EXPERIMENT 4.2 Studying the effectiveness of phytoremediation in controlling soil contamination

Problem statement
Are phytoremediation plants effective in controlling soil pollution?

Hypothesis
The roots of water spinach can absorb nutrients such as ammonia in soil.

Variables
- Manipulated variable: The presence of water spinach
- Responding variable: Reading of ammonia in the soil at the end of the experiment
- Constant variable: Mass of black soil

Materials: Water spinach, 5 kg of food waste, 50 m*l* of 2 M potassium chloride solution, plastic container, 5 kg of black soil, distilled water, ammonia test kit

Apparatus: 100 m*l* beaker and oven

Procedure
1. A thin layer of 5 kg of black soil is flattened on a plastic sheet and dried by using an oven.
2. 2.5 kg of black soil is put in a plastic container and labelled as container *A*.
3. The remaining 2.5 kg of black soil is put in another plastic container and labelled as container *B*.
4. The ammonia content of the soil in containers *A* and *B* is determined as follows.
   (a) 7 g of black soil from containers *A* and *B* is put in different conical flasks.
   (b) 50 m*l* of 2 M potassium chloride solution is mixed into the two different conical flasks and shaken.
   (c) The mixture is filtered into a 100 m*l* beaker.
   (d) 20 m*l* of distilled water is added to the filtrate.
   (e) The concentration of ammonia in the filtrate is determined using an ammonia test kit.
5. 2.5 kg of food waste is mixed evenly with the soil mixture in container *A*.
6. Step 5 is repeated for the soil mixture in container *B*.
7. 20 water spinach stalks are transferred into container *A* while container *B* is left without a water spinach plant as a control set.
8. Containers *A* and *B* are left in a warm but sheltered area.
9. Equal amounts of water are added every day to containers *A* and *B* for two weeks.
10. After two weeks, step 4 is repeated to test for the ammonia content in containers *A* and *B*.
11. The final readings of ammonia are recorded in a table.

Results

Glass container	Reading of ammonia in the soil (ppm)	
	Beginning of the experiment	End of the experiment
A		
B		

Discussion
The container that contains water spinach will record a lower reading of ammonia level after two weeks.

Conclusion
The roots of water spinach can absorb nutrients such as ammonia in soil.