

# MAGIC ART WITH RED CABBAGE

## The Scientific Explanation

**To understand how the magic works we need to understand...**

The red cabbage leaves' color comes from a group of pigments called anthocyanins, which are also found in other plants, including eggplants, beets, and even cyclamens. What sets this group of pigments apart is that they change their color depending on the pH

**of the substance they are mixed with. But what is pH?**

pH indicates a substance's acidity level. A high pH value means that a substance is basic (alkaline), and a low value means it is acidic. The middle of the pH scale is 7, which is neutral (neither acidic or basic).

Different substances have different pH values: Lemon juice, and citrus fruit in general, is acidic, as are vinegar and carbonated beverages. Soap solutions and bleach-based detergents are basic.

**Now back to the magic...**

The beautiful thing about anthocyanins is that a change in their pH level also changes their chemical structure. As a result, their color changes. Such materials are called indicators.

In a neutral solution with a pH value of 7, the color of the cabbage remains purple, but in an acidic solution (pH value lower than 7), the color changes, from purple to red to pink. In a basic solution (pH value higher than 7), the color becomes blue-green to yellow. Thus, in addition to creating magic art with solutions of different pH values, the cabbage water enables us to find out whether a substance is a base or an acid, and also to assess the substance's level of acidity or basicity.