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Fluids - Blood

Use plasma as "sample" in experiments 1-3

The results of experiments 1 and 2 should be given in the table:

Determination	Result
Detection of Cl^- ions	
Detection of SO_4^{-2} ions	
Detection of HPO_4^{-2} ions	
Detection of Ca^{+2} ions	
Detection of iron ions	
Detection of glucose	

Experiment 1. Detection of inorganic compounds in blood plasma

Protocol

Firstly, the plasma should be deproteinated. Take 2.5 cm^3 of plasma to centrifuge tube, add 2.5 cm^3 distilled water and 2.5 cm^3 5% TCA (trichloroacetic acid). Wait 15 min and then centrifuge the tube at 3 000 rpm for 10 min. Obtained deproteinated plasma filtrate can be used for the following tests:

Detection of Cl^- ions

Take 0.5 cm^3 of plasma filtrate to glass tube and add 2 drops of 0.2% $AgNO_3$ – as positive result white, caseous precipitate of AgCl will be formed.

Detection of SO_4^{-2} ions

Take 0.5 cm^3 of plasma filtrate to glass tube and add 2 drops of 5% $BaCl_2$ – as positive result white cloudiness of $BaSO_4$ will be formed.

Detection of HPO_4^{-2} ions

Take 0.5 cm^3 of plasma filtrate to glass tube, add 0.5 cm^3 ammonium molybdate solution and 0.5 cm^3 concentrated HNO_3. Heat it carefully over the burner to boil. As positive result yellow precipitate of ammonium phosphoro-molybdate will be formed.

Detection of Ca^{+2} ions

Take 0.5 cm^3 of plasma filtrate to glass tube, add 0.5 cm^3 ammonium oxalate $(NH_4)_2C_2O_4$ and add few drops of concentrated NH_4OH. As positive result white cloudiness of calcium oxalate

(CaC_2O_4) will be formed.

Detection of iron ions

Take 0.5 cm^3 of plasma filtrate, add few drops of 20% sulpho-salicylic acid solution and add 0.5 cm^3 of concentrated NH_4OH. In alkaline environment, iron forms yellow complex with sulpho-salicylic acid.

Experiment 2. Detection of organic compounds in blood plasma

Protocol

Take 0.5 cm^3 plasma and add 2 drops of Molisch reagent. Mix and add carefully 1 $cm^3$of concentrated H_2SO_4. On the border of the two given reagents, red-violet roundel will be formed.

Experiment 3. Demonstration of buffering properties of the blood

Protocol

Use 4 conical flask(Erlenmeyer flasks) marked as 1, 2, 3, and 4:

To flask 1 - add 10 cm^3 distilled H_2O and 3 drops of bromophenol blue

To flask 2 – add 9 cm^3 distilled H_2O, 1 cm^3 plasma, and 3 drops of bromophenol blue

To flask 3 – add 10 cm^3 distilled H_2O and 3 drops of phenolphthalein

To flask 4 – add 9 cm^3 distilled H_2O, 1 cm^3 plasma and 3 drops of phenolphthalein

Next, to flask 1 add a few drops of 0.1 mol/dm^3 HCl to obtain the change of tint (colour). Then, to flask 2, add as many drops of 0.1 mol/dm^3 HCl to obtain the same colour as in flask 1. Similarly, to flask 3 add a few drops of 0.1 $mol.dm^3$NaOH to have pink colour and as many NaOH solution to flask 4 to achieve the same, pink colour. Explain, why in flask 2 and 4 you can add so many acid or basic solution.

Experiment 4. The influence of chemical and physical factors on the durability of erythrocytes

Protocol

Take 4 glass tubs and add to each 2 drops of whole blood. Then add:

to 1st – 5 cm^3 0.9% NaCl

to 2nd – 5 cm^3 distilled water

to 3rd – 5 cm^3 0.9% NaOH and a few drops of chloroform or ether

to 4th – 5 cm^3 2% NaCl

Mix vigorously each tube and observe what will happen to the erythrocytes. Explain the results achieved in each sample.