CELINE

Automated nutrient measurements for greenhouse horticulture

CELINE enables full control of water and nutrient management

In (hydroponic) greenhouses, irrigation water is prepared by dissolving concentrated solutions of fertilizer in clean (rain) water and distibuting it across the growing systems. If excess drain water is collected and reused, it is essential to know the nutrient composition in order to achieve the optimal nutrient composition in the fresh irrigation water.

CELINE measures accurate and calibrated concentrations of all individual nutrients in the irrigation and drain water. This enables optimal dosing and savings on water and nutrients, for the crop, in every growing stage, in every kind of weather, under all circumstances.

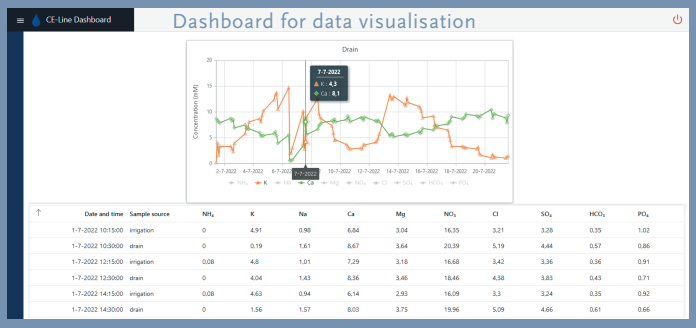
- **Fully closed watercycle**
- **Zero Liquid discharge growing**
- **Crop demand driven nutrient management**
- **Ultra-high crop yield, reduction of risks**
- **Assured constant quality**

CELINE, the plug and play laboratory in your greenhouse, is integrated into the water system of the greenhouse to take samples of the different water streams and to supply accurate data very quickly. The self-calibrating and self-cleaning technology requires no human intervention other than exchanging reagent liquids once a month.
It's like having a laboratory in your greenhouse!

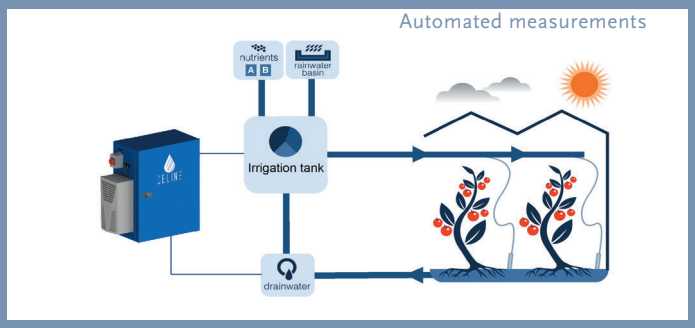
NOMINEE Category Innovation GreenTech Innovation & Concept Awards 2023

THE FOODTECH 500 2022 powered by FORWARD FEEDING

CELINE automatically measures the concentration of several individual nutrients. Data is provided in a cloud-based system that reports nutrient concentrations over time. Every measurement is internally calibrated by internal standards, exactly the same as in laboratories.



Dashboard for data visualisation



Automated measurements

Selection of macronutrients and micronutrients:
NH_4, K, Na, Mg, Ca, Cl, NO_3, SO_4, HCO_3, PO_4
Fe, B, Zn, Mn, Mo, Cu

CELINE automatically takes samples from drain and irrigation water and measures all the nutrients.

CELINE

Technical information

Technical specifications	
General information	
Dimensions	970mm x 430mm x 970mm
Weight	90 Kg
IP rating	IP54
Measurement information	
Measurement Time per Sample	30 minutes
Measurement components	Charged components
Unit of concentrations	mM/Mg/L or similar
Concentration range	0,05 mM - 30 mM
EC range	0,1 - 10,0 mS/cm
pH range	4-9
Filtration	0,1 - 0,5 Micron required, equipement available
Data	
Data storage	Cloud database
Data visualization	Display interface, Cloud portal, transfer via API
Accuracy *	>95%
Repeatability **	<5%
Reagent set	
Capacity	30 days with 8 measurements per day
Refill cycle	Monthly
Shelf life	1-2 Months
Installation	Manual replacement
Maintenance Cycle	6 Months
Installation information	
Method of installation	Hanging (hooks on system)
Power rating	230VAC 600W
Communication	Industrial Ethernet
Ambient Operating Temperature	5-45 °C (41 - 113 °F), not in direct sunlight
Operating Humidity	10 - 90%
Sample installaton	40mm ø PVC for bypass filtration
	Sample flow of ~20L/min
	Pre-pressure of 0.3 - 1 Bar (max. 3 Bar)

* Compared to reference laboratories, Groen Agro Control & Eurofins (conducted research by WUR)

** Following validation certification NEN-EN-ISO/IEC 17025:2018nl

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