

## *Acids and bases*

Every beverage and other kinds of drinks, or foods that are eaten, have a specific taste to them. There are foods with sour tastes like buttermilk, lemon juice, orange juice, and certain candies. There is also a second taste that is bitter leading someone to immediately want to spit it out of their mouth. These sour and bitter tastes are caused by acids and bases.

The sour taste, like in orange juice, is tangy and is caused **acids** found in drinks or other foods. The word acid itself comes from a Latin word which means sour: *acere*. There are natural acids in most of the liquids people drink, like orange or lemon juice, meaning they are found in nature. Chemically, acids are molecules that split apart in water releasing hydrogen ions, increasing the number of these ions.

On the other hand, **bases** have a horrible taste, like baking soda, and have a soap-like texture. It will feel soapy if rubbed between the fingers. Both acids and bases were defined in 1887 by Svante Arrhenius. Chemically, bases are molecules that split when put in water and release hydroxide ions, but reducing the number of hydrogen ions.

Determining whether a substance is an acid or base cannot be done by tasting every liquid in nature. Instead, there is a special type of substance used to discover whether a liquid is acidic or basic in nature. The different substances are known as **indicators**.

The indicators will change color depending on whether the substance is an acid or base. The indicators, such as litmus, turmeric, and China rose are naturally occurring and are dipped into the liquid to determine its sourness or bitterness.

**Litmus** is the most commonly used natural indicator. Its natural colour is purple, but when an acidic solution touches it, it will turn red. If it is dipped into a basic solution the litmus will turn blue. Litmus is made from organisms called lichens,

which come from fungus and alga, and are found in the form of a paper strip or a solution used by chemists and other scientists.

A **pH scale** is used to indicate the number of hydrogen ions in a specific solution. The more hydrogen ions in a liquid, the more acidic the solution. If a solution has more hydroxide ions in it, meaning less hydrogen ions, the liquid would be less acidic and more basic. The pH scale uses a range from 1 to 14, with liquids having a pH value between 0 and 7 as being acidic, with a score of 0 as being the strongest acid. Bases score between 7 and 14 with a liquid having a pH score of 14 being the strongest base. A score of 7 indicates a solution is **neutral** meaning the hydrogen and hydroxide ions in the solution are equal, such as water.

Acids with a low pH and bases with a high pH are both very reactive and dangerous. They can be corrosive and burn a person's skin. Acids and bases can be found in nature such as those located in the leaves, thorns, seeds, or sap of plants. In bodies, the stomach has **hydrochloric acid** used to digest food and for killing disease-causing germs. The pancreas of the body is basic in nature and also helps with digestion. Acids and bases work together to help keep the body healthy. In addition, acids are used in batteries of cars, and bases are used in household cleaning products and as fertilizers for crops.

1) All of the following are rated as acid Except:

**A:** Orange juice

**B:** Buttermilk

**C:** Baking soda

**D:** Lemon juice

2) Which of the following can be the best to explain the difference between acids and bases?

**A:** Acids and bases have an equal number of hydrogen ions but varies in the number of hydroxide atoms.

**B:** Acids have a decreased number of hydrogen ions; bases have an increased number of hydrogen ions.

**C:** Acids have an increased number of hydroxide ions; bases have a decreased number of hydroxide ions.

**D:** Acids have an increased number of hydrogen ions; bases have a decreased number of hydrogen ions.

3) Which of the following is the most commonly used indicator?

**A:** Litmus

**B:** China rose

**C:** Turmeric

**D:** Plants

4) If litmus comes in contact with an acidic solution, the litmus will turn which of the following color?

**A:** Red

**B:** Blue

**C:** Green

**D:** Yellow

5) Which of the following score on a pH scale would indicate a neutral solution?

**A:** 1

**B:** 14

**C:** 0

**D:** 7

6) Which of the following part of the body contains hydrochloric acid?

**A:** Pancreas

**B:** Heart

**C:** Stomach

**D:** Kidney