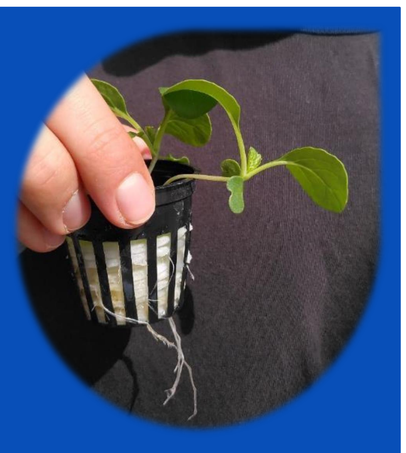
CirCulTex: Circular urban cultivation systems with re-useable textile growing substrates



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CirCulTex

CirCulTex develops a light-weight and re-useable textile substrate for soilless urban cultivation systems (hydroponic, aquaponics and terrabioponic) in order to increase the resource-use efficiency and sustainability of urban farming in the growing bioeconomy.

1) State of the art

Modern soilless urban cultivation systems require substrates:

- ➲ Sustainability of currently used substrates !?
  - ≈ *peat* - destruction of wetlands
  - ≈ *rockwool* - energy-intensive production [1, 2]
- ➲ Requirements: Researched alternatives are bio-based residues and wastes, but quality, availability and characteristics are unsuitable [1, 2]

Textile substrate ➲ Re-usability? Meet sustainability | Quality and quantity? Meet requirements

2) Reusable textile substrate

a) Textile development based on plant performance

- ○ Specific composition
- ○ Sizing of the textile
- ○ Stability / re-usability

b) Cleaning options

- Thermal
- Mechanical
- Solvent-based
- Biological

c) Circular cultivation

- ➲ Hydroponics
- ➲ Aquaponics
- ➲ Terrabioponics

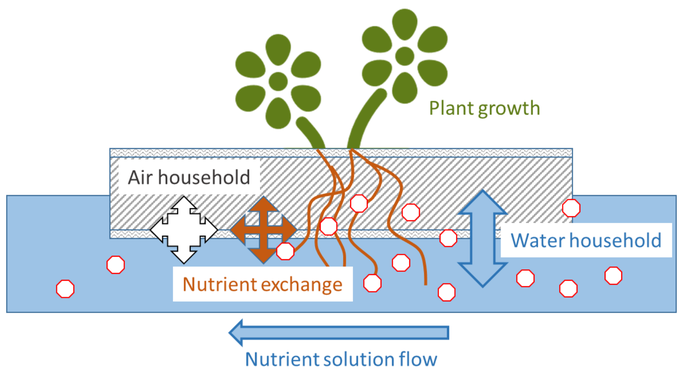


Fig. 1: Important characteristics of (textile) substrates for soilless cultivation systems

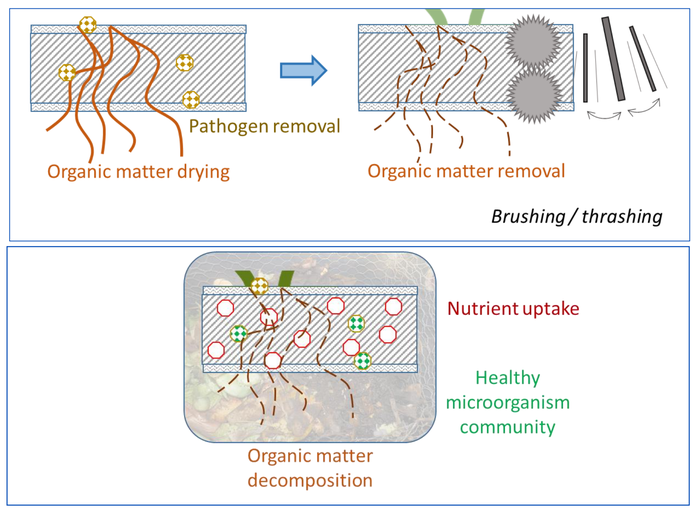
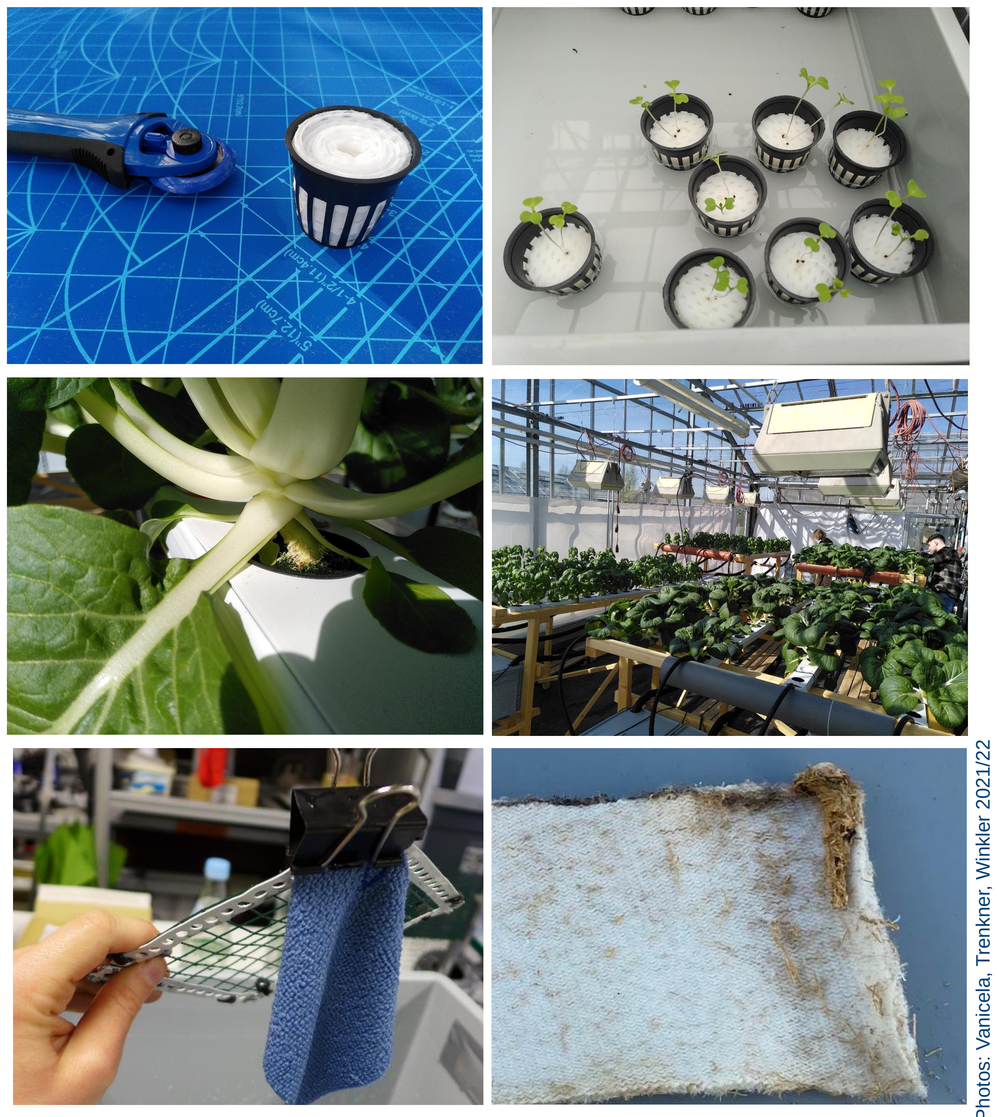


Fig. 2: Proposed substrate cleaning processes



Photos: Vanicela, Trenkner, Winkler 2021/22

3) Intended outcome and impact

Textiles are a promising option, despite of not being biobased, to increase the sustainability of soilless cultivation in urban and peri-urban areas. Circular, light-weight and resource-efficient urban farming with re-usable textile substrate on a private and commercial basis can increase urban agricultural activities and link urban inhabitants with food production. This in turn can induce a more sustainable consumer behavior and thus support the societal transition towards the bioeconomy.

Acknowledgement:

We are gratefully for the funding by

IGSTC INDO-GERMAN SCIENCE AND TECHNOLOGY CENTRE

विज्ञान एवं प्रौद्योगिकी विभाग DEPARTMENT OF SCIENCE & TECHNOLOGY

Bundesministerium für Bildung und Forschung

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