

# Influence of antacid and some food on acidity of gastric juice. Potentiometric determination of pH.

04.09.12

[http://tera.chem.ut.ee/~koit/arstpr/ph\\_en.pdf](http://tera.chem.ut.ee/~koit/arstpr/ph_en.pdf)

## 1 Introduction

Human stomach produces 2-3 liters of gastric juice in a day (600-800 ml per meal). Concentration of hydrochloric acid in gastric juice is about 0.1-0.001 M (pH = 1 ... 3). Excessive secretion of gastric acid may cause heartburn (pyrosis) and peptic ulcer. To reduce the acidity of gastric juice, antacids („anti-acid”) are used. Selection of antacids and their active ingredients are listed in Table 1.

**Table 1.** Active ingredients of antacids.

Antacid	Active ingredient
Rennie	Calcium and magnesium carbonate
Maalox	Aluminum and magnesium hydroxide
Frutin	Calcium and magnesium carbonate
Alminox	„Aluminium aminoacetate”, magnesium hydroxide
Magaldrate	Aluminium-magnesiumhydroxide sulphate
Almagel (out of production)	Aluminum and magnesium hydroxide

Acid-base properties of solutions are expressed as pH. Potentiometric measurement is a rapid and precise method for determination of pH (approximate pH can be determined with indicator paper).

## 2 Aim of the work

Determine how is the acidity of gastric juice related to drinks consumed. Observe the change in acidity of gastric juice after administration of an antacid.

## 3 Instruments, chemicals and glassware

1. pH-meter/potentiometer Evikon E6115
2. Combined glass- and reference electrode
3. pH-meter calibration buffer
4. 0.1 M hydrochloric acid
5. Milk, Coca-Cola, water
6. Antacid (tablet or suspension)
7. Pipettes
8. Beaker
9. Magnetic stirrer and stirring bar

## 4 Analytical procedure

Before immersion of an electrode in the solution rinse it with distilled water and dry with paper. The solutions must be stirred during calibration and pH measurement.

## **4.1 Calibration of pH-meter**

Switch on the pH-meter using <On/Off> button. Remove the protective cover from electrode and open the hole in the upper part of electrode. For calibration immerse the electrode in calibration buffer with pH 7 and wait for 3-4 minutes. Press <CAL> button twice. The pH-meter measures the temperature of the solution and the potential in millivolts. „pH 4” will start flashing on the pH-meter screen. Immerse the electrode in calibration buffer with pH 4 and wait for 3-4 minutes. Press <CAL>. The pH-meter measures the temperature of the solution and the potential in millivolts. Now the pH-meter will switch to pH measuring mode and is ready for measurement.

## **4.2 Measurement of pH**

After calibration there is no need to push any button on the pH-meter for measurement. The electrode is simply immersed into the solution. Wait for stable readout!

### Procedure

1. Measure pH of drinks (milk, Coca-Cola, water)
2. Into 150 ml beaker measure 70 ml of 0.1 M hydrochloric acid (it is one tenth part of the amount of gastric juice produced per meal).
3. Measure pH of hydrochloric acid.
4. Add 10 ml of some drink (corresponds to drinking of half a glass).
5. Measure pH.
6. Add 10 ml more of the drink (corresponds to drinking of a glass).
7. Measure pH.
8. Measure new portion (70 ml) of hydrochloric acid into the beaker and start recording pH values in it.
9. Weight 1/10 of antacid dose (tablet or suspension) and add to the beaker.
10. Note the pH of the solution at 1 minute intervals.

## **5 Results**

The pH values of solutions and a graph with pH change after addition of antacid.