



**FILTRATION USING
FILTER PAPER, CHEESE CLOTH,
ULTRA MEMBRANE,
NITROCELLULOSE MEMBRANE**

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How we can define the filtration?

- Separation** of insoluble substance from a liquid, by allowing it to pass through a porous material is called filtration
- Filtration can remove suspended material from liquid as long as the pores in the filter paper are smaller than the particles of the suspended substance.

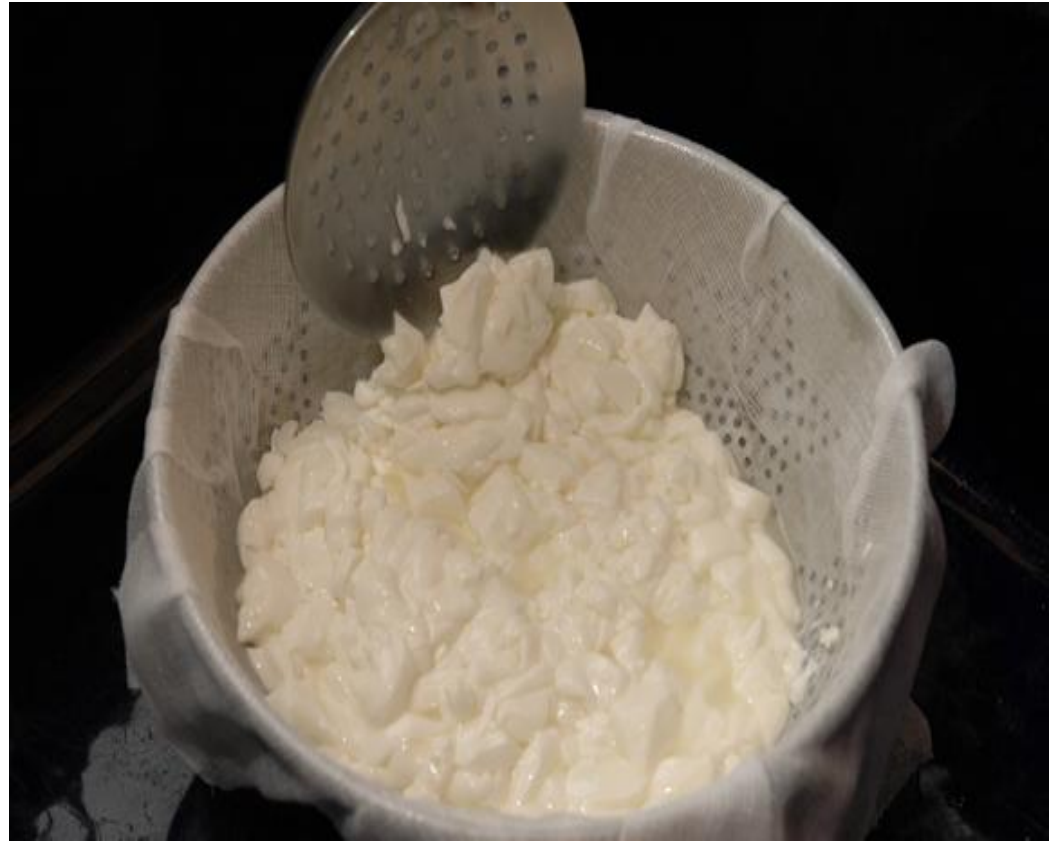
Procedure of Filtration

Filtration is done by passing a mixture through a filter. The **residue is the substance that remains on the filter paper.** *The filtrate* is the substance that *flows* through the filter paper.

1 - cheese cloth

The **cloth filter** is a simple and cost-effective appropriate technology method for reducing the contamination of certain solution.

The cloth folded then placed over a wide-mouthed container used collect the solid material e.g. cheese or used to collect surface water.



2- filter paper

Filter paper is a semi-permeable paper barrier placed perpendicular to a liquid or air flow. It is used to separate fine solids from liquids or air.

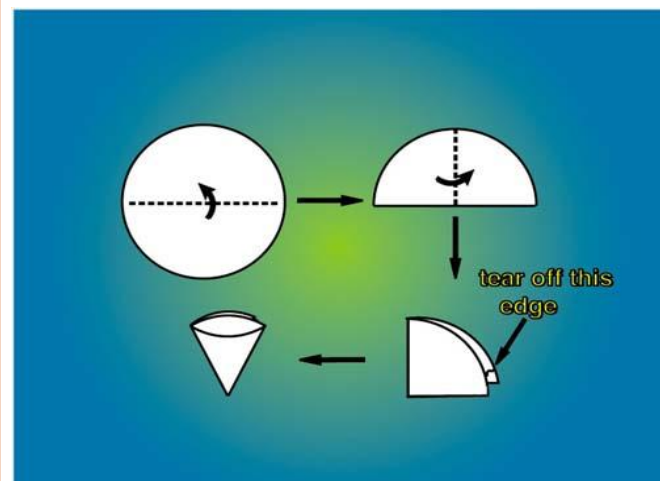
For laboratory use filter papers are made in a varieties of ways since specific applications require specific types of papers. The raw materials might be acid washed wooden fibers, carbon or quartz fibers.

In laboratories, filter paper is usually used with a filter funnel.

Ash less filter paper is mainly used for gravimetric methods in quantitative chemical analysis.

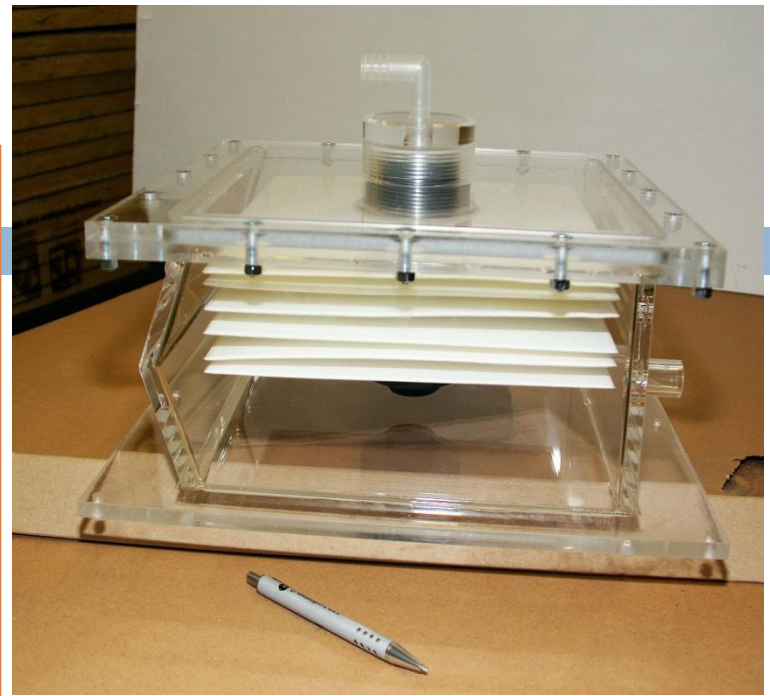
These papers may be impregnated with various reagents for use in detection tests like pH, pregnancy or diabetes.

-Coffee filters and tea bags are working in same principle.



3-Ultra membrane

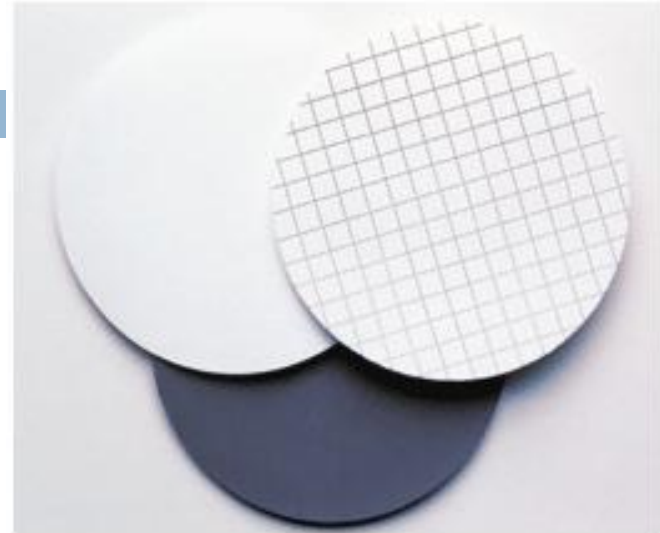
Ultrafiltration is a variety of membrane filtration in which hydrostatic pressure forces a liquid against a semipermeable membrane. Suspended solids and solutes of high molecular weight are retained, while water and low molecular weight solutes pass through the membrane. This separation process is used in industry and research for purifying and concentrating macromolecular (1-1000 KDa) solutions, especially protein solutions.



4- nitrocellulose membrane

Nitrocellulose membrane is a high quality membrane ideal for analyzing proteins and nucleic acids. Nitrocellulose membrane is commonly used for nucleic acid and protein detection in research and diagnostic applications.

Nitrocellulose membrane has high binding capacity for nucleic acids and proteins. Presence of high levels of cellulose acetate, can reduce the protein binding capacity of the membrane. The most important characteristics of the nitrocellulose membrane , are high tensile strength and hydrophilicity



Method:

a) Filtration using Cheesecloth

1. Measure 500ml (2 cups) of distilled water into a large graduated cylinder
2. Add 30 ml (2 tbsp.) of finely crushed leaves into the water and stir gently.
3. Record the appearance of the mixture in the cylinder.
4. Place a clean piece of screen over a 1000-mL beaker, labeled Beaker A, and spread a piece of cheesecloth (or kitchen cloth) over the screen
5. Pour the mixture slowly through the filter (make sure it goes through both layers) into the beaker
6. Observe the liquid in the beaker and the solid on the filter and record.
7. Repeat steps 1-6 using Beaker B and a piece of cotton fabric placed over the screen. Make sure you rinse the screen in between.
8. Repeat steps 1-6 using Beaker C and a coffee filter placed over the screen. Make sure you rinse the screen in between.
9. Compare the results of Beaker A, B and C.

Method:

b) Filtration using Filter Paper

1. Fold the filter paper into four and fit it into the funnel.
2. When the filter paper does not fit well into the funnel, slightly adjust the folding in order to fit it perfectly.
3. In order to make the filter paper fit perfectly, cut the edge of the over lapping filter paper in contact with the funnel obliquely. Wet the paper with the solvent and press with fingers to fit the paper in.
4. Place a container in a manner that the leg of the funnel touches its inside wall.
5. Pour the unfiltered solution used in the earlier experiment in the funnel.

c) Nitrocellulose filter

Nitrocellulose filter is used to separate single stranded DNA and Proteins. Proteins and single stranded (ss) DNA adsorb to nitrocellulose filters. A solution containing ss DNA/protein is filtered through a nitrocellulose filter.

The amount of ss DNA/protein adsorbed to the filter can be determined by measuring the absorbance of the solution before and after filtration at 260 and 280 nm respectively.

Adsorption of Protein

1. Prepare a solution of albumin and casein (5 g/litre)
2. Measure the absorbance at 280 nm
3. Filter the solution through a nitrocellulose filter and measure the absorbance of the filtrate at 280 nm.

Adsorption of Single Stranded DNA

1. Dissolve 10 mg of DNA (obtained from Sigma or any other commercial sample) in buffered saline and make up the volume to 100 ml.
2. Read the absorbance at 260nm.
3. Heat the solution by placing in a boiling water bath for 10 minutes.
4. Pass the solution quickly before it renatures through the nitrocellulose membrane.
5. Read the absorbance of the filtrate at 260 nm.

Thank
you