

Sedimentation method

This method may be used for the size range of 1-200 μm .
→ The diameter is expressed as Stokes diameter.

Dist.

Applications:

- These used for ~~the~~ formulation & evaluation of suspension.
 - it also used for evaluation & formulation of emulsion.
 - it is also used for the determination of molecular weight of polymer.
- principle:—

The rate of settling of particles in a suspension or emulsion can be obtained by Stokes' law.
→ As per Stokes' law, Stokes diameter or d_{st} can be expressed by

$$d_{st} = \frac{18 \eta_0 h}{\sqrt{(\rho_s - \rho_0) g t}}$$

Here h = distance of fall in time t

η_0 = viscosity of the medium

ρ_s = density of the particle

ρ_0 = density of the dispersion medium

g = Acceleration due to gravity

t = Time taken

Method

An apparatus is used for addresson pipette.
→ it is usually consist of 55 ml

cylindrical vessel containing watch glass.
→ The pipette is shielded with a ground glass stopper.
→ When the pipette is placed in the diffuser the lower tip should be 2 cm below imp. the surface of suspension.

Procedure

1-2% suspension is prepared in suitable medium.

→ A little centrifuging agent should be added to the uniform dispersion suspension.

→ The suspension is then transferred into the andresen vessel.

→ stopper is placed and the vessel is shaken to distribute the suspension uniformly.

→ stopper is then removed and at different intervals 10 ml of sample is withdrawn and collected in a watch glass.

→ The sample are evaporated and the weights are taken.

→ The particle diameter is calculated from stock's law.

→ The weight obtained will be plotted against different diameters and the graphs are obtained.

practical consideration:

The suspension should be very dilute.

1-2%

→ The flow should be laminar & stream line.

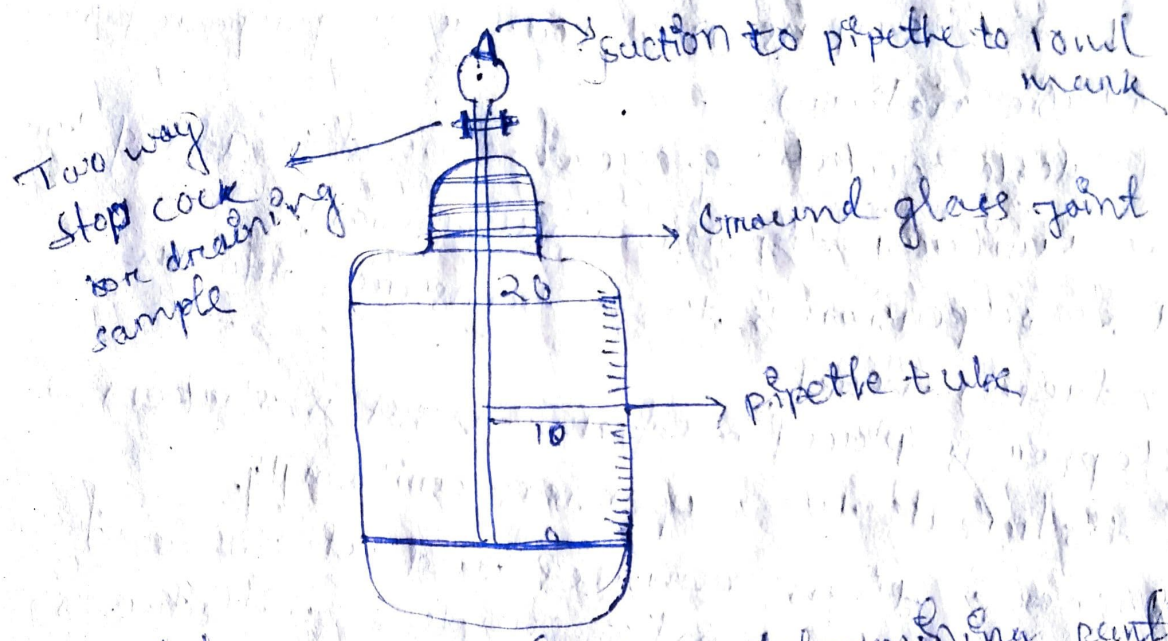
Advantage

→ This method is easy & simple and can be carried out rapidly

Disadvantage:-

→ Difficult to operate easily bcz the suspension get different result.

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Addressen apparatus for determining particle size by gravity sedimentation method

Conductivity method:-

- particle size range of 0.5 - 5000 nm are measured by conductivity method.
- By this particle size expressed as volume diameter i.e. d_v .

Application:-

- Applied for suspension and some time solution.
- It is used also in desulfation of drug in desired medium.

→ it is also used for the effect of antibacterial agent on the growth of microorganisms.

Principle

It is otherwise called as Coulter counter method.

→ The particles are suspended in a conducting electrolyte like NaCl.

→ The dispersion is filled in the sample cell.

→ The cell contains an ~~orifice~~ orifice & maintains contact to the external medium.

→ The electrodes are placed in the solution i.e. inside cell and suspension i.e. outside the cell.

→ The constant voltage will be applied across the 2 electrodes.

→ In this position the current passes ~~at~~ through the suspension particles & travels through the orifice.

→ The particles of flow displace its own volume of electrolyte to reach into the beaker.

→ This change in electric resistance termed as voltage pulse which is related to particle volume.

→ This voltage pulse will be analysed by pulse height analyser.

→ The analyser is previously calibrated & terms in particle size for different

threshold settings.

⇒ For a given threshold settings, pulses are electronically counted.

⇒ This gives the particle size distribution which can be plotted on different graph.

Advantage: -

- ⇒ 4000 particles per second can be counted by this method.
- ⇒ Short time period is needed for analysing the particle size distribution.
- ⇒ It is a quick and accurate method.

Disadvantage

⇒ This method is unsuitable for highly polar & H₂O soluble materials, but if a non-solvent is used it may not produce adequate conductance.

