

Aim ~~→~~ Goal

To study the effect of various factor on the rate of filtration.

Reference :-

Requirements :-

- Glasswares :- Beaker, filter paper, measuring cylinder, funnel, wire gauge.
- Chemicals :- Calcium carbonate.

Theory :-

Principle :- Filtration is a process where solid particle suspension are separated from liquid or gas employing porous media which retain a solid particle but allow the fluid to pass through. A volume of filtration obtain through the filter paper per unit time is called rate of filtration.

Observation :

S.No.	Sample	Time taken	Vol. of filtrate	Rate of filtration
1.	5% CaCO_3	197 sec	40 ml	0.20 ml/sec
2.	10% CaCO_3	300 sec	40 ml	0.13 ml/sec

Calculation :

$$\text{Rate of filtration} = \frac{\text{Vol. of filtrate}}{\text{Time taken}}$$

$$(i) \text{ 5\% } \text{CaCO}_3 = \frac{40 \text{ ml}}{197 \text{ sec}} = 0.20 \text{ ml/sec}$$

$$(ii) \text{ 10\% } \text{CaCO}_3 = \frac{40 \text{ ml}}{300 \text{ sec}} = 0.13 \text{ ml/sec}$$

eg:- $\boxed{\frac{dv}{dt} = \frac{K.A \Delta P}{\mu L}}$ - darcy's law

where,

A = Area of filter,

V = Volume of filter,

K = Constant,

ΔP = Pressure drop across the filter media and cake,

μ = Viscosity of filtrate

L = Thickness of cake

t = Time of filtration.

Procedure :-

i) Effect of thickness of cake:-

Prepare two solutions of calcium carbonate using water as solvent the concentrations of solutions are 5% and 10%.

Filter them and note the time taken for filtration to calculate the rate of filtration and compare them.

(ii) Preparation of 5% solution of CaCO_3 .

Accurately weigh 2.5g of CaCO_3 and dissolve into 50ml of distilled water.

(iii) Preparation of 10% solution of CaCO_3

Accurately weigh 5g of CaCO_3 and dissolve into 50ml of distilled water.

Result:-

The study of effect of rate of filtration was successfully performed in the laboratory.