Solids that help in filtration (by inc. the rate of filtration eg: Charcoal, Bentonite, Kieselghur).

Unit 2.

→ Filtration ∴ (unit operation);

Filtration maybe defined as a process of separation of solids from a fluid by passing the same through a porous medium that retains the solid but allows the fluid to pass through (filter medium to porous in nature).

(contains solid & liq) The suspension to be filtered is known as slurry. The porous medium used to retain the solids is known as filter medium. The accumulated solids on the filter is referred as filter cake, while the clear liquid passing through the filter is filtrate.

Factors Influencing Filtration ∴

A simple straining process does not provide a complete description of how particles are removed from a suspension. The particles are exposed to a no. of forces including gravity or electrical fields.

factors influencing filtration are ∴,

While performing filtration it is necessary to keep in mind whether filtrate, filter cake or both are required.

It depends upon

Properties of the liquid - density, viscosity & corrosiveness

Properties of solid → particle shape, size, charge, density, size distribution, rigidity or compressibility of the solid under pressure & tendency of particle to flocculate together

Proportion of solids in the slurry → rate at which filter cake is formed especially in the early stage of filtration

Objectives → whether solid or liquid both are to be collected.

Temperature of suspension.

Surface area of the filter medium

Size, shape of solid or it is either polydisperse or monodisperse

Pressure → applied through gravity or by applying upstream pressure (motor is used to bring slurry on filter media), downstream (motor is attached below) → more preferable

Downstream method not used for thermolabile substances

motor

Downstream pr
collapse of m
accident Eu

→ Dilute
1% w
is do

Proce

Core size
less

→ As
the
thro
cak
gets

Resi
of

Int
re

Aft
re

Sc
+

Downstream pressure reduces chances of collapse of machine hence reduces chances of accident (when vaccum is created)

→ Dilute slurry (impurities less than 1% w/v of solid) then clarification is done.

Process of filtration ↓

Pore size of filter medium should be less than particle size.

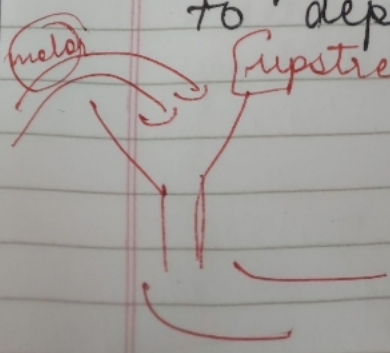
→ As the filter cake deposits on the filter media the liq flows through the capillaries of filter cake & the surface phenomenon gets converted to depth phenomenon

Resistance also inc. as the deposition of filter cake inc (thickness inc.)

Intially Resistance (negligible) & rate of filtration is maximum.

After sometime resistance ↑ & rate of filtration ↓

Surface phenomenon gets converted to depth phenomenon



→ Membrane filter for opthalmic preparations

Types of filtration
Surface filtration
Depth filtration

→ Applications of filteration
Production of bulk drugs.
Production of oral formulations (tinctare, suspension, emulsion, aromatic elixir)

G.P.A

HEPA filters (High Efficiency Particulate Air filter) generally used for air (microbes, dust particles) size less than 0.5 micron
for sterile product (parentrals & opthalmic preparation) membrane filter used

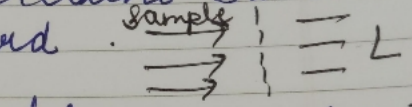
In filtration of sterile liquids (membrane filters) pore size less than size of bacteria

Mechanism of filtration

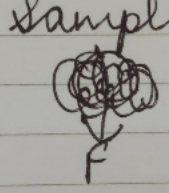
- Straining
- Impingement
- Entanglement
- Attractive forces

Straining → Use of filter media to separate solid from liq

Impingement → Sample strikes on filter media solid retains back & liq move forward.



Entanglement → Use of fibrous material to cause filtration K/a entanglement.



Attractive forces → Filter media is charged either +ve or -ve & since opp. charges attract each other. for eg: filter media is -vely charged & the +vely charged particles attract & retain on filter media