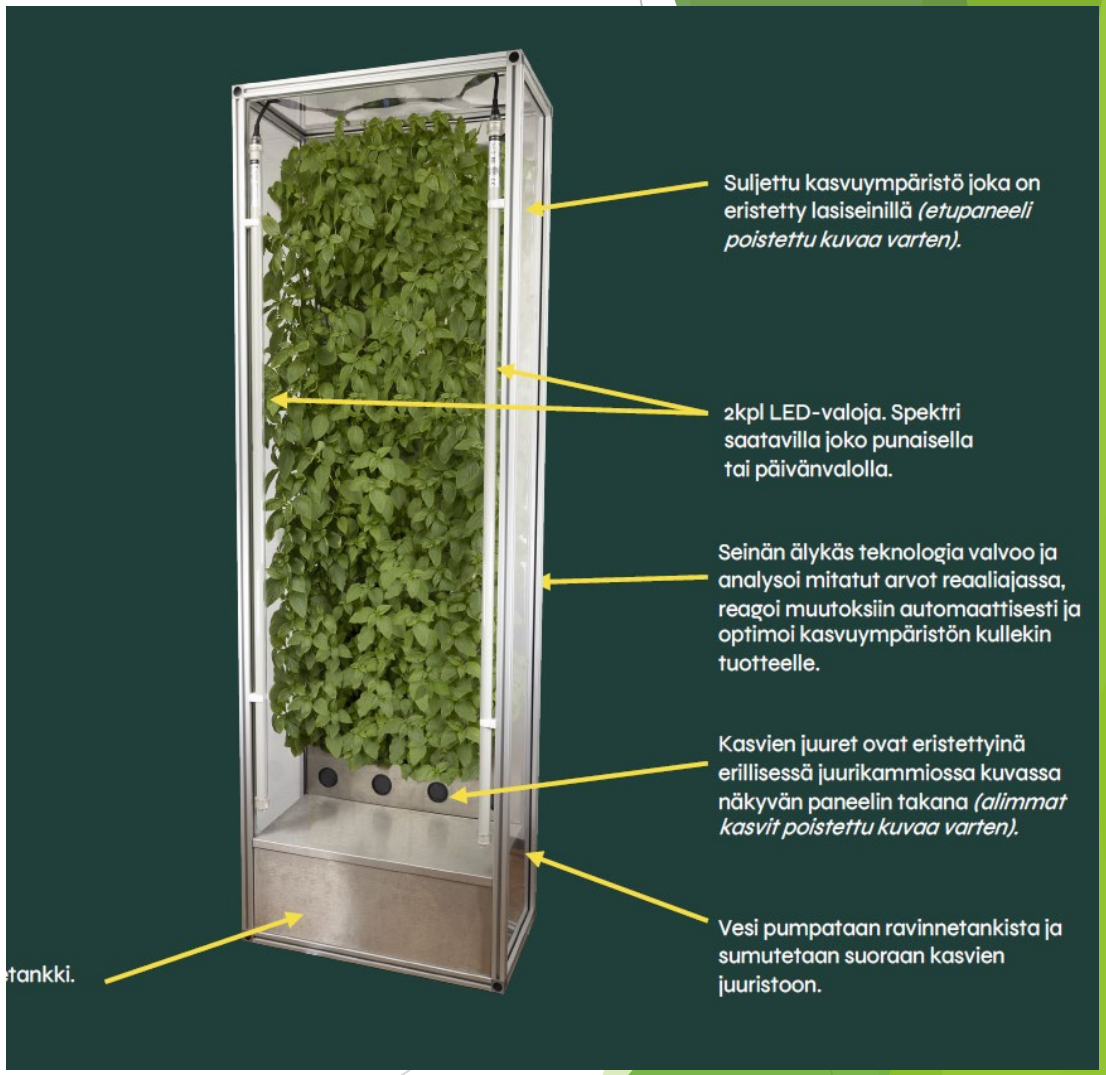
Nettle vertical farming

ARKNOKK open days 13.6.23, Juho Haveri-Heikkilä

Vertical Pilot

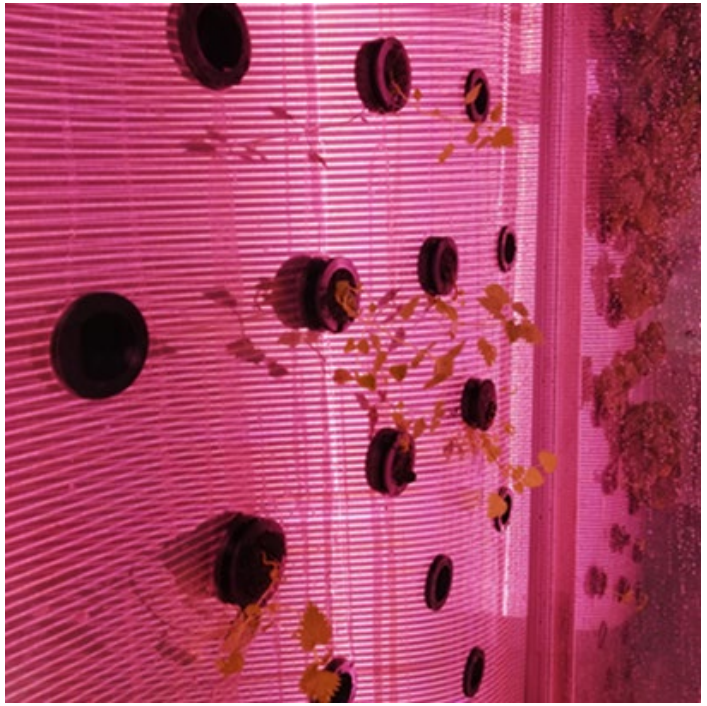
- Nettle cultivation has been tested in Arctic Farming's cultivation cabinet
- We used nettle (isonokkonen) urtica dioica strain
- Plants receive nutrient water aeroponically, i.e. nutrient water is sprayed onto plants in a dark space from above.
- The purpose of the dark space is to reduce the growth of different algae, which occurs when nutrient water meets light.
- The spraying has been scheduled to start every two hours and has lasted 15 minutes at a time
- Lights: 20 h lights on, 4 h lights off
- The cabinets will be updated in order to adjust the temperature and other growing conditions
- www.arcticfarming.fi



Research questions

- How to grow nettles vertically in cabinets?
- How to grow as much biomass as possible?
- Different cutting methods?
- Growing seedlings under different conditions?
- Amount of active ingredients vertical farming vs nature?

Growing proses



Nettle thinning and growth

- Nettle growth started to be good for thinning at the turn of April-May So in terms of time, about 4-5 months after the nettles have been pre-grown.
- Thinning 4.4.2023 – 58 grams of fresh leaves from 8 pots

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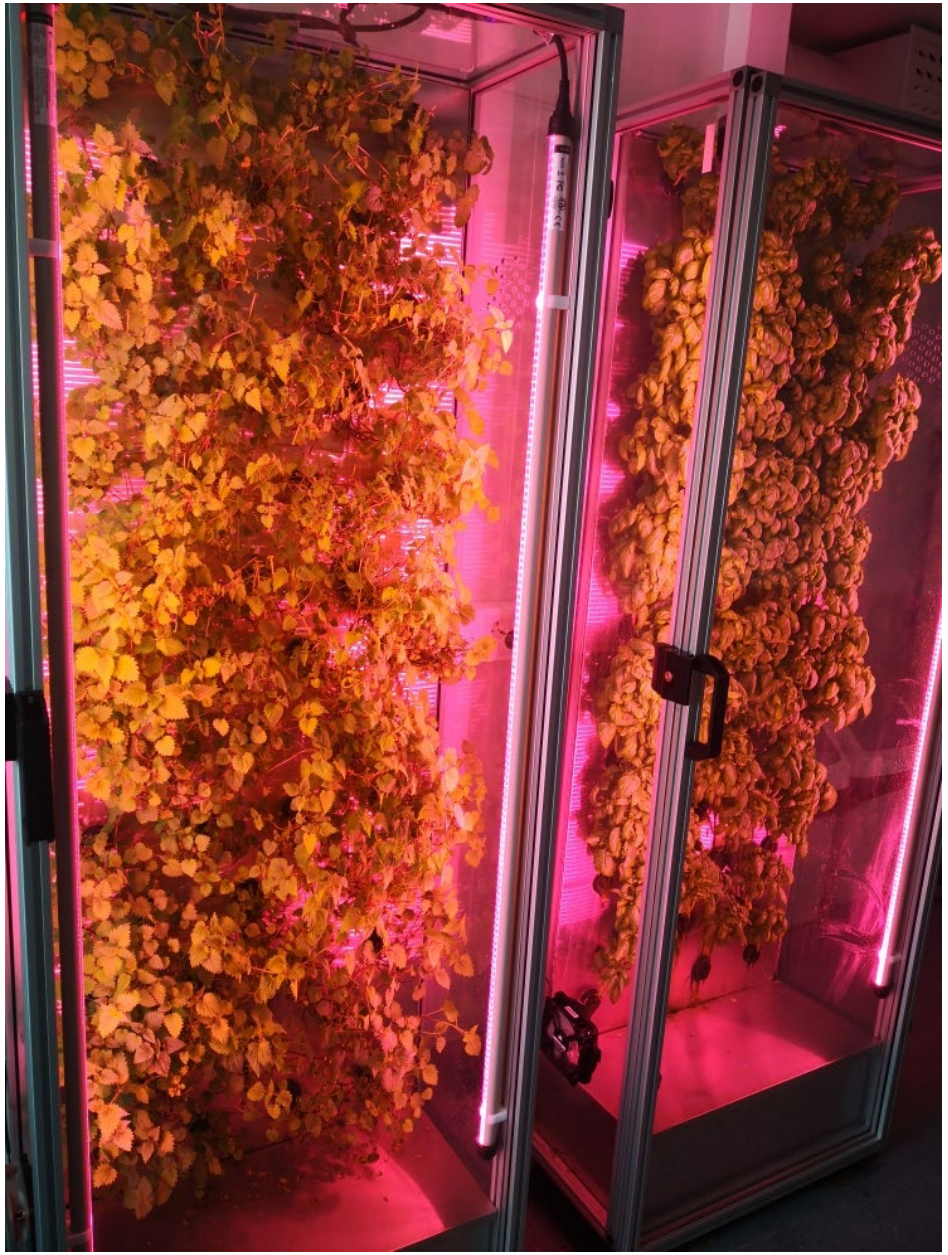
Nettle in full growth 24.5.23



Basil pilot

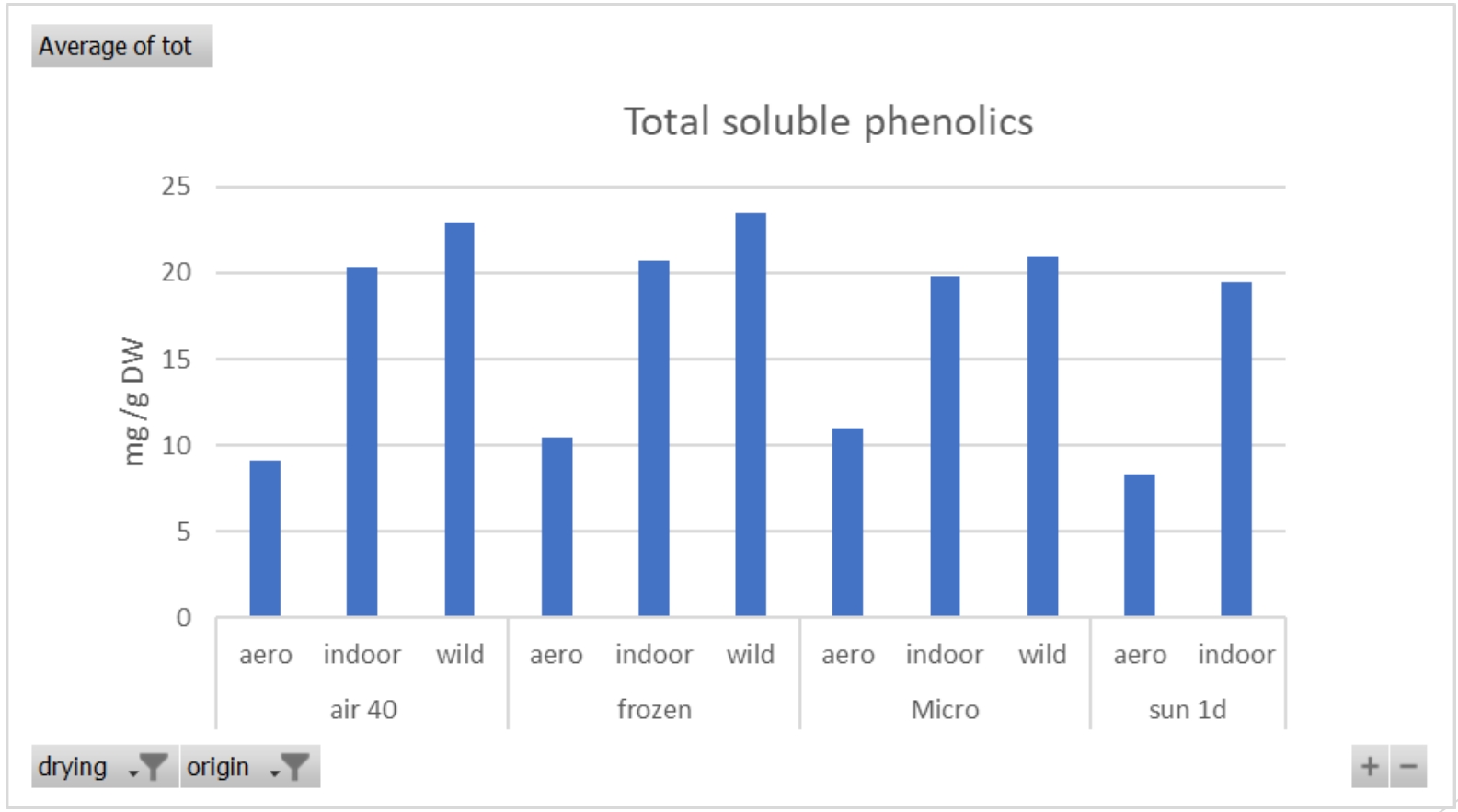
Results

- Thinnings:
- we cut the nettles harder so that they started to branch and make as many leaves as possible

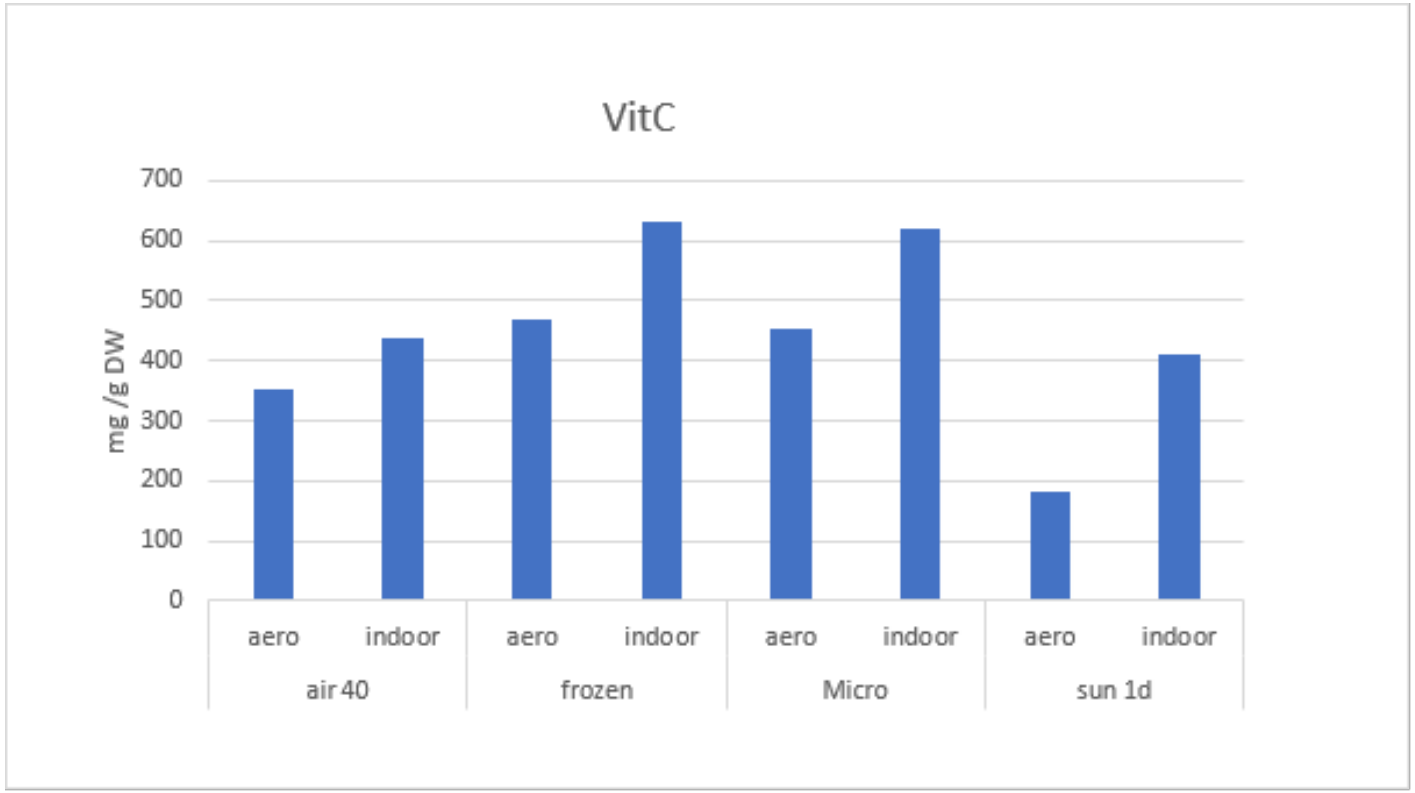
- Growth:
- Now: collection of leaves every 4-5 days → fresh leaves about 250g

- Analysis:
- the amount of phenol and vitamin C is lower vertically than in nature or in sunlight indoors
- experiments performed under basic conditions
- by increasing the stress of the plant can the amount of active substances be increased? such as light, wind and heat and their variations

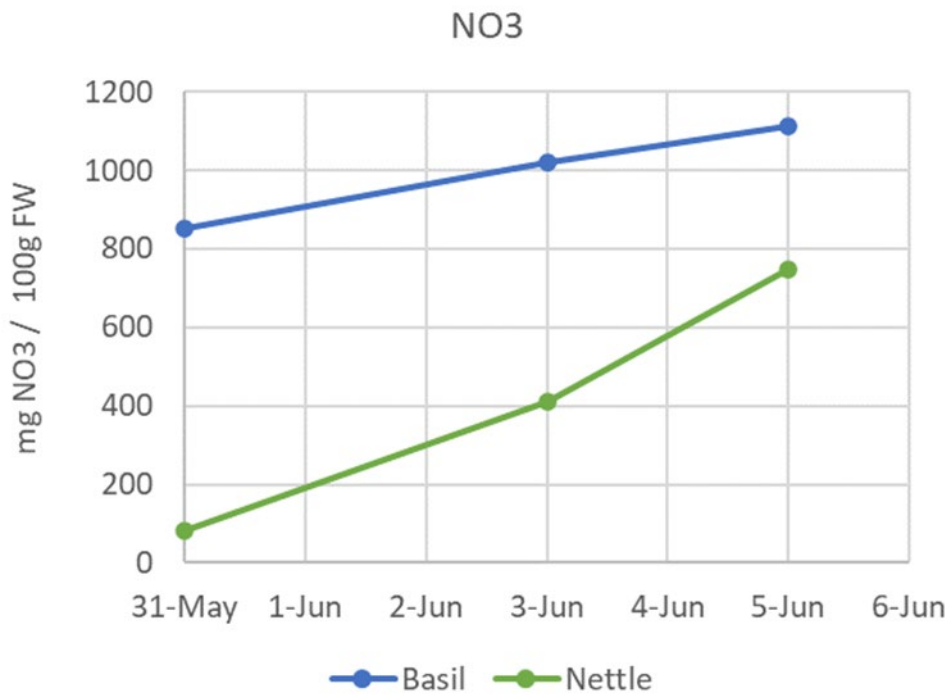
Phenolics


Average of tot
Total soluble phenolics
mg/g DW
25
20
15
10
5
0
aero
indoor
wild
aero
indoor
wild
aero
indoor
wild
aero
indoor
air 40
frozen
Micro
sun 1d
drying
origin
+
−

Vitamin C


VitC
mg /g DW
700
600
500
400
300
200
100
0
aero
indoor
aero
indoor
aero
indoor
aero
indoor
air 40
frozen
Micro
sun 1d

Nitrite NO3


NO3
1200
1000
800
600
400
200
0
mg NO3 / 100g FW
31-May
1-Jun
2-Jun
3-Jun
4-Jun
5-Jun
6-Jun
Basil
Nettle

challenges in nettle vertical cultivation

- Bigger challenges in growing nettles have been the high nitrate content of nettle leaves
- When the seedlings were small, both the basil and the nettle cupboard had a short-growing root system
- PH and electrical conductivity decrease faster in nettle than in basil. So this means that nettles take a lot more nutrients from the water than basil

NEXT

- additional funding has been applied for pilots of growing wild plants
- try other natural plants for vertical farming
- Natural plants that cannot be collected sustainably from Finnish nature
- plants whose active substances can be used in e.g. the cosmetics industry