Wetting Phenomena and Wetting Agents

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Wettability

- is the property that indicate the affinity between solid and fluid phase
- In order for wetting of solid to occur, the liquid must displace air and spread over the surface of the solid, otherwise, we say that the solid is NOT wetted.
- When a liquid comes into contact with the solid, the behavior of the liquid will depend on the balance between the forces of attraction of molecules in the liquid (cohesion) and the forces of attraction between the liquid and the solid phases (adhesion) .

Wettability

- In the case of mercury and glass, attractive forces between molecules of mercury and glass are much smaller than the forces of attraction between molecules of mercury themselves. As a result, mercury will come together as a single spherical drop.

- In contrast, for water and glass, attractive forces between the solid and liquid molecules are greater than the forces between molecules of liquid themselves, and so the liquid is able to wet the surface of the glass.

Dispersion

- Many pharmaceutical preparations require dispersion of solid in liquids.

- Example: The preparation of suspension requires that the fine solid particles immersed and then dispersed in a liquid vehicle, that is mean the solid particles have to be wetted in order to be dispersed in a liquid.

Spreading Coefficient

- Lotions, creams, sunscreens, and many cosmetics have to be spread on the skin to exert their effect. When a liquid spreads over the surface of a substrate, it covers all or a part of the surface.

- The substrate can be a solid or another liquid that is immiscible with the spreading liquid.

Spreading Coefficient

- When a drop of oil is added on the surface of water, three things may happen:

1- The drop may spread as a thin film on the surface of water.

2- It may form a liquid lens if the oil cannot spread on the surface of water.

3. The drop may spread as a monolayer film with areas that are identified as lenses

Application of S.A.A

1- As emulsifying agents by decrease Interfacial tension

2- Wetting agents by decreasing the contact angle; wetting is the first step for dispersing a solid in a liquid vehicle

3-Detergents; which are surfactants that are used for removal of dirt

4- Solubilizing agents by formation of micells

5- A surfactant may affect the activity of a drug.

Electro-kinetic Phenomena

- The movement of a charged surface with respect to an adjacent liquid phase . The most important application of this phenomena is electrophoresis
- Electrophoresis: Involves the movement of a charged particle through a liquid under the influence of an applied potential difference.
- An electrophoresis cell fitted with two electrodes contains the dispersion. When a potential is applied across the electrodes, the particles migrate to the oppositely charged electrode.
- From knowledge of the direction and rate of migration , the sign and magnitude of zeta potential can be determined It is mainly used for separation of plasma protein


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