

# VIDYA BHAWAN BALIKA VIDYAPEETH

## STUDY MATERIAL SCIENCE

### CLASS-VII

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#### ▸ Acids, Bases and salts

#### **Natural Indicators Around Us**

It is not safe to taste every substance to find out if it is acidic or basic. There are some special substances that have different colours in acidic and basic mediums. These substances are known as indicators. The indicators change their colour when added to a solution containing an acidic or a basic substance.

Some naturally occurring indicators are litmus, turmeric, China rose petals (gudhal) and red cabbage juice. These indicators show different colours in acidic and basic media. They are used to test whether a substance is acidic or basic in nature.

#### **Litmus- A Natural Dye**

A naturally occurring indicator, i.e. litmus is obtained from certain lichens (small plants) and used as a dilute solution. Litmus has mauve (purple) colour in water. In an acidic solution, it turns red. When it is added to a basic solution, it turns blue. Usually, it is available as a red and blue litmus paper.

#### **Turmeric is Another Natural Indicator**

Turmeric is a bright yellow powder obtained from a plant. It is called 'Haldi' in Hindi. Turmeric contains a yellow dye. Turmeric turns red in basic solution. It is used as indicator in the form of turmeric paper.

## **China Rose as an Indicator**

China rose is a natural indicator. It is called 'Gudhal' in Hindi. It is extracted from the red flowers of China rose plant with water.

## **Acid Rain**

The rain containing excess of acids called an acid rain. The rain becomes acidic because carbon dioxide, sulphur dioxide and nitrogen dioxide dissolve in rain drops to form carbonic acid, sulphuric acid and nitric acid respectively. It can cause damage to buildings, historical monuments, plants and animals.

This happens as follows:

- Acid rain makes the water of lakes, ponds and rivers too acidic due to which fish and other aquatic animals get killed.
- Acid rain eats up the leaves of the trees gradually. By losing leaves, the trees die. Acid rain also damages crop plants in the fields.
- Acid rain damages the metal structures like steel bridges, etc when it falls on them.
- Acid rain damages the surfaces of buildings and monuments made up of marble.

## **Neutralisation**

Acids and bases are chemically opposite substances. So, when an acid is mixed with a base, they neutralise (or cancel) the effect of each other. When an acid solution and a base solution are mixed in suitable amounts, both the acidic nature of the acid and the basic nature of the base are destroyed. The resulting solution is neither acidic nor basic. So, the reaction between an acid and base is known as neutralisation. In the process of neutralisation, salt and water are produced with the evolution of heat.

Salt produced in the reaction may be acidic, basic or neutral in nature. The evolved heat raises the temperature of the reaction mixture.

Acid + Base → Salt + Water (Heat is evolved)

e.g. Hydrochloric acid (HCl) (Acid) + Sodium hydroxide (NaOH) (Base) → Sodium chloride (NaCl) (Salt) + Water (H<sub>2</sub>O)

If dilute sulphuric acid is added to lime water (which is a base), then neutralisation reaction takes place and the reaction mixture becomes hot.

We are going to use an indicator which you have not used so far. It is called phenolphthalein.

**Note:** Phenolphthalein is an indicator used in the neutralisation process. When the solution is basic, phenolphthalein gives a pink colour but if the solution is acidic, it remains colourless.

### **Neutralisations in Everyday Life**

The neutralisation reactions involving acids and bases play a very important role in our everyday life. The treatment of an ant's sting, remedy for indigestion, soil treatment and the treatment of factory wastes, all involve neutralisation reaction.