

Efficient Indoor Farming

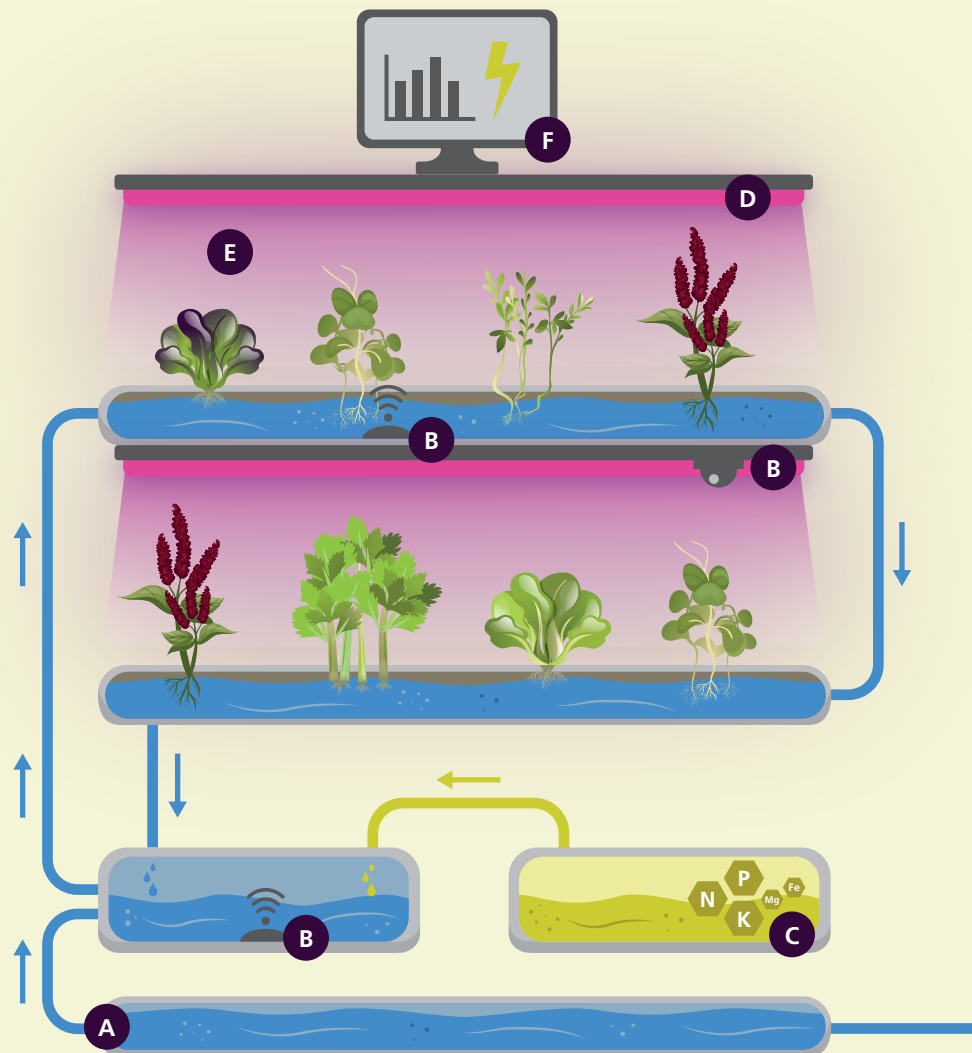


Indoor Farming or Controlled Environment Agriculture (CEA) is an innovative method for plant cultivation, which takes place in closed systems and under controlled conditions. CEA offers important advantages: high yields per hectare and per liter of water used, a high degree of automation, low consumption of fertilizers and pesticides and high yield security. Despite these advantages there are challenges which can be overcome by using robust ceramic and diagnostic components and technologies.

www.ikts.fraunhofer.de/en/indoor_farming

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- A Water treatment**
Ceramic membranes and AOP processes for the reuse of different source waters and their recirculation
- B Monitoring**
Sensors and optical methods for the detection and evaluation of environmental parameters, plant health, nutrient composition and root growth
- C Nutrients**
Use of adapted recyclates from organic residues and ceramic growth bodies for optimized nutrient uptake
- D Lighting**
Energy saving through pulse-width-modulated lighting for synchronized electron emission (illuminant) and photon absorption (plant)
- E Air conditioning and temperature control**
Zeolite ceramics as latent storage for demand-driven heat and humidity regulation
- F Control concepts**
Using self-learning systems or artificial intelligence based on real-time data and incorporating external data sources



Material and technology development

Development and characterization of ceramics-based functional materials | Development of singular technologies for client-specific tasks

Nutrient and fertilizer development

Residual material evaluation | Nutrient recovery and design of fertilizer products | Analytical and biological assessment of recyclates and fertilizer products

Materials and energy balancing

Life cycle assessment | GHG balancing and cost accounting for processes and new and existing existing plants | Support for R&D projects | Certification

Knowledge and technology transfer

Support and guidance of CEA projects with a focus on plant cultivation and algae production