

C4 pH value of beverages – How acidic is it in the stomach?

1 Apparatus and materials

- Paper towels or similar for wiping the hands
- 4 pH test strips
- 4 plastic cups, 100 ml
- Various beverages, e.g., tap water, mineral water (with carbon dioxide), apple juice, cola, tea
- 1 water-soluble marker for marking the cups

Attention: After you have completed the experiment, return the materials or dispose of them properly as instructed by your teacher.

2 Safety information

The materials may be used only as instructed by your teacher or as described in the experimentation instructions. The beverages are not suitable for consumption.

3 Conducting the experiment

- Number each cup with a marker in the order in which you will test the beverages.
- Note which beverage belongs to which number.
- Pour about 40 ml of each beverage into the cup (about half full).
- Have a pH test strip ready for each cup.



Fig. 1: Mark cups.



Fig. 2: Before measuring. The pH test strips are ready to dip in.

- Dip the pH test strip into the beverage for about 10 seconds. Make sure that all indicator fields (color fields) are wetted.
- Wipe off the strip on the edge of the cup.
- Read off the pH value of the particular beverage immediately by comparing the color of the pH test strip directly with the color field scale on the package. Make sure you hold the test strip against the color scale the right way round. Use the green field for orientation.
- **Note:** The color indication on the test strip can change again and give an incorrect pH reading if exposed to the air for a long time.
- After the experiment, empty the cups as instructed by the teacher, rinse them out with water, and wipe off the numbers. The test strips can be disposed of in the regular trash.

4 Observation

Note down the pH values of the various beverages.

5 Analysis

- a) Compare the pH values of the beverages with one another. Arrange them in a small table in ascending order of pH value.
- b) Check whether your results agree with the results of the other students.

6 Questions

- a) In what way do beverages with a low pH value differ from those with a high pH value?
- b) Deduce the following from your test results: What properties must the stomach have in order to process beverages and food with extreme pH values without harm?
- c) What pH value does gastric acid have? Explain why.
- d) There are illnesses in which the gastric acid attacks the mucus membrane of the stomach. What would a doctor advise or prescribe to the patient in this case?
- e) What path do beverages take on their way through the digestive tract?
Describe the path in your own words.
- f) How and in what sections of the digestive tract are the energy-providing nutrients, proteins, carbohydrates, and fats broken down mechanically and chemically?