الجزء العملى

Mechanical adsorption

Tools:

Methylene blue- distilled water- conical flasks- filter papers – funnel- charcoal- absolute ethyl alcohol- beaker.

Procedures:

1- Filtrate about 40ml of Methylene blue soln. through filter paper and notice the filtrate colour

2- Add 10-15 gm of charcoal to the Methylene blue soln. in a conical flask with shaking for 5 min. and Filtrate.

3- Wash the ppt. from the previous test with 40 ml absolute ethyl alcohol with shaking for 5 min. and Filtrate.

Observation

……

……

……

……

……

……

……

……

……

……

Comment

……

……

……

Chemical adsorption

Tools:

Iodine soln.- starch soln.-test tube.

Procedures:

1- Take 5 ml of starch soln.in test tube

2- Add drops of Iodine soln.

Observation

……

……

Comment

……

……

……

……

……

……

……

Electrical adsorption

Tools:

Methylene blue soln.- distilled water- petri dishes- filter papers – light green soln.- burette-

Procedures:

1- Take 10-15ml of Methylene blue soln. in petri dish

2- Fix a filter paper in burette holder that touch the M.B. soln. in the petri dish.

3- Repeat this step using light green soln.

Observation

……

……

……

……

……

Comment

……

……

……

……

……

……

……

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Diffusion and dialysis

1-Diffusion through filter paper

Tools:

Starch soln.- NaCl soln.- iodine soln.- test tubes – AgNO3 soln.- beaker- filter paper.

Procedures:

1- Mix about 10 ml of Starch soln. with NaCl soln.in a beaker
2- Filtrate the mixture through filter paper.
3- Detect the presence of Starch soln. and NaCl soln. in the filtrate using iodine soln. and $AgNO_3$ soln. respectively.

Observation

……

……

Comment

……

……

……

……

……

……

……

2-Diffusion through cellophane paper

Tools:

Starch soln.- NaCl soln.- iodine soln.- test tubes – AgNO3 soln.- beaker- cellophane paper- distilled water- string.

Procedures:

1- Mix about 10 ml of Starch soln. with NaCl soln.in a cellophane paper, tie it with string and hang it in a beaker containing distilled water.

2- Wait for half an hour.

3- Detect the presence of Starch soln. and NaCl soln. in the distilled water using iodine soln. and $AgNO_3$ soln. respectively.

Observation

……

……

Comment

……

……

……

……

……

……

……

3-Diffusion through gelatinous membrane

Tools:

Starch soln.-gelatin- iodine soln.- test tubes –beaker

Procedures:

1- Prepare two test tubes and add 10 ml of gelatin in it.
2- Add 2ml of iodine soln. in one of these test tubes (tube 1) and 2ml of starch soln.in the other (tube 2).
3- Shake the test tubes well and leave them in refrigerator .
4- Add 2ml of starch soln. to tube 1 and 2ml of iodine soln. to the tube 2

Observation

……

……

Comment

……

……

……

……

……

……

……

4-Diffusion of ions through gelatinous membrane

Tools:

Gelatin- NaOH soln.- ph.ph. Indicator- $FeCl_3$ soln.-potassium Ferro cyanide- test tubes –beaker

Procedures:

1- Prepare 10 ml of gelatin soln. in a test tube.
2- Add 1ml of potassium Ferro cyanide and 1ml of NaOH soln
3- Add drops of ph.ph Indicator and shake the test tube well .
4- Leave the test tube in a refrigerator until it freeze.
5- Add 2ml of $FeCl_3$ soln. on the mix. and leave the test tube in a refrigerator

Observation

……

……

Comment

……

……

……

……

……

……

Determination the osmotic suction force by curvature the Ricinus petioles

Tools:

Ricinus petioles- knife or scalpel, NaCl solution (concentrated), distilled water, petri-dishes, different concentrations.

Procedures:

3- Cut the Ricinus petioles with knife

4- Put some of these petioles in 3 petri dishes

5- One of the petri dish contain distilled water , the second contain concentrated solution of NaCl

6- Put different concentrations of NaCl in petri dishes

7- Observe the curvature of Ricinus petioles in each petri dish.

Observation

……

……

……

……

……

……

……

……

……

……

Comment

……

……

……

……

……

……

……

……

……

……

……

……

……

plasmolysis and deplasmolysis

Tools:

NaCl solution-distilled water- petri-dishes- slide – cover- onion skin leaves.

Procedures:

1-examine the onion cells under microscope

2-immerse the onion cells in concentrated NaCl soln. and leave it for 30 min.

3- examine the onion cells under microscope.

4- Immerse the shrinked onion cells in distilled water and leave it for 30 min. then examine it under microscope

Observation

……

……

……

……

……

Comment

……

……

……

……

……

……

……

……

……

……

……

……

……

Osmotic tree

Tools:

$CuSO_4$ soln.(5%)- potassium Ferro cyanide- test tubes –holder.

Procedures:

1- Take 5ml of $CuSO_4$ soln.(5%) in a test tube and tie it in a holder.

2- Add crystals of potassium Ferro cyanide

3- Leave the test tube for 5 min.

Observation

……

……

Comment

……

……

……

……

……

……

……

……

Enzymes

Hydrolases enzymes

A- Carbohydrase.

1- Detection of the invertase enzyme

Tools:

Sucrose soln.- Fehling reagent – test tubes – water bath 100℃ , 40℃- invertase

Procedures:

1- Take 5ml of sucrose soln.in two clean test tubes.

2-Add 2ml of invertase in one tube and let the other tube without addition

3-Put the tubes in water bath at 38-40℃ for 30 min.

4-Add 5ml of Fehling reagent in the two test tubes.

5- Put the tubes in water bath at 100℃ for 15 min.

Observation

……

……

……

Comment

……

……

……

……

……

……

……

……

2-Detection of diastase

Tools:

Starch soln.- Fehling reagent – chines plate – water bath 100℃ , 40℃- diastase- iodine soln. -

Procedures:

1- Take 2 test tubes and add 5ml of starch soln.

2-Add 2ml of diastase in two tubes .

3-Put the tubes in water bath at 38-40℃ for 30 min.

4- After 15 min. take drops of the mix. inn the chines plate which contain iodine soln. to detect the complete conversion of starch to simple sugar.

4-Add 5ml of Fehling reagent .

5- Put the tube in water bath at 100℃ for 15 min.

Observation

……

……

……

Comment

……

……

……

……

……

……

……

……

……

……

……

……

……

B- Proteases enzymes

1-Detection of pepsin

Tools:

Egg albumin (protein sample)- HCl (0.4%) – test tube - pepsin

Procedures:

1-Take 5ml of egg albumin in clean test tube.

2-Add 5ml of HCl (0.4%) and 1ml of pepsin

3-Heat in water bath at 38-40°C for 30 min.

Observation

……

……

……

Comment

……

……

……

……

……

……

……

……

2-Detection of trypsin

Tools:

Egg albumin- NaOH (0.4%)– test tube – trypsin

Procedures:

1-Take 5ml of egg albumin in clean test tube.

2-Add 5ml of NaOH (0.4%) and 1ml of trypsin

3-Heat in water bath at 38-40°C for 30 min.

Observation

……

……

……

……

Comment

……

……

……

……

……

……

……

……

Oxidation reduction enzymes
A-Dehydrogeneses
1-Detection of Schardinger enzyme

Tools:

Fresh milk- formaldehyde– test tubes – M.B.- paraffin oil

Procedures:

1-Take 5ml of Fresh milk in a clean test tube and 5ml of boiled milk in another test tube.

2-Add 1ml of formaldehyde in each tube followed by drops of M.B

3-cover the test tubes with paraffin oil

4-Heat in water bath at 38-40°C.

Observation

……

……

……

Comment

……

……

……

……

……

……

……

……

B- oxidases

1- Detection of catechol oxidase

Tools:

Potato tubers – guiacol

Procedures:

1-prepare discs of potato tubers .

2-Add drops of guiacol on its surface.

Observation

……

……

……

Comment

……

……

……

……

……

……

……

……

C- peroxidase
Detection of peroxidase enzyme

Tools:

Radish roots – guiacol- H_2O_2

Procedures:

1-Prepare discs of Radish roots and grind them.

2-Take 5ml of guiacol on these discs.

3-Add 1ml of H_2O_2

Observation

……

……

……

Comment

……

……

……

……

……

……

……

……

Detection of catalase enzyme

Tools:

Yeast suspension – test tube– H_2O_2

Procedures:

1-Take 5ml of Yeast suspension in a test tube.

2-Add 2ml of H_2O_2 and cover the tube.

3- Put the tube in water bath at 38-40°C.

Observation

……

……

……

Comment

……

……

……

……

……

……

Transpiration

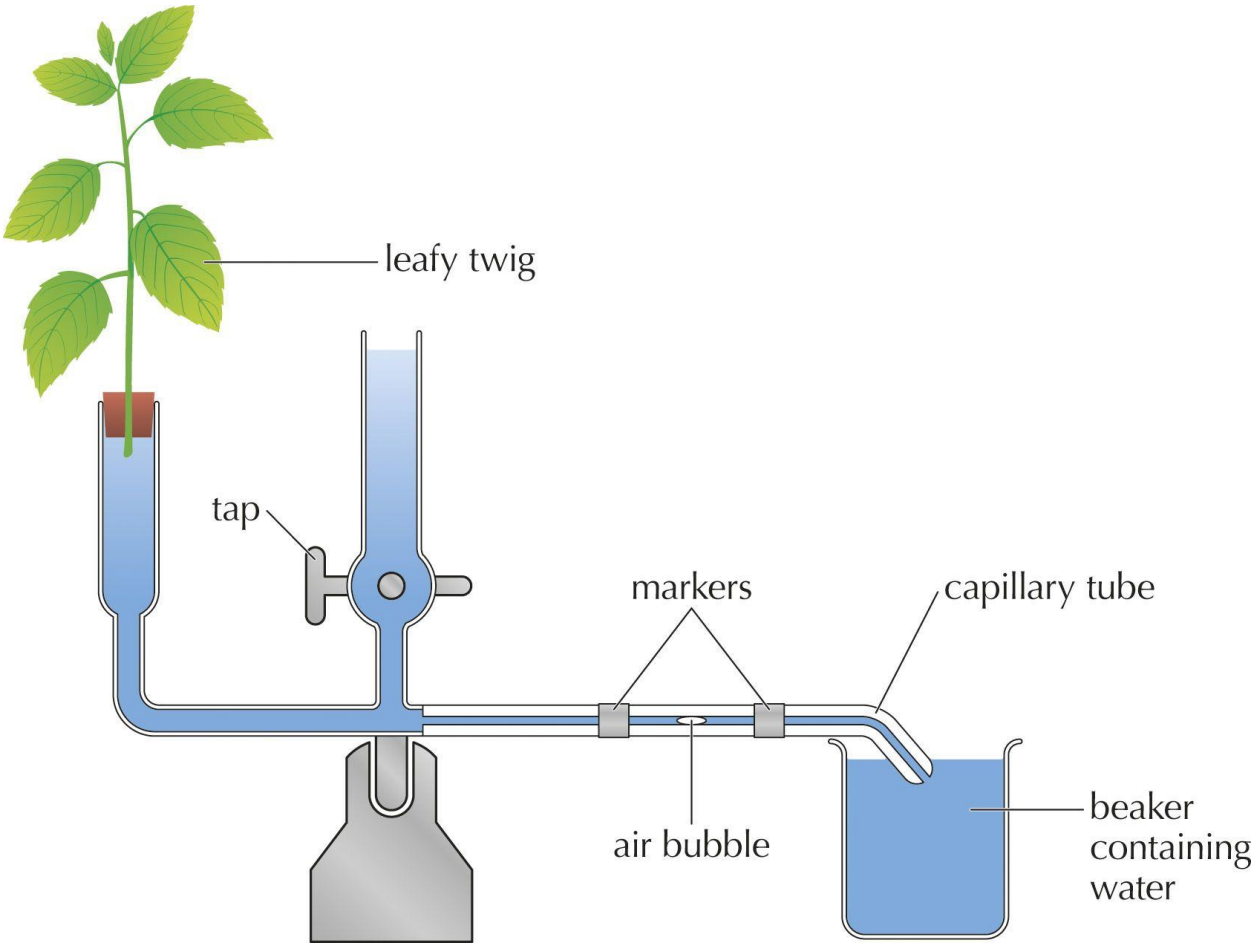
3-Potometer

- **Uses**

It is used to measure the rate of transpiration

- **The idea of its work**

It is based on the idea that the rate of absorption (the rate at which water plants acquire) almost equals the rate of transpiration (the rate at which water is lost)



Mechanism of work and the law

The plant that we want to measure transpiration rate for it is fixed in part designated for it inside the device, and the leaf surface area for this plant is estimated

There are two ways to measure the rate of transpiration

1-The gravimetric method for estimating the rate of transpiration

The apparatus is filled with water and branch of plant is fixed in its appropriate place, then the apparatus is weighted before beginning the experiment and weighted after the end of the experiment, the amount of lost water is calculated as the difference between the two weights

W1 = weight before beginning the experiment

W 2 = weight of the apparatus after the end of the experiment

$$\text{Transpiration rate} = \frac{\text{Weight of water lost (W1-W2)}}{\text{Leaf area (cm) x time (hours)}}$$

g / cm2 / hour

Methods for determining leaf area

1-By graphing

The paper is placed on a graph paper, then its dimensions are drawn with bullets and the number of squares taken is calculated, where each square represents 1 cm through the number of squares The area of the paper is approximately calculated

1- Weighted method

Draws a square with known dimensions, length and width, on a filter paper, and let its area be (A 1), then cut it and weight it (W1) .on the same type of filter paper draw the leave that you want to find its area and let its area A2 and weight it lets its weight W2

W1/ A1= W 2 /A 2

A2 = A1 x W2/W1

Leaf area = number of leaves x area of one leaves

If the stomata are found on two surfaces, the area of the leaves *2