

Basic laboratory techniques

2. Preparation and dilution of the physiological solution

a) Prepare 100 ml of the physiological solution — 0.9% (w/V) NaCl aqueous solution — according to the following procedure:

Weigh 0.9 g NaCl into a beaker and dissolve it in approximately 50 ml of distilled water. Transfer the solution quantitatively into a 100ml volumetric flask. (Wash the beaker several times with a small amount of water and collect it all in the volumetric flask. Be sure that the total volume does not raise over the reading line.) Fill the volumetric flask up to the reading line and mix well.

b) Dilute the physiological solution 10×, 100×, 1000× and 10 000× as follows:

Measure out 5 ml of the solution using a glass pipette and transfer it into the beaker A, fill it up to 50 ml with water and mix it.

Take 5 ml from the beaker A and transfer it into the beaker B, fill it up to 50 ml with water and mix it. Continue in the same way to prepare solutions C and D.

c) Transfer 2ml samples of all the solutions into test tubes 1–5.

d) Add a drop of AgNO₃ reagent into each test tube and compare the precipitation intensity in individual test tubes.

Tasks: 1) Write the ionic equation of the precipitation reaction.

2) Calculate the molar and mass concentrations of the diluted solutions.

3. Diluting sulfuric acid solutions

a) Prepare 1% H₂SO₄ solution: add 0.5 ml of concentrated sulfuric acid into approximately 25 ml of distilled water in beaker A. Fill the beaker up to 50 ml and mix it.

b) Transfer 5 ml from the beaker A into beaker B. Fill up to 50 ml and mix.

c) Transfer 5 ml from the beaker B into beaker C. Fill up to 50 ml and mix.

d) Transfer 5 ml from the beaker C into beaker D. Fill up to 50 ml, mix and discard 5 ml from the beaker D.

e) Add 5 drops of the acid-base indicator (2% solution of neutral red; it is red in an acidic medium and yellowish in a basic one) into each beaker. Mix and note the color. Add 5 drops of the 1% NaOH solution and mix again. Note the color changes.

Tasks: 1) Write the chemical equation of the acidobasic reaction.

2) Explain the coloration differences between the solutions.

3) Calculate the molar and mass concentrations of the diluted solutions.