

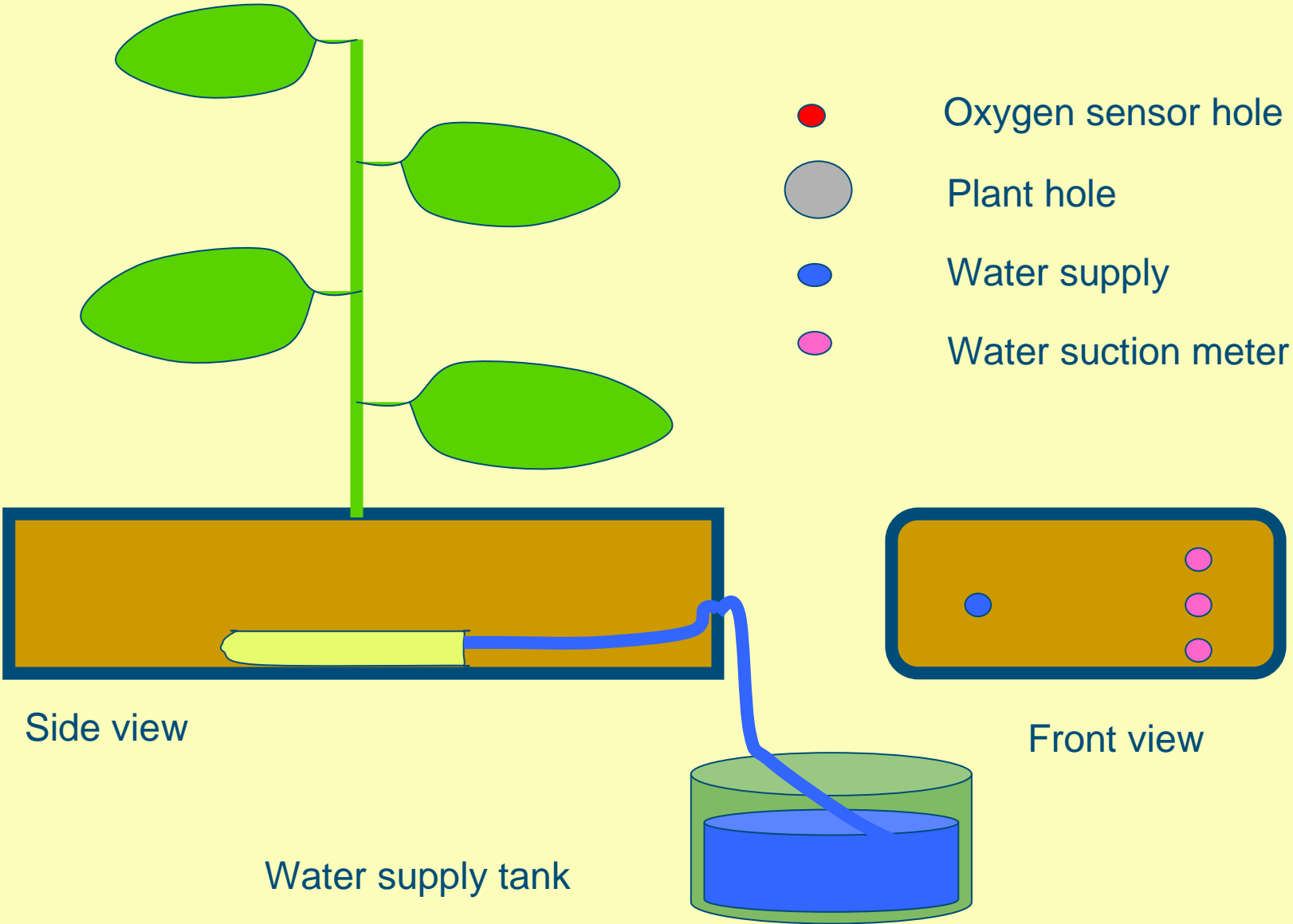
# Plants for Power Production; optimising root exudates

## Non conventional bio refining programme

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# BACKGROUND: previous attempt: air tight boxes



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## BACKGROUND: previous attempt

- Oxygen tight proved very demanding
- No exudates could be found
- Plant health deteriorated
- Root observations in rockwool were cumbersome

# Proposed technical improvements

1. Aerobic start
2. Sterilized start<sup>b2</sup>
3. Split root<sup>b3</sup>
4. Sand as rooting medium<sup>b1</sup>



## Slide 5

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**b1** Er zal een testopstelling gebouwd worden waarin onder goed gecontroleerde omgevingscondities de exudaatproductie van planten gemeten kan worden. In deze opstelling zullen de energiestromen gemeten worden: fotosynthese (primaire energieconversie en vastlegging CO<sub>2</sub>), de groei van de plant (biomassatoename) en transport van vastgelegde CO<sub>2</sub> naar de wortel (bron van exudaten) en de concentraties exudaten in de wortelomgeving.

blok009, 22-2-2009

**b2** Nog iets meer nadruk op het ontsmetten als kritisch

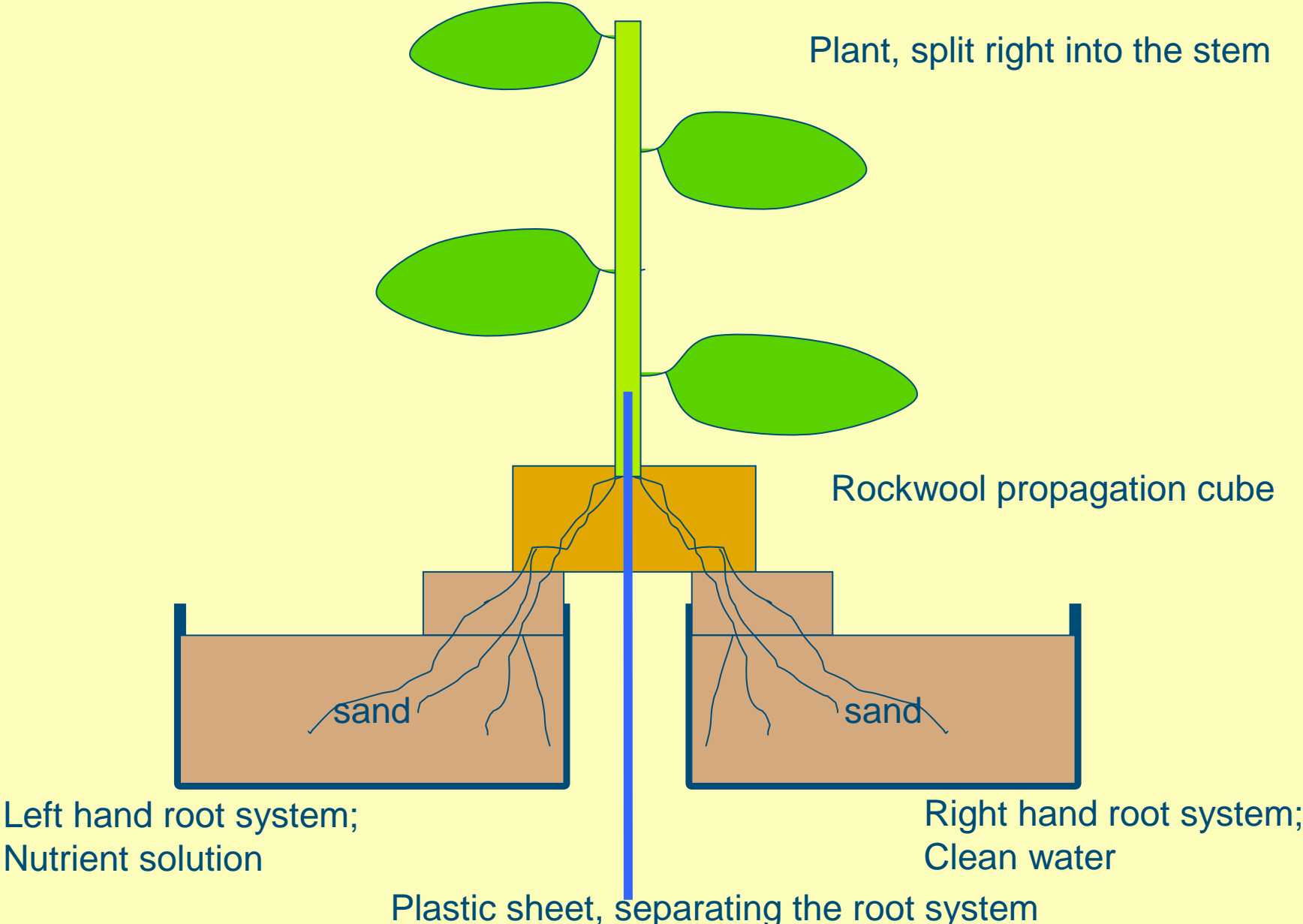
blok009, 22-2-2009

**b3** Denk ook aan het meenemen van geënte planten!!

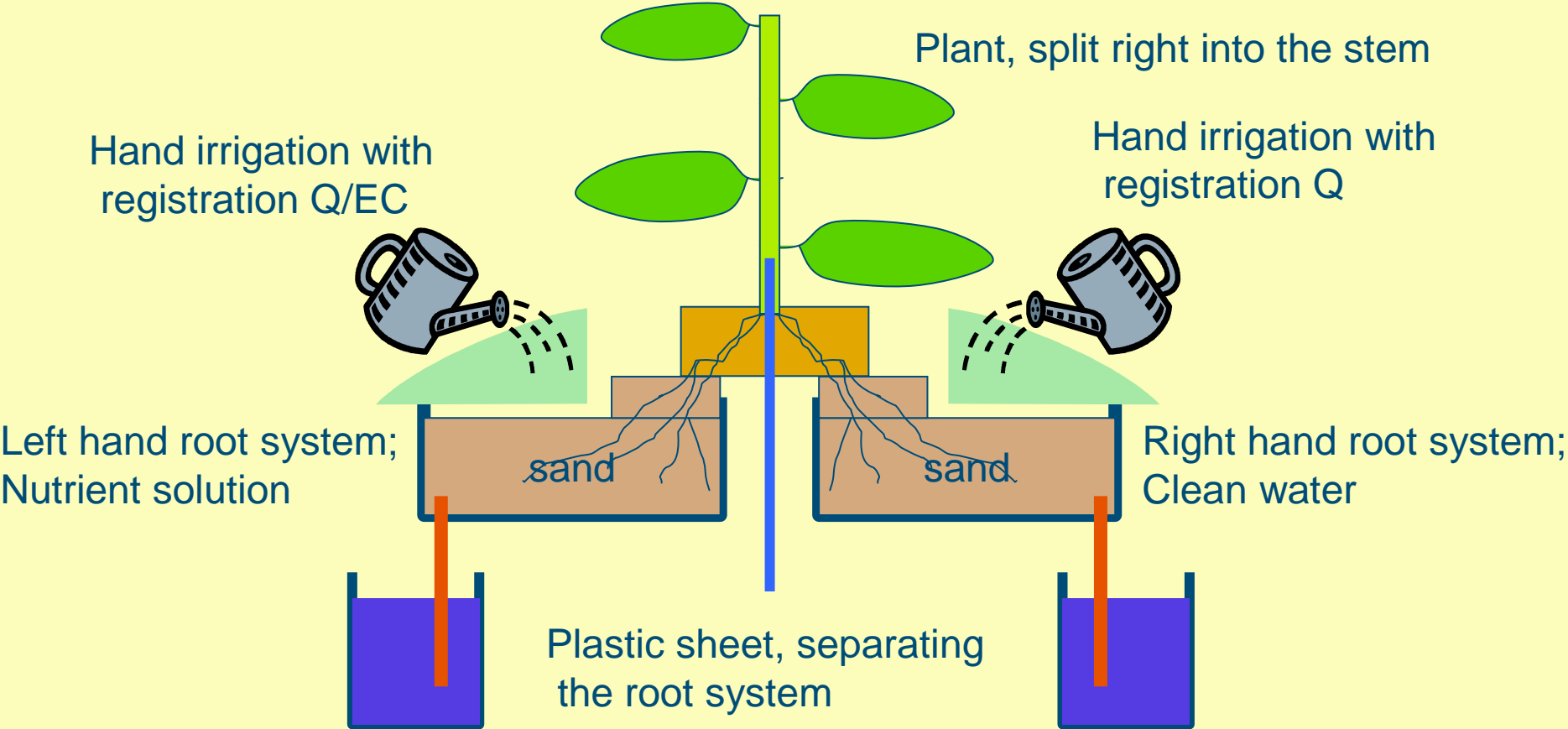
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# SIMPLE SPLIT ROOT SYSTEM



# SLIGHTLY LESS SIMPLE SPLIT ROOT SYSTEM



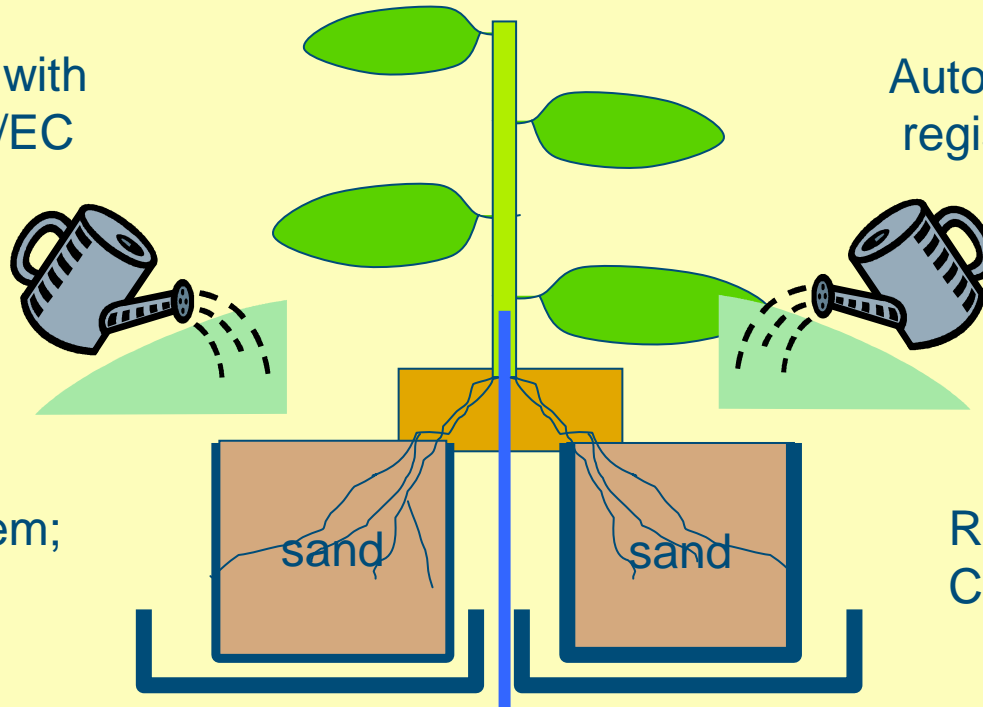


# SIMPLER SPLIT ROOT SYSTEM

Plant, split right into the stem

Auto irrigation with  
registration Q/EC

Auto irrigation with  
registration Q



Left hand root system;  
Nutrient solution

Right hand root system;  
Clean water

Plastic sheet, separating  
the root system

## Advantages split root in sand

1. Exudation manipulation on part of the roots  
i.e. without killing the plant
2. The start can be aerobic
3. Sand can be washed of the roots for better  
root measurements

## Proposed treatments (on a split half)

1. Root temperature (increased root leakage)
2. Phosphate (organic acid release)
3. Iron (organic acid release)
4. Anoxia (fuel cell prerequisite)

# POSSIBLE SCHEDULE IN TWO AIRCO COMPARTMENTS

Start date	Harvest date	Comp.	Nr of plants	Treatments	
09-03-2009	23-03-2009	1.11	8	2	EC (+), standaard
06-04-2009	06-04-2009	1.04	48	4	T(+), P(-), Fe(-), standaard
07-05-2009	08-06-2009	1.04	48	4	T(+), EC(+), O <sub>2</sub> (-), standaard

## Measurements;

- exudates; 96 samples/week
- water use once a week
- EC drain and nutrient use once a week
- plant length
- fresh weight /dry weight; once per cultivation cycle

# Wageningen UR Glastuinbouw

## Innovaties vóór en mét de glastuinbouw

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