The lime content of the soil

Biology | Ecology & environment | Soil examination

Difficulty level	Group size	Preparation time	Execution time
easy	2	10 minutes	10 minutes

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Teacher information

Application

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Experiment setup

The lime content of the soil is important for plants in various respects. On the one hand, it influences the soil properties - e.g. the acidity, the heat retention capacity, the water balance and the aeration. On the other hand, calcium plays a direct role as an antagonist of potassium in swelling processes and also in a certain way as a building material for the plant.

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Other teacher information (1/2)

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Prior knowledge

Students should be familiar with the various biological, chemical and physical processes that take place in the soil. Particular attention should be paid to the relationship between potassium and calcium.

Scientific Principle

When hydrochloric acid meets lime, a reaction takes place that produces a gas (carbon dioxide). This causes foaming, which the students should observe.

Other teacher information (2/2)

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Learning objective

Students should recognize that there are differences in the amount of lime that is present in the soil.

Tasks

Have students bring in various soil samples from the area and use hydrochloric acid to detect the lime present in the sample.

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Safety instructions

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- Hydrochloric acid is corrosive! Wear gloves and protective goggles! Avoid contact with skin and eyes.
- The general instructions for safe experimentation in science lessons apply to this experiment.
- For the H- and P-phrases please refer to the corresponding safety data sheets.

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Student Information

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Motivation

Experiment setup

The lime content of the soil is important for plants in various respects. On the one hand, it influences the soil properties - e.g. the acidity, the heat retention capacity, the water balance and the aeration. On the other hand, calcium plays a direct role as an antagonist of potassium in swelling processes and also in a certain way as a building material for the plant.

Tasks

How much lime is in the soil?

Investigate the lime content of garden soil, sand and other soil samples using a chemical reaction.

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Equipment

Position	Material	Item No.	Quantity
1	Watch glass, dia.60 mm	34570-00	3
2	Pipette with rubber bulb	64701-00	1
3	Hydrochloric acid,approx.5% 250ml	30315-25	1
4	Spoon, with spatula end, 180 mm, plastic	38833-00	1
5	Protecting glasses, clear glass	39316-00	1

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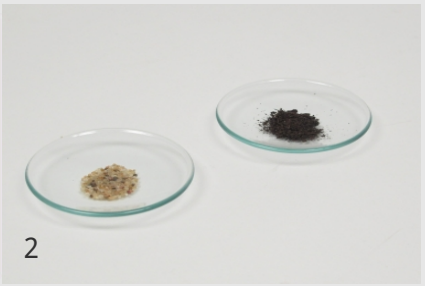
Set-up and procedure

- Place a small amount of the soil sample on a 60 mm diameter watch glass (Fig. 1).
- The soil sample may be fresh or air dry and should occupy approximately a 25 mm diameter circular area on the watch glass.
- Drop 3-5 drops of 5% hydrochloric acid from the pipette onto the soil sample. Observe the reaction.
- Proceed in the same way with the remaining soil samples (Fig. 2).

1



2

Report

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Task 1

Drag the words to the right place.

The _____ of the soil is important for plants in various respects. On the one hand, it influences the _____ - e.g. the acidity, the heat retention capacity, the water balance and the aeration. On the other hand, calcium plays a direct role as a _____ (antagonist) of _____ in swelling processes and also in a certain way as a building material for the plant.

- counterpart
- lime content
- soil properties
- potassium

Check

Task 2

Choose the correct statement.

- ○ If lime is present, the soil sample will freeze when hydrochloric acid is added.
- ○ If lime is present, the soil sample will turn green when hydrochloric acid is added.
- ○ If lime is present, the soil sample will begin to burn when hydrochloric acid is added.
- ○ If lime is present, the soil sample will foam when hydrochloric acid is added.

Check

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Task 3

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Choose the correct statements.

- [ ] The more the soil sample foams when hydrochloric acid is added, the less lime is present in it.
- [ ] The foaming of the soil sample is a reaction between the hydrochloric acid and the lime, which produces, among other things, carbon dioxide (CO2).
- [ ] The more the soil sample foams when hydrochloric acid is added, the more lime is present in it.

Check

Slide	Score / Total
Slide 12: Lime content	0/4
Slide 13: Lime	0/1
Slide 14: Foaming of the soil sample	0/2
Total	**0/7**

Solutions Repeat

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