

# Controlling the hydroponic system

Technical information sheet No. 5

1

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## What to measure?

1. Irrigation supply solution (L/m<sup>2</sup>, for comparison)
2. Solution going to the plants (L/m<sup>2</sup>, for comparison)
3. Drain solution from the plants (L/m<sup>2</sup>, for comparison), calculate drain percentage (supply/drain), it should be around 20-40%
4. Chemical analysis of fresh nutrient solution
5. Chemical analysis of solution going to the plants
6. Chemical analysis of drain solution
7. Before start: chemical analysis of irrigation water
8. Before start: chemical physical analysis of substrate

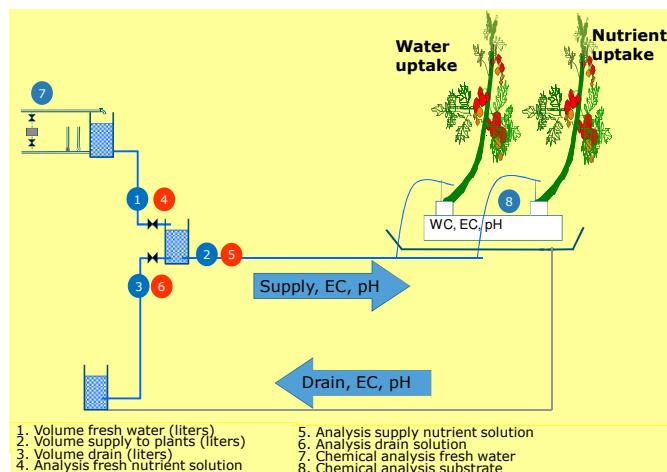
## Watching, registration, combining

1. **Watch** if roots are well, before the plant shows a problem.
2. **Registration** measurements in a list to know what will happen in the future by finding trends. This will reveal what is going to happen if no changes are made.
3. **Combining** two or more measurements will give more information than a single measurement (examples in Table 1).

In all cases changes should be made before problems reduce plant growth.

Table 1 Examples combining measurements A&B into new information C		
A	liters supply	
B	liters drain	
C	(A-B) = liters used by plant	water supply too high too low?
A	liters supply	
B	EC supply	do plants enough nutrients?
C	(A*B) = nutrient load (mg/L)	combine with drain nutrient load
A	nutrient load supply	
B	nutrient load drain	
C	(A-B) = nutrients uptake plant	nutrient supply too high or too low?
A	liters used by the plant	
B	radiation sum per day	
C	water use per radiation unit	higher, with higher T or lower RH
A	nutrients used by the plant	
B	radiation sum per day	
C	nutrient use per radiation unit	constant with radiation

## Where to measure?



1. Volume fresh water (liters)
2. Volume supply to plants (liters)
3. Volume drain (liters)
4. Analysis fresh nutrient solution
5. Analysis supply nutrient solution
6. Analysis drain solution
7. Chemical analysis fresh water
8. Chemical analysis substrate

## How often?

- Water quantities, EC and pH: 2-7 times per week. EC should be around 2-4 mS/cm (recipe dependent). The pH will show whether yield is reduced (>6.5) or roots will suffer (pH<4); optimal is about 5.5.
- Element analysis: once per 14 days. It shows accumulation or depletion.

Table 2 Measurements and measurement frequencies

Amount (liter)	Fresh water	daily
	Supply water	daily
	Drain water	daily
pH / EC	Fresh water	1-2 /week
	Supply water	daily
	Drain water	daily
Nutritional analyses	Fresh water	Start, 1x / 2months
	Supply water	2x / month
	Drain water	2x / month
	Substrate	Start, 1x / 2months

