Effect of nutrient solutions on plant growth (soil culture)

Student worksheet

Soil culture

In soil culture, as the name implies, the growing medium is soil.

You can use the method outlined below to investigate the effects of nutrient deficiencies on the growth of seedlings produced from germinated seeds.

Equipment and materials

- Seeds. Radish seeds are good to use, but you could try others.
- Soil. Your teacher may suggest which type to use.
- Complete-nutrient solution and nutrient-deficient solution (containing none of the nutrient you are investigating).
- Small container with a wick to allow watering from below.
- Water container and lid, with a slot cut in the lid for the wick to pass through and dip into the nutrient solution.

Method

Set up two experiments – one using the complete nutrient solution and the other using the nutrient-deficient solution. Follow the procedure below for both experiments.

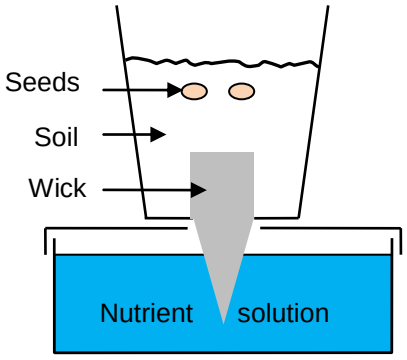

Figure Experimental set up.

1. Pour enough nutrient solution (complete or nutrient-deficient) into the water container so that the wick dips into it and stays moist at all times.
2. Fill the small container to within 5 mm of the top with soil. Add two seeds, then another 2-3 mm depth of soil and firm it gently.
3. Water well with the nutrient solution and then place it on the water container with its wick dipping into nutrient solution. Leave under a light bank for about three weeks or longer if only using natural light.
4. Monitor growth each week, noting observations. You could, for example, measure the height of the seedlings and note when leaves appear.
5. After four weeks, remove the seedling and shake it gently to remove any soil sticking to its roots**.** Measure its mass.
6. Place the seedling in an oven at 80 – 90 °C to dry. Measure its mass every day until 3 readings are constant.
7. Record the dry mass of plant material.

Results and conclusions

Record your observation and measurements.

Describe the effect of the nutrient-deficiency you studied.

If other students investigated deficiencies of other nutrients, summarise their results and draw your own conclusions from these results.