

∴ Liquid dosage form:

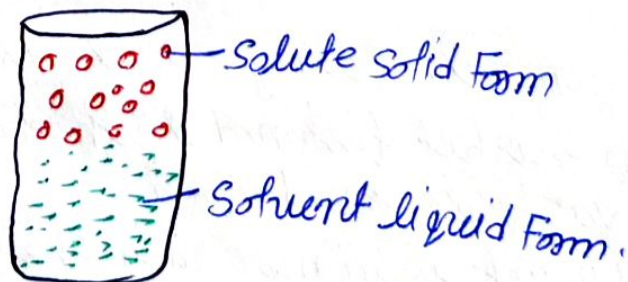
- When the active Pharmaceutical ingredient (API) is mixed in liquid excipient then it is called liquid dosage form.
- Those liquid dosage form which is taken inside from mouth is called liquid oral dosage form.
- In liquid ^{oral} dosage form (LODF) the (API) is called solute and the excipient is called solvent.
- On the basis of nature of liquid dosage form it is of two types -
 - (i) Monophasic
 - (ii) Biphasic.

(i) Monophasic Liquid dosage form

When the (API) is completely soluble or mixed in the liquid solvent then it is called monophasic.

→ This type of solution is also called Homogenous mixture because the API is disappear after mixing.

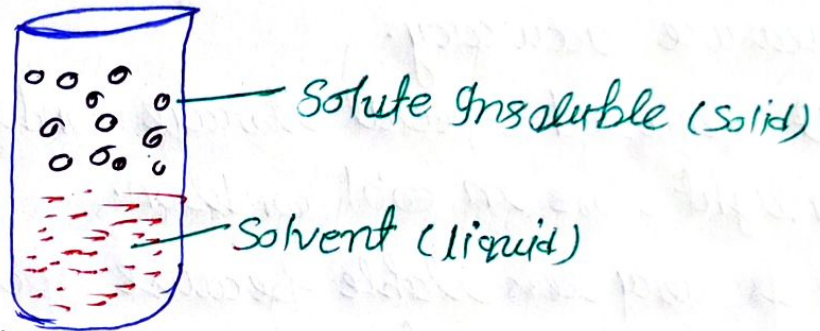
Ex: Solution



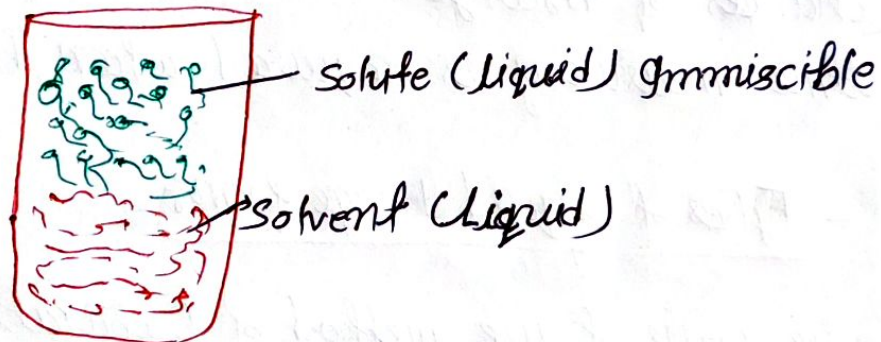
Monophasic

(2) Biphasic :

→ When (API) is not mixed in solvent completely then both solute and solvent phase are seen separately so it is called biphasic liquid dosage form.



Biphasic Suspension.



Advantages of Liquid Dosage form :

- The liquid dosage form is easily to swallow for children and old patient.
- The absorption rate of these dosage form is faster because it has no disintegration and dissolution time.
- Due to its flow property it has flexibility in achieving dose.
- We can make liquid dosage form tasty and palatable.

Disadvantages of Liquid dosage form:

- It has shorten life after opening the cap it has to be finished in 15 to 30 days.
- Each time when LDF is taken then it is harder to measure accuracy.
- It required special storage condition like away from sunlight store in cool condition.
- It is very less stable because after opening the cap there is changes of contamination with bacteria.
- LDF is always store in a glass container so there is a changes of breakage.
- Each time measuring is required when drugs is taken

← Types of liquid dosage form:

→ on the basis of use method of Preparation LDF is of following types -

- 1) Liniment
- 2) Infusion
- 3) Emulsion
- 4) Suspension
- 5) Syrup
- 6) Elixer
- 7) Tincture
- 8) Optic drops

Syrup (Solution)

- Syrup is a form of pharmaceutical solution in which the active pharmaceutical drug is dissolved in liquid vehicle.
- The pharmaceutical drug is completely dissolved in liquid solvent it is used internally for local or systemic action.

Types of Syrup:

It is of three types:-

- (1) Simple Syrup.
- (2) Flavoured Syrup.
- (3) Medicated Syrup.

(1) Simple Syrup:-

→ In this type of syrup simple drug is dissolved only in water.

Ex:- Salt in water.

(2) Flavoured Syrup:-

→ In this type of solution the active pharmaceutical drug is dissolved in a flavoured vehicle.

→ In flavoured vehicle the sugar, flavour, colour, diff. agent are premixed Ex - Cough Syrup.

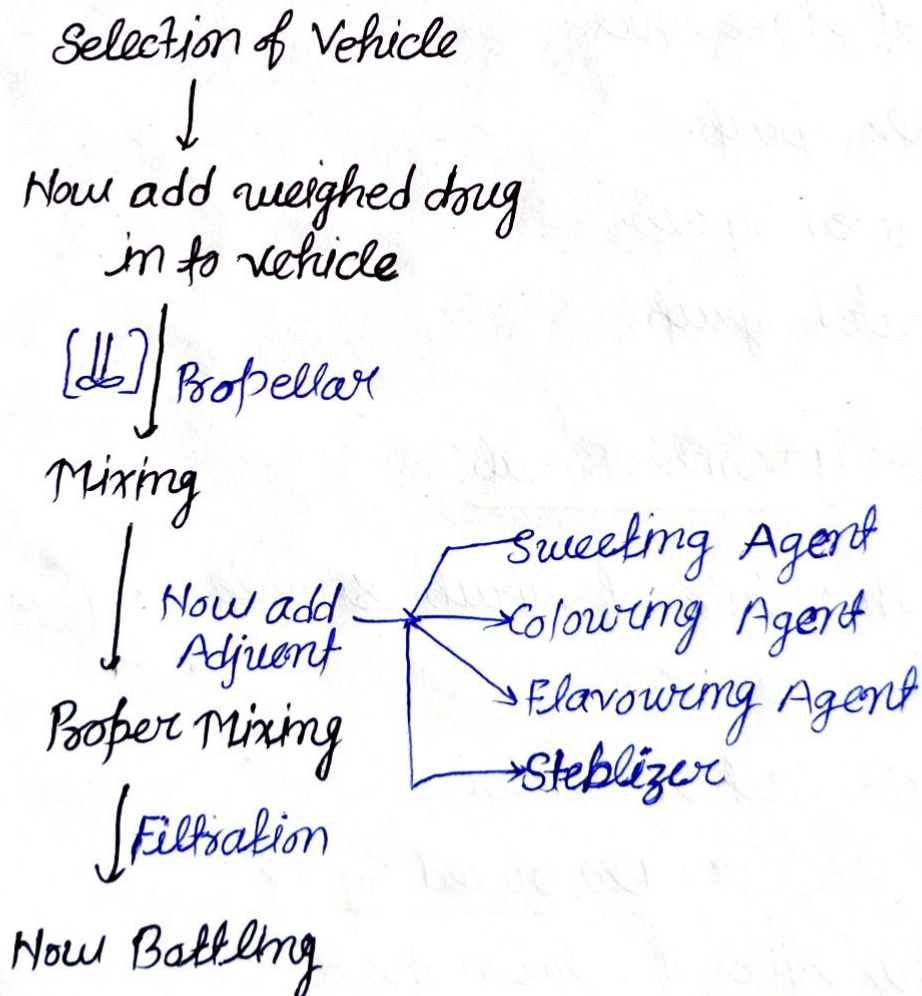
(3) Medicated Syrup:

→ In this syrup the pharmaceutical drug is dissolved in vehicle which contains some medicine.

Ex- Paracetamol Syrup (P.C.M)

Method of Preparation of Syrup:

- In the preparation of syrup first of all a syrup and then add drug ingredient.
- Following steps are involved in preparation of syrup



∴ Advantage And Evaluation of Syrup ∴

(1) Clean and Purified Vehicle (Water) The water is filtered and purified at the plant to destroy any micro-organisms and to remove particles from the water. Quality control techniques test water frequently to ensure that it is clean and pure before the syrup is made. The syrup is also thoroughly filtered before filling in bottles.

(2) Light Transmittance Meter: A light transmittance meter is a newer tool that is used to check syrup color in a light transmittance meter. A syrup sample is checked for color by passing light through the sample.

→ The percentage of light transmission is compared to light transmission rates set for different grades.

→ When using one, you need to be sure there are no fingerprints on the syrup test bottles and that the syrup sample has no bubbles or cloudiness. Any of these conditions may diminish the light that is transmitted through the sample and therefore lowers the grade of the sample.

(3) Visual Inspection:

- with visual inspection the ingredients and the final products are carefully examined for purity and Appearance.
- Physical Appearance of products for patient adherence and compliance is critical so it should be:
 - (A) Good looking
 - (B) Clear in Appearance

(4) pH Measurement

- The measurement and Maintenance pH is also very important step in the quality control testing
- Generally there are two different types of method used in the measurement of pH.

(5) Physical Stability In Syrup:

- The Syrup are must be stable physically.
- Exa: (i) It appearance (No of Crystallization and microbial growth).
- (2) Colour must be completely soluble with other ingredients
- (3) Odour and taste Palatable.
- (4) Solid material is completely miscible in liquid

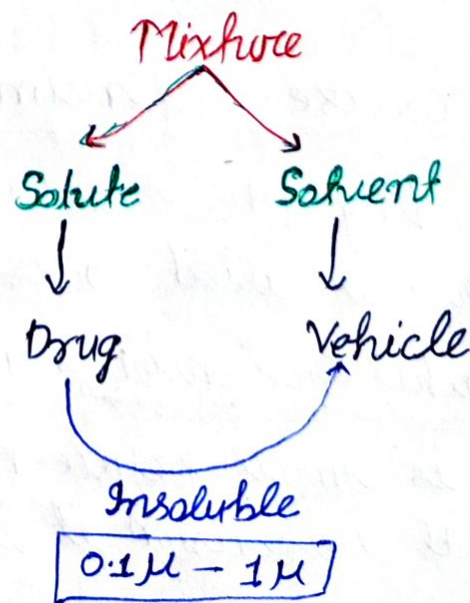
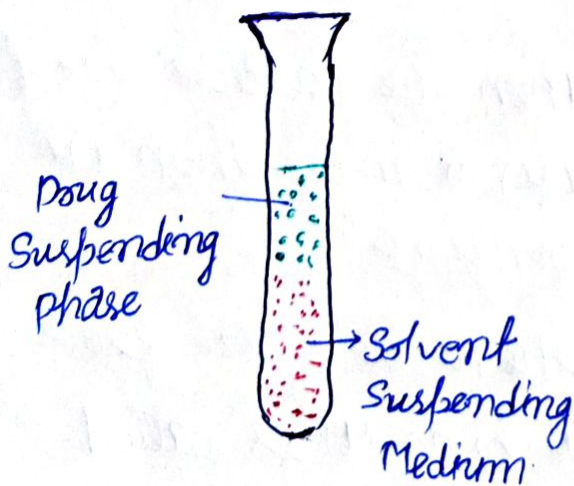
(6) Sucrose Concentration:

- ⇒ The determination of sucrose concentrations is also very important in quality control testing of syrup.
- ⇒ If the concentration of sucrose in the syrup is very high it may crystallise the syrup and less sucrose concentrations give favour for the microbial growth.
- ⇒ There is no specific method for the determination sucrose in syrup we use HPLC and UV spectroscopy for this purpose.

⇒ Suspension:

Suspension is a liquid dosage form in which the solid drug particles of size (0.1μ to 1μ) is dispersed in the liquid vehicle.

- ⇒ But these solid particle are not soluble in liquid.



Factors Affecting Stability

- (1) Particle Size: The particle size of should be small because the larger particle will fallen down with high sedimentation Rate and become unstable.
- (2) Viscosity: The solvent or suspending medium should be viscous so the rate of sedimentation is decrease.
- (3) Agitation: With proper shaking the particle are Redispersed.

Types of suspension

(1) On the basis of Particle Size: On the basis of particle size of suspending phase is **of two types -**

or more than 1μ , then this is called coarse suspension.

(A) Coarse Suspension
this is less stable

(B) Colloidal Suspension.

(A) Coarse Suspension: When the particle size of suspending phase is $(0.5\mu - 1\mu)$ or more than 1μ then this is called coarse suspension.

(B) Colloidal Suspension: When the particle size of suspending phase is small between $(0.1\mu$ to $0.5\mu)$ is called colloidal suspension it is more stable

⇨ on the basis of Aggregation or Flocculation:

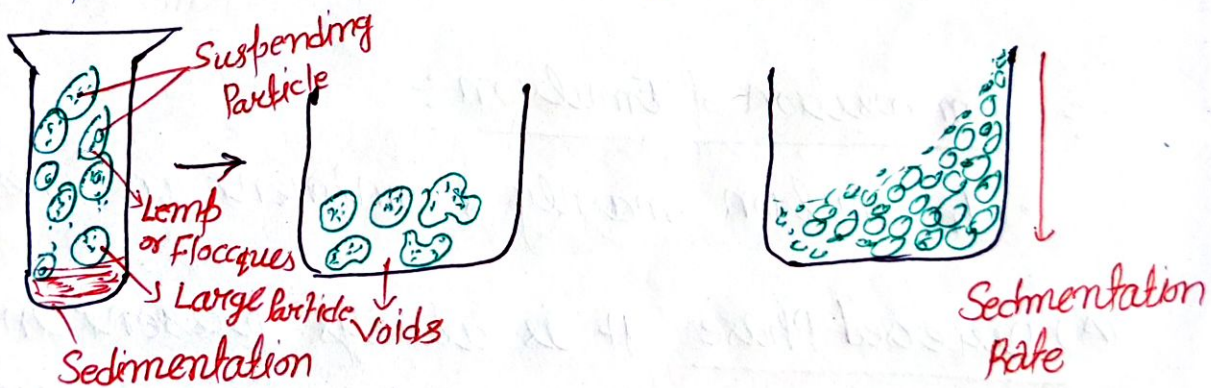
→ When suspending particle are dispersed in suspending phase then due to attraction force they comes closer and make flocules. (Flocules)

on the basis of this it is of two types :-

(A) Flocculated Suspension:- When flocules formation takes place in suspension then it is called flocculated

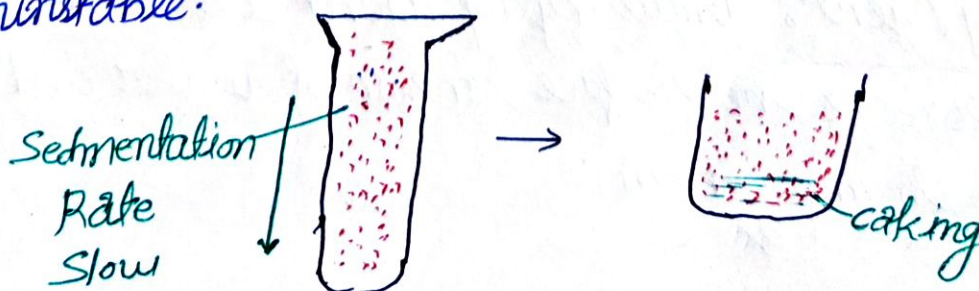
→ There sedimentation rate is very high but there space between these particle in which solvent is filled so they easily Redispersed.

→ This suspension is stable for long term.



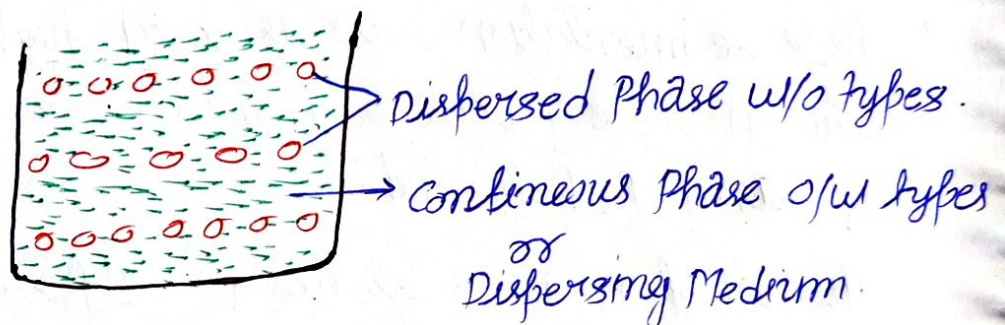
(B) Deflocculated Suspension:- When particle size are always is dispersed phase and they do not make it is called deflocculated suspension.

→ They form solid cake After make long time so it is unstable.



Emulsion Liquid dosage Form:

- Emulsion is a liquid dosage form in which two liquid are mix together and both are immiscible in nature.
- Emulsion is a biphasic and heterogenous Nature in which dispersed phase is mixed in dispersing medium or continuous phase

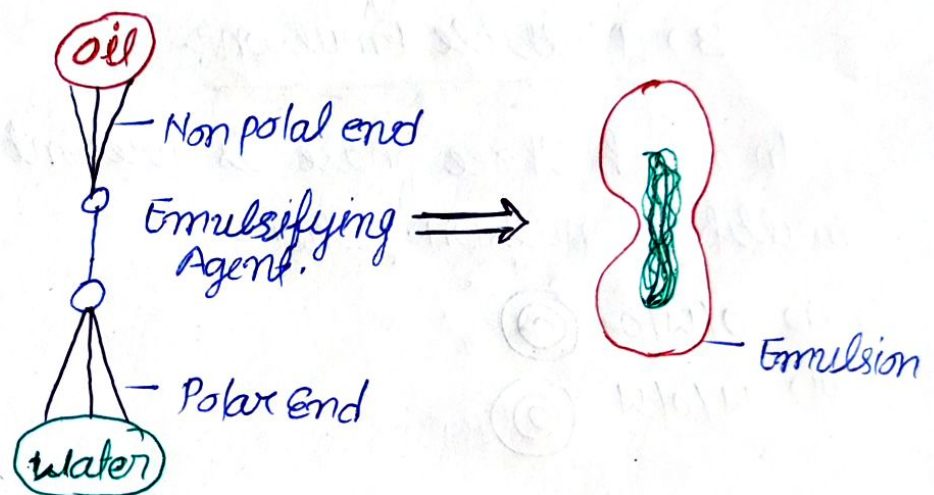


Composition of Emulsion:

→ In emulsion mainly 3 component are present.

- (A) Dispersed Phase It is always present in less amount and they are spread over continuous phase
- (B) Dispersion Phase or Medium: It is always present in large amount and it decide the phase of emulsion
- (C) Emulsifying Agent: Emulsifying agent are those agent which decrease the surface tension of water and oil and allow to mix them

- Emulsifying agent are bipolar in nature there one end is polar. bind with water and other end is non polar bind with oil.
- Emulsifying agent comes both water and oil molecule closer to each other and mixed them.



∴ Types of Emulsion ∴

→ On the basis of dispersed and continuous phase is of four types.

- (1) W/o Types.
- (2) O/w Types
- (3) Multiple Emulsion.
- (4) Micro Emulsion.

(1) Water/oil Types ∴


In this type of emulsion water is present in less amount and oil is present large amount it means water is dispersed phase and oil is dispersing medium.


(2) Oil/Water Phase:

⇒ In this emulsion oil is present in less amount and water is present large amount it means oil is dispersed phase and water is dispersing medium.

(3) Multiple Emulsion:

→ In which three phase is present in emulsion called multiple emulsion. Either -

(i) O/W/O 

(ii) W/O/W 

(4) Micro Emulsion:

→ Such emulsion in which the size of dispersed phase is very small from 10 nm - 200 nm then it will seem to be clear this is called micro emulsion.

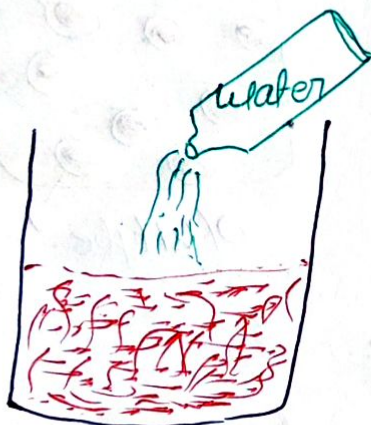
∴ Detection of Emulsion or Evaluation of Emulsion:

There are following method to identify the emulsifying agent either it is O/W or W/O.

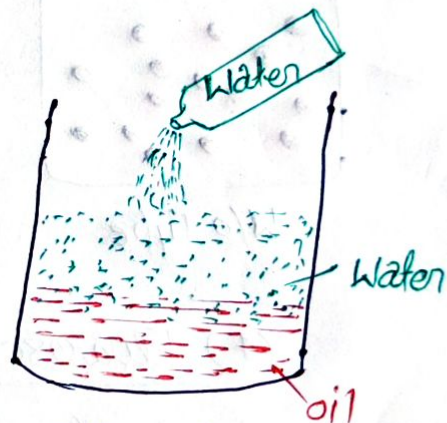
- (i) Dilution Test
- (ii) Conductivity test.
- (iii) Dye Solubility Test.
- (iv) Fluorescence test.

(1) Dilution Test :-

- In this test emulsion is diluted after adding water when we add water oil/water type emulsion then there is no effect on the appearance of emulsion.
- But when water is added in water/oil type emulsion then both water and oil layer is get separate this is called breaking of emulsion.



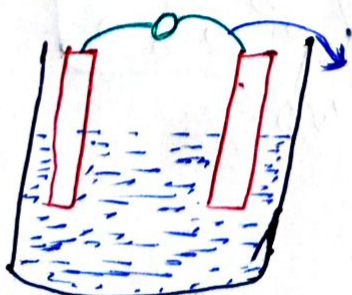
O/W type
No change



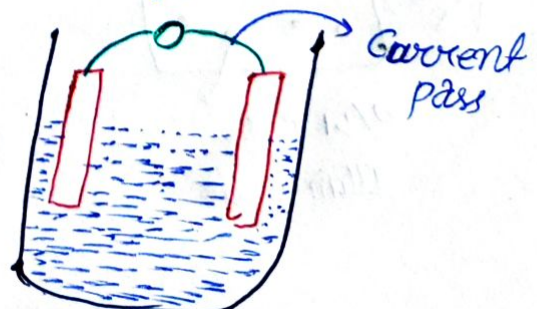
W/O Type
Breaking

(2) Conductivity Test :-

- Water is a good conductor of electricity but oil is not a conductor
- In a electron chemical cell add emulsion of electricity is pass then emulsion is o/w type and it is current is not pass then emulsion is w/o type.



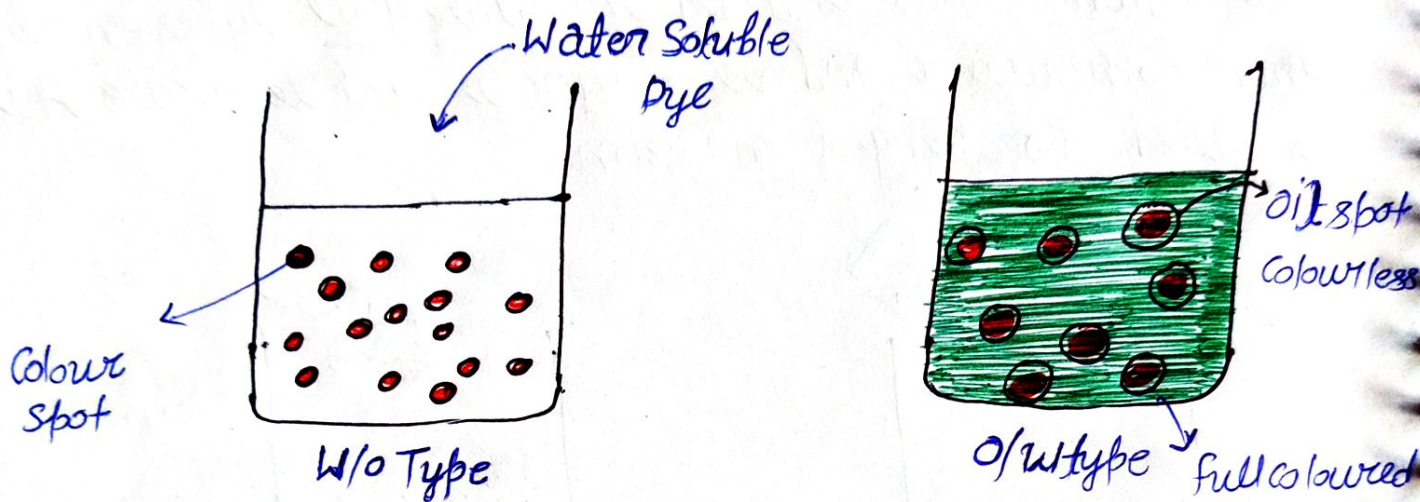
W/O Types Emulsion



O/W Types Emulsion

(3) Dye Solubility Test:

→ When we add water soluble dye inside the emulsion if the color spots appear anywhere the emulsion is w/o type and if full emulsion become coloured then it is o/w type -



(4) Fluorescence Test:

→ Oil reflects light so it illuminates if we pass the emulsion with light source then if the emulsion illuminates.
→ Add some spot it means emulsion is o/w type and if the whole emulsion is illuminate w/o type

