

Chemistry Practical Class 12 Study of the Role of Emulsifying Agent in Stabilising the Emulsions of Different Oils Viva Questions with Answers

Q1: What is the theory behind this experiment?

Answer:

An emulsion is a colloid in which the dispersion medium and the dispersed phase are liquid. They are distinguished here depending on their relative amounts. The dispersed phase is present in lower amounts, whereas the dispersion medium is prevalent.

Shake the mixture of oil and water. A slight milky solution can be seen. It's called an emulsion of oil in water because it's unstable. When left to stand, two layers form, separating the oil from the water.

A soap solution can be added to strengthen the stability of an oil and water emulsion. Soap solution would be an emulsifying agent. The carboxyl polar group reduces the interfacial surface tension between the two layers. The soap concentration required to complete the emulsification process is known as the optimum concentration. Effective stabilisation is not obtained if the amount is greater or less than the optimum concentration.

Q2: Define Emulsifier.

Answer:

A component that functions as an emulsifier is defined as a substance that stabilises emulsions. It also prevents liquids that generally don't mix from separating.

Emulsifiers are a type of device that stirs or shakes substances to create an emulsion.

Q3: Give a few examples of emulsifiers.

Answer:

Natural or synthetic emulsifiers are available. Egg yolk, lecithin, and glycerin are examples of natural emulsifiers. Polysorbate 20, polysorbate 80, and PEG-40 hydrogenated castor oil are typical synthetic emulsifiers.

Q4: How to prepare the detergent solution?

Answer:

Add 10 mL of distilled water to a test tube and dissolve 1 g of detergent.

Q5: What are the precautions to be taken during the experiment?

Answer:

- Fill each of the five test tubes with the same detergent solution.
- To reduce the time recording inaccuracy, shake all five test tubes for the same amount of time.
- When you observe the layers separate, immediately stop the stopwatch and restart it as soon as the shaking stops.

Q6: Name a reagent other than soap, which can be used as an emulsifying agent in the *oil in water type emulsion*.

Answer:

The emulsifying agent used in oil in water emulsion, other than soap, is Protein. A good example of oil in water emulsion is milk. It is made out of liquid fat that has been dispersed in water. Milk proteins serve as an emulsifier.

Q7: Milk is said to be a stable emulsion. What provides stability to milk?

Answer:

Unconcentrated milk is exceptionally heat stable at its natural pH, and it may be heated for >15 minutes at 140°C, well above the commercially used temperatures, with no visible evidence of instability.

Q8: Give one test to distinguish whether the given emulsion is an oil-in-water-type emulsion.

Answer:

A dilution test can be used to identify it. In this approach, the emulsion is diluted with water. When an emulsion is diluted with water, it is referred to as an oil-in-water emulsion. It is an example of a water-in-oil emulsion when it is not diluted and acts as the dispersion medium.

Q9: Give some examples of emulsions that you come across in daily life.

Answer:

Homogenised Milk

Mayonnaise
Crema
Butter
Margarine
Cold Cream
Emulsion Paints
Perfume and Room freshener

Q10: Dettol forms an emulsion in water. How does this emulsion get stabilised?

Answer:

It is stabilised by adding an emulsifier like gelatin, starch, soap etc.

Q11: Vanishing cream and cold cream both are emulsions. Then, what is the difference between the two?

Answer:

Cold cream is an emulsion of water in oil, whereas vanishing cream is an emulsion of oil in water. Because this cream's base (dispersion medium) contains oil, it's best for daytime use.

Q12: What is the dispersion of a liquid in another liquid called?

Answer:

It is called emulsion. A gel is the term used to describe the dispersion of a liquid within a solid. Foam refers to a gas's dispersion in a liquid medium. An emulsion is the process of a liquid dispersing in another liquid. Aerosol is a gaseous medium in which a solid or liquid is dispersed.

Q13: An emulsion is a type of colloid.

- a) True
- b) False

Answer:

True. A colloidal dispersion in which the dispersed phase and the dispersion medium are liquids is known as an emulsion. It's a mixture of two liquids that usually don't mix. These liquids are believed to be immiscible because they do not mix.

Q14: Soaps are emulsifying agents.

- a) True

b) False

Answer:

True. Soaps are sodium or potassium salts of fatty acids with larger molecular weights, such as sodium palmitate ($C_{15}H_{31}COONa$), sodium stearate ($C_{17}H_{35}COONa$), etc. The hydrophobic part (soluble in oil) and the hydrophilic part (insoluble in oil) make up a soap molecule (soluble in water).

Q15: How do emulsifying agents stabilise the emulsion? Give an example of an emulsifier for oil in a water system?

Answer:

Emulsifiers work by lowering the interfacial tension between the two liquids that make up an emulsion. Long-chain compounds containing polar groups are emulsifiers.

Casein (milk protein), for example, is an emulsifier. Around fat molecules scattered in the water, it forms a protective coating. Interfacial tension is reduced, and the emulsion is stabilised.

Q16: Which is a better emulsifying agent? Soap or detergent?

Answer:

Detergents are a better emulsifier than soaps because detergents do not create scum in hard water, whereas soaps do.

Q17: Which base is generally found in soaps?

Answer:

Sodium hydroxide.

Q18: How can we classify Emulsions?

Answer:

Emulsions are divided into several categories.

- **Oil-in-Water Emulsions:** Oil is dispersed in water in this emulsion; hence oil is the dispersed phase, and water is the dispersion medium. Milk, foundation cream, and vanishing cream are just a few examples.

- **Water-in-Oil Emulsions:** Water is dispersed in oil in this emulsion; hence water is the dispersed phase, and oil is the dispersion medium. Butter and cod liver oil are two examples.
- **Multiple emulsions:** Oil-in-water or water-in-oil emulsions are disseminated in another liquid medium. There are two kinds of them:
 - Oil-in-Water-in-Oil emulsions
 - Water-in-Oil-in-Water emulsions

Q19: What is the difference between a macroemulsion and a microemulsion?

Answer:

In comparison to a microemulsion, a macroemulsion requires more surfactant.

Q20: What does it mean if a lipophilic liquid is added to an emulsion and it is miscible?

Answer:

Adding a lipophilic liquid to the emulsion and its miscible means the oil phase is greater, or it is without an emulsion.

Q21: What will happen if I add oil and water together without an emulsifying agent?

Answer:

The cohesive forces of water and oil will be greater than the adhesive forces, which means the two phases will fully separate.

Q22: What are the four main components required for making an emulsion?

Answer:

A water phase, an oil phase, work, and an emulsifying agent.