



University
of Basel

Swiss Nanoscience Institute



Red cabbage indicator – advanced version

Once you have some experience with the red cabbage pH indicator, you can take the experiment a step further.

What you'll need

- red cabbage pH indicator, ideally decanted into a bottle
- 6 small glasses
- lemons, different soaps, household detergent

Instructions

Acidic scale:

Fill each glass with roughly the same amount of red cabbage juice. Pour 1 or 2 drops of lemon juice into the first glass, a little more into the second glass, and so on. This will result in a spectrum of colors ranging from violet to red.

Alkaline scale:

Once again, fill each glass with the same amount of red cabbage juice. Pour 1 or 2 drops of soaps and/or household detergent into the first glass, a little more into the second glass, and so on until you have an alkaline scale.

Changes over time

Leave the bottle of red cabbage juice at room temperature for one or two days and keep an eye on its color.

How it works

The pigment cyanidin contained in the red cabbage gains or loses hydrogen ions according to the pH of the solution. This leads to changes in color. At a pH of 6 to 7, cyanidin is violet. At lower pH values it is red, while at higher pH it turns blue, and eventually green. (Source: <https://www.seilnacht.com/Lexikon/Indikato.htm>)

Take care when handling strong alkalis. If you can, wear protective goggles to make sure nothing gets in your eyes, and ask your parents which detergents you are allowed to use beforehand. The strongest alkalis you are likely to have at home are drain cleaners. If you are allowed to use them, be very careful as they are highly caustic.



If you simply leave the cabbage juice alone, after a while bacteria will begin to grow in it. When you open the bottle, you'll probably notice some carbon dioxide escaping, produced by the bacteria as they break down organic compounds in the liquid. These metabolic processes also tend to produce acids, bringing our pH indicator closer to the red end of the scale.