeezing

- + watering properties!
- ± air volume
- + lightness
- + recycled material
- water footprint
- carbon footprint

Can be used 100%

Renewable growing media materials – under development

J. Näkkilä



Composted reed canary grass, bark, digestate



J. Heiskanen

Digested manure



<https://www.growertalks.com>

Aged pine bark

Plant fibers

- composting
 - ageing
 - fiberization?
- + multatuotteet
+ recycling nutrients
– Air volume
– Availability
Nutrient balance?

Common reed (*P. australis*)
Reed canary grass (*P. arundinacea*)
Hemp

Digested manure

Digesting - screw clamping

- + air volume
- + good WHC
- ± rich in nutrients
- ± hygienization

In mixtures 30-50%

Pine bark

crushing - screening
- ageing/composting

- + air volume!
- + persistence of structure
- + side stream
- Low WHC
- Increased need for N-fertilization

Can be used x – 100 %

Logging residues?

Life cycle assessment of growing media



GME publishes LCA guideline for growing media

First sector-wide methodology for environmental footprint calculation

31.05.2021

- "Peat environmental footprint scores are similar to those of non-peat components"

"Growing media's contribution to the overall environmental footprint of a plant is minimal"

Plant fibers and forestry side streams as growing media

- BLOKAS project 2017-2020

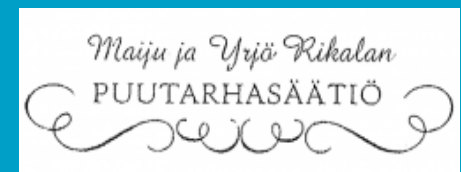
jamk | biotalous



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Vipuvoimaa
EU:lta
2014-2020



14.10.20

22

Examples on growing media developed

Compost 1

Reed canary grass 60%
Pine bark 30 %
Digested fibre reject 10 %

pH 7
DW 78 kg/m³
WHC 5 g/g
Air space 38%

Compost 2

Reed canary grass 40%
Pine bark 30
Buckwheat husk 30

pH 7
DW 71 kg/m³
WHC 4 g/g
Air space 60%



Photos Juha Näkkilä

Growth response of petunia

Compost mixed with peat 50/75%

75%
Compost 1

75%
Compost 2

50%
Compost 1

50%
Compost 2

Peat
(Control)



Photo Juha Näkkilä

Plant and wood fibers increase the need for N fertilization

Fertilization recommended to petunia

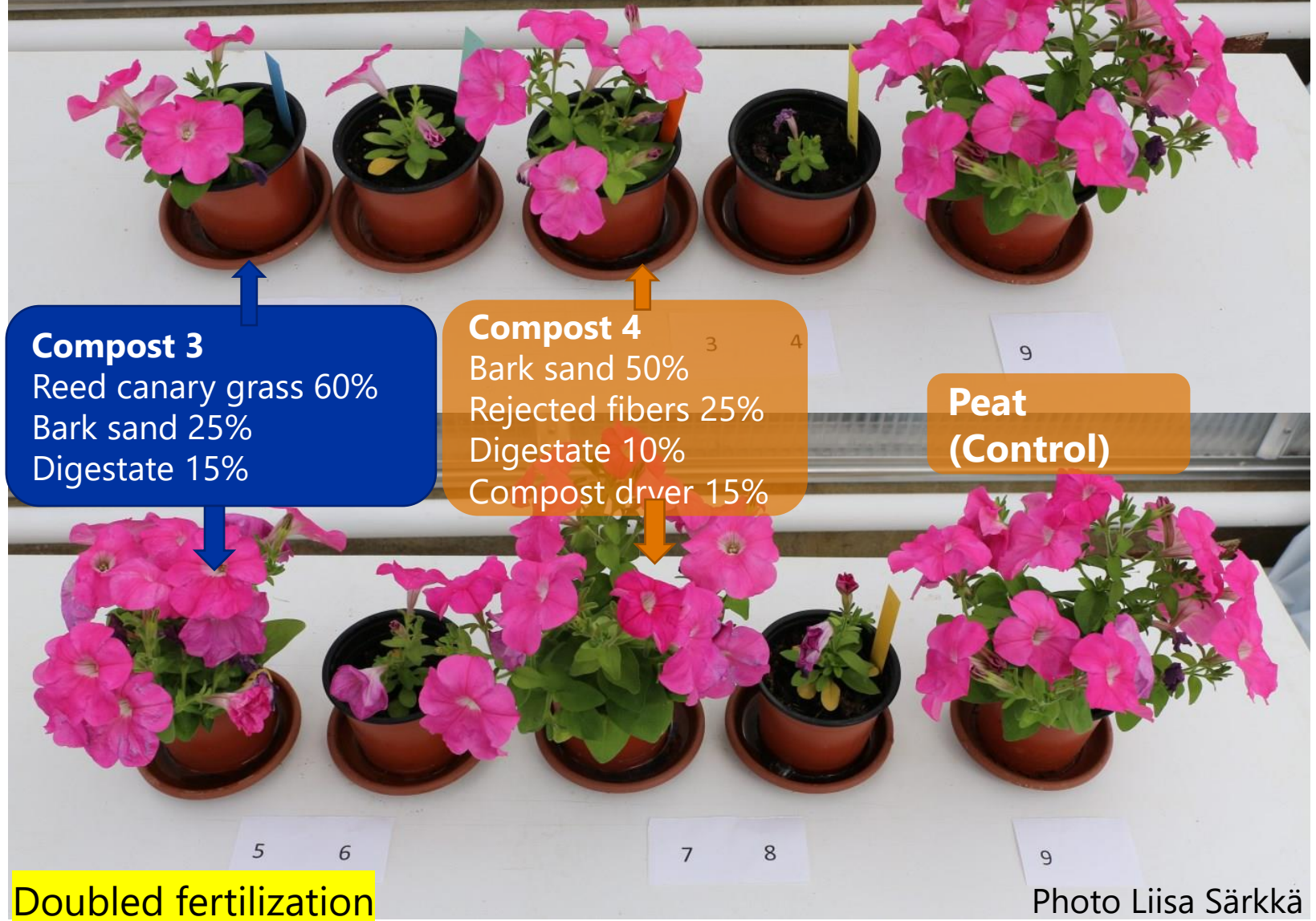


Photo Liisa Särkkä

Composts were also tested in greenhouse cucumber production at Luke Piikkiö research station



Photos Juha Näkkilä

Cucumber yield comparable to peat

Growing medium	Cucumber yield kg plant-1	1. Class yield	Small
Reed canary grass 60% Bark sand 25% Digestate 15%	14,3	11,5	2,8
Reed canary grass Bark sand Rejected fibers	14,1	10,8	3,0
Bark sand 50% Rejected fibers 25% Digestate 10% Compost dryer 15%	14,3	12,0	2,3
Reed canary grass Horse manure	15,8	12,6	3,2
Peat (Control)	15,1	11,3	3,7
Significant difference	No	No	No

Conclusions from BLOKAS project

- Wide range of side streams can be processed into safe and functional growing medium materials by composting
- Plant fibres serve as a good basic ingredient to which side streams from the forestry industry can be added
- Nutrient-rich ingredients added to the compost mixture (digestates, manure etc.) accelerate composting process and improve the nutrient economy of the finished medium (especially N)
- The nutrient level of growing media produced by composting of recycled materials varies. Nutrient analysis needed to design fertilization.
- There is no solution to completely replace peat yet, the recipes produced in Biokas project can substitute peat up to 50%



Testing peat alternatives for greenhouse and forest seedling production

- KATUKA project 2022-2023

Finnish Glasshouse Growers' Association and Natural Resources Institute Finland together with

- Biolan Oyj, Kekkilä-BVB, Kiteen Mato ja Multa Oy
- Österbottens svenska producentförbund, ÖSP
- Hedelmän- ja marjanviljelijäinliitto

“Kasvuturpeelle kavereita” KATUKA project

The project aims to

- (1) promote the development of new growing media materials to replace peat as a collaboration between research and enterprises
- (2) produce guidance for farmers to enable them to adopt new growing media without significant loss to productivity
- (3) Provide information to manufacturers of growing media to improve product characteristics and guidance for farmers on the use of new growing media

Funding:

MMM, Recycle nutrients for clear waters program

Puutarhasäätiö – Foundation for horticulture

Maiju ja Yrjö Rikalan puutarhasäätiö – Rikala foundation

Growing media producers

KATUKA project

- Growing media materials to be tested:
- Mixtures with moss and wood fiber, some with peat added
- Composted plant fibers (common reed and reed canary grass)
- Digestate from biogas production



KATUKA project

- New growing media from GM producers will be tested at Luke and under Luke's guidance to determine their suitability for cultivation and further develop these products to meet the needs of demanding greenhouse farming.
- Ongoing/coming experiments with tomato, lettuce, poinsettia, greenhouse cucumber and summer flowers, pine seedlings



Photo Juha Näkkilä

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