

SECTION

3

Enrichment

A Salty Solution to an Acidic Problem

Most people have heard of acid rain and the damage it causes to forests. Acid rain is formed when certain chemicals, including sulfur and nitrogen oxides, react with water in the atmosphere. These chemicals are mostly produced by cars and electrical power plants. When these chemicals get into the atmosphere, they can combine with water to form strong acids. When the water finally gathers as rain and falls to the ground, the acid can damage or kill life forms.

A Soil Problem

Much of the damage to plants from acid rain is a result of damage that acid rain causes to the soil. Acid rain drains many of the nutrients out of the soil and can cause toxic substances to increase. Remember that, in an acid, the hydrogen ion is reactive. Chemical reactions involving hydrogen ions can cause changes in compounds in the soil. Examples of ions required by plants are potassium (K^+), calcium (Ca^{2+}), and sodium (Na^+). These ions might be washed out of the soil if rainwater becomes too acidic.

The acidity can also cause aluminum ions, which are toxic to many plants, to increase in concentration.

A Soil Solution

However, some good news is being discovered. Soils with the salt calcium carbonate ($CaCO_3$) are very good at neutralizing the acids. Rocks composed of this salt are called limestone. In Brazil, the atmosphere contains much acid rain. However, in the region of Belo Horizonte, a large amount of limestone is found. The limestone is mined to use as a building material. The dust from digging up the limestone can reach high concentrations in the air. In the atmosphere it can neutralize the acid in the rain. The neutralized rain is better for plant life in the region.

Farmers can use powdered limestone or lime (calcium oxide) to help neutralize the effects of acid rain. This is a case where a common salt can be used to combat acid rain. Reducing air pollution is still the best way to prevent acid rain.

1. What are the main sources of acid rain?

2. What can happen to soil if the hydrogen ion concentration increases?

3. Which common salt is good for neutralizing acid rain?

4. Where can this salt be found in nature?
