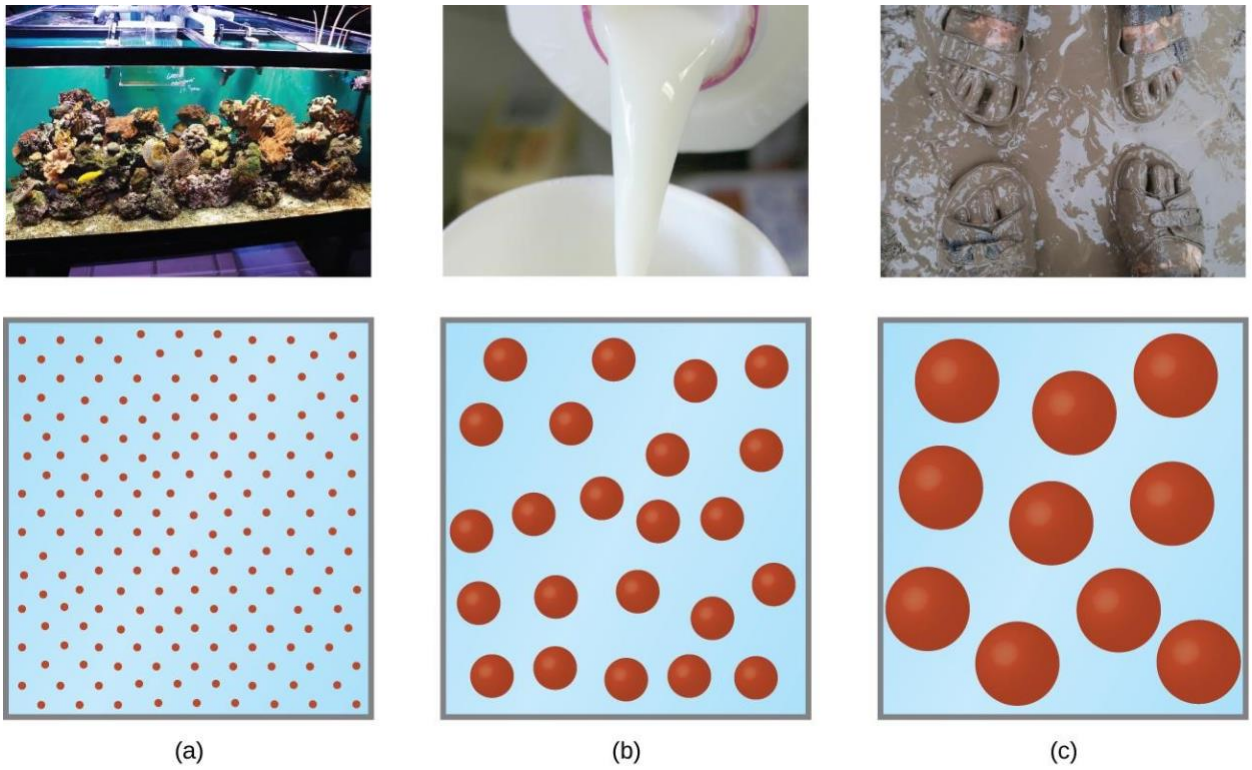
Classify the following system with its appropriate group (lyophilic ,lyophobic ,coherent ,incoherent) Aqueous solution of soap ,Butter ,Cream ,Real pearl ,Protein ,Soup.

1. Collides:

Colloids are blends in which at least one substances are scattered as generally big solid particles or liquid droplets all through a solid, fluid, or gas medium. The particles of a colloid stay scattered and don't settle because of gravity, and they are frequently electrically charged. Colloids are enormous in nature and are engaged with numerous mechanical applications.

you may have made suspensions, for example, blends of mud and water, flour and water, or a suspension of strong shades in water, known as gum based paint. These suspensions are heterogeneous mixtures made out of generally huge particles that are noticeable (or that can be seen with an magnifying glass). They are shady, and the suspended particles settle out subsequent to blending. Then again, when we make an answer, we set up a homogeneous blend in which no settling happens and in which the disintegrated species are atoms or particles. Solutions show totally extraordinary behavior from suspensions. ,the molecules or ions are invisible, and they don't settle out on standing. A gathering of solution called colloids (or colloidal dispersion) display properties halfway between those of suspensions and solutions. The particles in a colloid are bigger than simple atoms; in any case, colloidal particle are little enough that they don't settle out after standing.

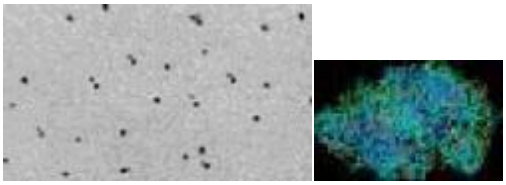


(a)A solution is a homogeneous blend that shows up clear, for example, the saltwater in this aquarium. (b) In a colloid, for example, milk, the particles are a lot bigger yet stay scattered and don't settle. (c) A suspension, for example, mud, is a heterogeneous blend of suspended particles that seems cloudt and in which the particles can settle

2. Classification of collide on basis of structure

1. **Incoherent**

- Macromolecule solution (lyophilic)
- Colloidal dispersion (lyophobic)
- Association collide (lyophilic)



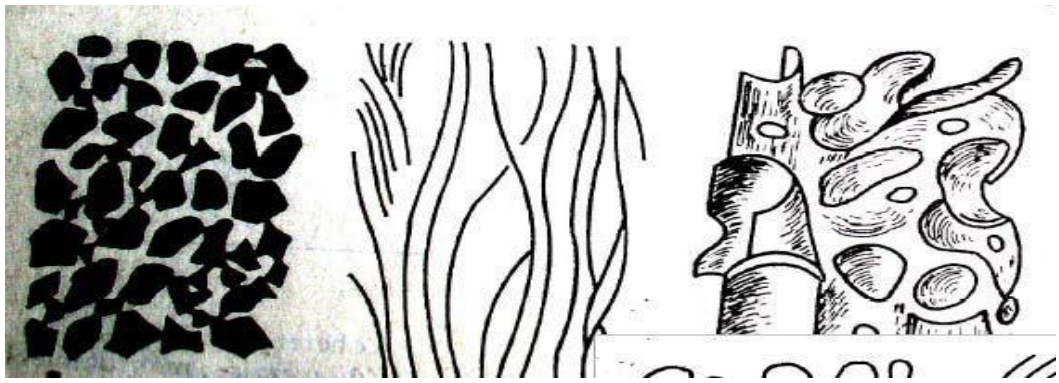
2.

Coheren

t(gel)

Reticular

- Spongoid
- Pordin



1. Incoherent:

Lyophilic And Lyophobic

- Lyophilic: Lyophilic colloids are fluid loving colloids (Lyo implies solvent and philic implies loving.

- Lyophobic : Lyophobic colloids are fluid repelling colloids (Lyo implies dissolvable and phobic methods repelling).

➢ Examples

- Lyophilic: Sols of natural substances like gelatin, gum, starch and proteins.
- Lyophobic: Sols of inorganic substances like Arsenic, Iron (Fe (OH)3) and Platinum. ➢ Ease of Preparation
- Lyophilic : As these colloids are fluid loving, their sols are easily prepared but difficult to get ready and can be arranged straightforwardly by blending colloid in with liquid. Extra stabilizers are not required during their preparation.
- Lyophobic: As these colloids are water repelling, their sols are anything but difficult to get ready and can't be formed directly by blending colloid in with liquid. Extraordinary strategies are utilized to get ready lyophobic sols and extra stabilizers are required during their arrangement.

➢ Stability

- Lyophilic: Lyophilic sols are generally stable as solid powers of collaboration exist between colloidal particles and liquid.
- Lyophobic: Lyophobic sols are less stable as feeble powers of collaboration exist between colloidal particles and fluid.

➢ Charge

- Lyophilic: The charge on the lyophilic sol relies on pH of the arrangement and can be negative, positive or may be neutral.

- Lyophobic: The charge on lyophobic sol can be positive or negative. As Fe(OH)3 sol is positively charged while 2S3 sol is negatively charged in nature .

  - Viscosity
  - Lyophilic: The lyophilic colloids are exceptionally thick in nature and have higher thickness than that of the medium.
  - Lyophobic: The Lyophobic colloids have practically same consistency as that of medium.
  - Reversibility
  - Lyophilic: Reversible, in light of the fact that on dissipating the liquid the buildup the residue left will goes into colloidal state on addition of fluid.
  - Lyophobic: Irreversible, in light of the fact that on dissipating the fluid, the buildup left can't be changed over into arrangement on negligible expansion of fluid.
  - Electrophoresis
  - Lyophilic: Depending on the type of charge these particles may relocate to cathode or anode.
  - Lyophobic: Depending on the type of charge these particles relocate to either cathode or anode.
  - Surface Tension

- Lyophilic: The surface tension of these sols is not as much as that of dispersion medium.
- Lyophobic: The surface tension is about same as that of scattering medium.

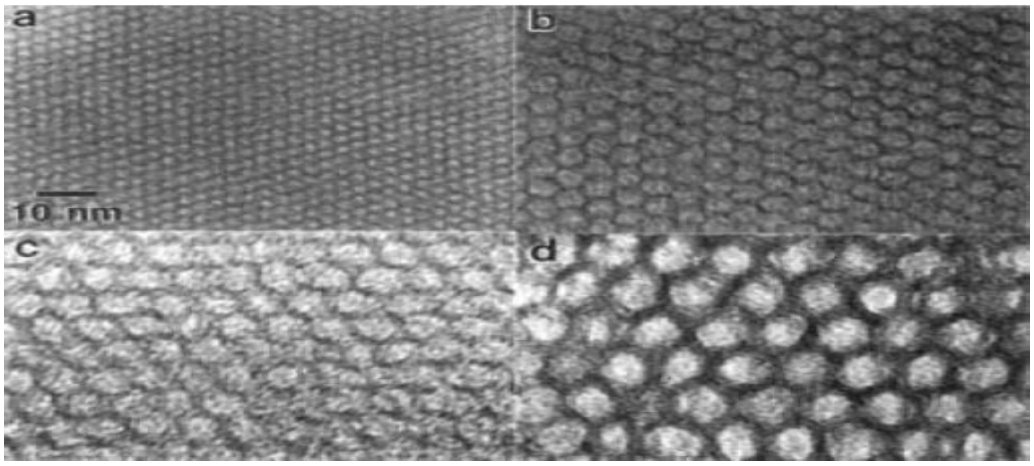
Association collides

These are generally experienced in soap solution and detergent in water. These issues become significant, obviously, in process of for cleaning and sanitizing hardware (food processors, biochemical makers, hospitals, and so on.), yet the standards additionally apply to other affiliation colloids likewise experienced industrially, mainly in the food preparing Þeld. A regular soap for example, sodium stearate, C17H35COONa, or a cleanser, for example, sodium dodecyl benzene sulfonate, C12H25C6H4· SO3Na, comprises of a long hydrocarbon tail furthermore, a polar head gathering.

2. Coherent

Gel: it is a strong or semisolid arrangement of at any rate two constituents, consisting of a consolidated mass and interpenetrated by a liquid (fluid or gas)(liogel; aerogel). System without particular boundaries No sedimentation.

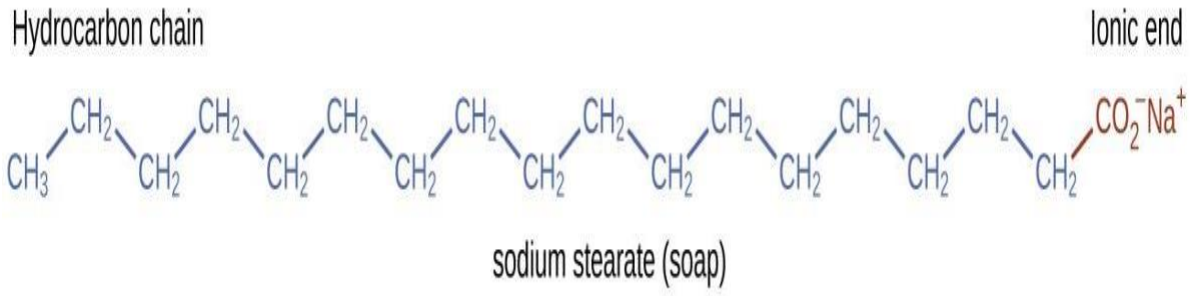
Figure 27 - Glass of gelatin.



1 . Soap

Soap is a blend of sodium salts of different normally occuring unsaturated fats. Air bubbles added to a liquid soap will diminish the soap density and consequently it will drift on water. In the event that the unsaturated fat salt has potassium instead of sodium, a gentler foam is formed. Soap is formed by a saponification or hydrolysis reaction of a fat or oil. , sodium carbonate or sodium hydroxide is utilized to neutralize the unsaturated fat and convert it to

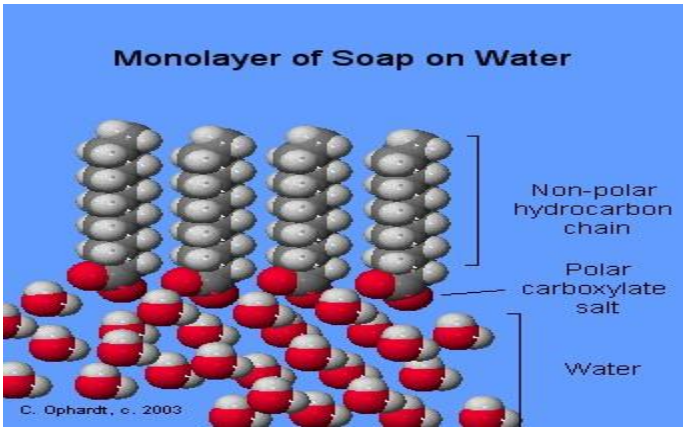
the salt.



Cleansing Action of Soap:

The cleansing activity of soap is seen by its polar and non-polar structures by using its solvency principles. The long hydrocarbon chain is obviously non-polar and

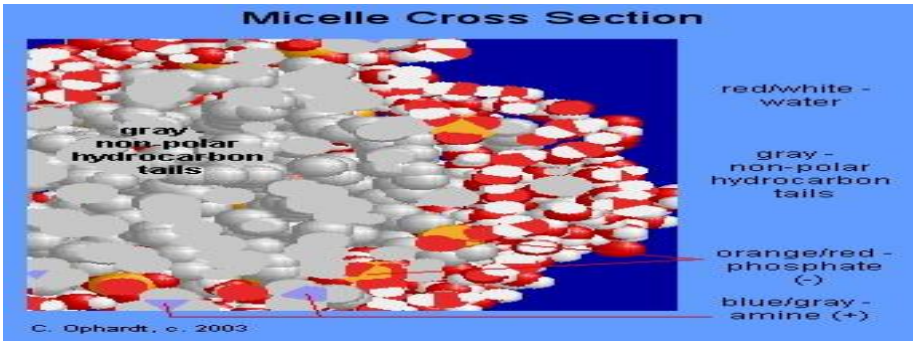
hydrophobic (repelled by water). The "salt" that is present at the end of soap is ionic and hydrophilic (water insolvable). Monolayer: When soap is added to water, the ionic-salt present at the end is pulled in to water and disintegrated in it. The non-polar hydrocarbon end of the soap particle is repulsed by water. A drop or two of soap in water make a monolayer on the water surface. The soap particles "stand up" on a superficial level as the polar carboxyl salt end is pulled in to the polar water. The nonpolar hydrocarbon tails are repelled by the water, which causes them to seem to hold up.



Soap versus oil versus water:

Water alone can't able to enter oil or oil since they are of inverse polarity. At the point when oil (non-polar hydrocarbons) are blended in with a soap water arrangement, the soap particles fill in as a "connect" between polar water atoms and non-polar oil atoms. soap atoms have the two properties of non-polar and polar present oppositely .The oil is an pure hydrocarbon so it is nonpolar. The non-polar hydrocarbon tail of the soap breaks up into the oil. That leaves the polar carboxylate particle of the soap atoms are standing out of the oil beads, the outside of each oil drop is oppositely charged. Accordingly, the oil beads repulse one another and stay suspended in arrangement (this is called an

emulsion) to be washed away by a flood of water. The outside of the bead is additionally covered with a layer of water atoms.



Impact of Hard Water:

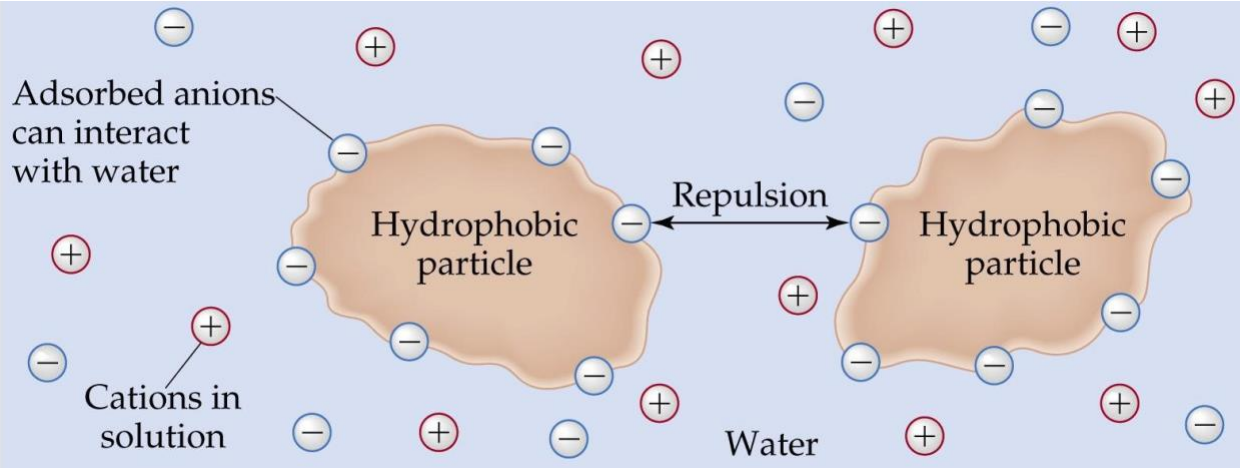
On the off chance that soap is utilized in "hard" water, the soap will be participated as "bath ring" by calcium or magnesium particles present in "hard" water. The impacts of "hard" water calcium or magnesium particles are limited by the expansion of "builders". The most well-known "builder used to be sodium trimetaphosphate. The phosphates respond with the calcium or magnesium particles and keeps them in arrangement yet away from the soap molecule. The cleanser atom would then be able to carry out its responsibility without obstruction from calcium or magnesium particles. Other "developers" incorporate sodium carbonate, boran, and sodium silicate are at present in cleansers

2.Butter

Butter is a main product of dairy that can prepared from milk of some mammals, like – sheep, cow, goat . It mainly a mix up of unsaturated fatty acids of & Cholesterol.

Each compounds in this mixture are long chain of organic carbon. So butter is lyophobic,lyophobic mean water repelling because it does not dissolve in water, Means it is incoherent because incoherent include lyophobic molecule which are colloidal dispersion.so they have incoherent system of collides.

According to rule (like dissolve like) so butter is made up of fat is fat is non-polar and water is polar so according to rule polar dissolve in polar and non-polar dissolve in non-polar , So butter do not dissolve in water because water is polar.



3. Cream

The cream contains around 55 to 93% by weight water, around 5 to 45% by weight fat, around 1 to 10% by weight protein, about 0.5 to 10% by weight starch, and an small amount of emulsifier. Ideally, the cream additionally contains a successful measure of stabilizer and a viable measure of buffer A cream substitute involving from 5% to 40% by weight of spread, from about 0.25% to about 5% by weight of a thickening operator,

and about 0.25% to about 4% of a food protein, in light of the aggregate weight of the cream substitute, together with an adequate measure of water to add up to 100% by weight, and, alternatively, from about 0.05% to about 2% by weight of a food acceptable acid. "CREAM SUBSTITUTES" reveals cream substitutes involving: a cheddar curd, a water source, and a mix of gums that give the cream substitute the surface of a thick cream, or potentially dependability against oil partition. The gums might be locusts bean gum and thickener. The measure of cheddar curd in the synthesis is normally not more than about 55% by weight of the aggregate fixings. There is likewise given a procedure to the production of a cream substitute, including: joining a cheddar curd, a water source, and hydrated gums, to shape a blend, in which the measure of cheddar curd isn't more than about 55% by weight of the all-out fixings, homogenizing the blend, and warming the blend at a temperature and for a period adequate to purify the blend to shape a cream substitute

As cream is basically a mixture of oil and water as you know oil does not readily dissolveor disperse in water. So to allow to this happen a dispersing agent is added to the mixture .A cream is therefore a type of emulsion made of water and oil. As cream is in coherent means it is lyophobic but it can be dissove in water and made lyophilic by adding emulsyfier in it.

- ❖ Working of emulsifier

To understand this, firstly we have to conceptualize the method of coalescing. Coalescing is the method in which the same particles present in the emulsions come

close together to form larger and heavy particles leading to the separation of the dispersion medium and dispersed phase

Emulsifiers help in protecting coalescing by creating a physical barrier between two the dispersion medium and dispersed phase

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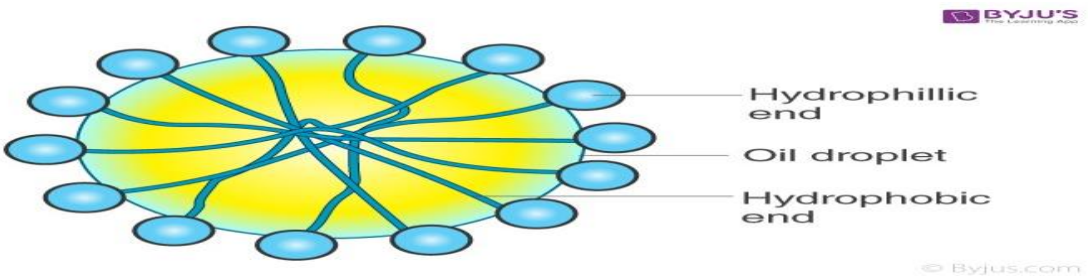
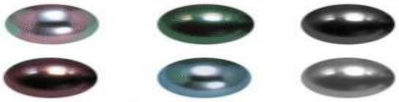


4.Natural pearls

Natural pearls are about 100% calcium carbonate and conchiolin. It is felt that normal pearls structure under a lot of accidental conditions when a tiny parasite enters a bivalve mollusk and settles inside the shell. The mollusk, disturbed by the intruder, frames a pearl sac of outer mantle tissue cells and secretes the calcium carbonate and conchiolin to cover the aggravation. This secretion procedure is repeated, subsequently delivering a pearl. Normal pearls come in numerous shapes, with superbly round ones being nearly uncommon. typically, the development of a characteristic pearl comprises of an earthy brown central zone shaped by columnar calcium carbonate (typically calcite, in some cases columnar aragonite) and a yellowish to white external zone comprising of nacre (forbidden aragonite). The presence of columnar calcium carbonate having natural material demonstrates adolescent mantle tissue that formed during the early time of pearl advancement.

Pearl itself is a calcium carbonate so it doesnot dissolve in water it is realized that not all ionic substances dissolve in water because the ions that makeup calcium carbonate are attracted so strongly to each otherthat the attraction by water molecule cannot pull them apart so they are incoherent because it is liyophobic as we know liyophobic are water repelling.calcium carbonate is soluble when it react with CO_2 its solubility can be increased.

eeding species	Product	Characteristic color nuances
	-Akoya pearl	
	-South Sea pearl	
	-Tahitian pearl -black pearl	
	-freshwater pearl -Chinese pearl	
	-melo pearl	

5. Protein

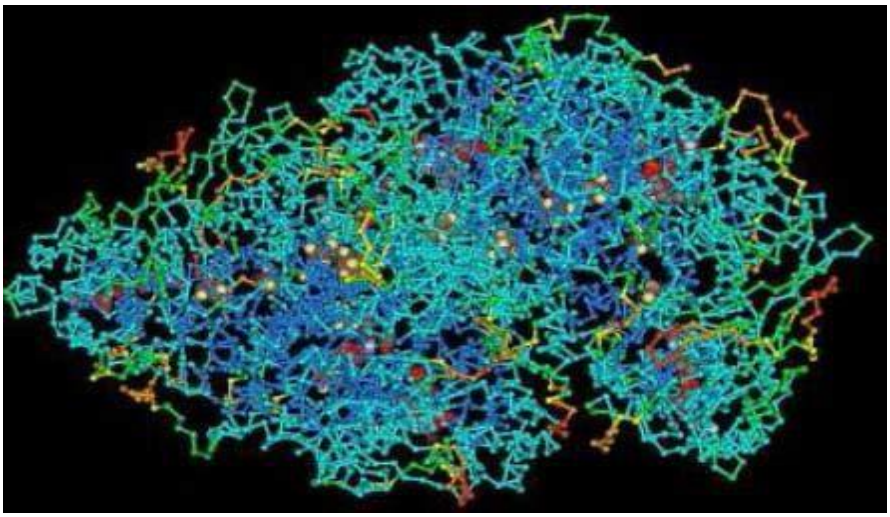
Proteins are made up of amino acid. All amino acid have identiclestructure of backbone but ther are differ in their side chain .these side chains have different properties some are hydrophobic where as other are hydrophilic this way a stable ,protein is formed that is water soluble.

Fibrous protein are in soluble in water because their surface is primarily composed of amino acid with non polar side chains

Proteins are build up of amino acid to form a functional protein the amino acid chain is folded in a way that that the hydrophobic parts end upup on inside and the hydrophilic parts on the outside this way a stabel, water soluble protein is formed

Globular proteins are sepherical in shape and usually water soluble. This allow for the hydrophilic sections to form intermolecular forces with water molecule dissolving the protein.

The hydrophilic part of the protein contains amino acid wiyh polar side chain



Structure of polypeptide chain in aqeous solution.

Globular protein or spheroprotein are sepherical (globe like). Potein and are one of the common protein types while others are fibrous , disordered and membranous protein globular proteins are somewhat water soluble unlike fibrous and membrenous protein. There are multiple fold classes of globular proteins. Since are many different architectures that can fold into a roughly sepherical shape.

Fish soup

The protein content of fish soup powder was found to be wiyh inranges from 8_9 g per 100 g with fisf being the only source of protein of high biological value .The fat content of fish soup ranges from 1.1 to 59 g per 100 g of sample. As fish soup contain protein which is globular in nature and soluble in water

As soup is viscous in nature and is a great source of proteis. And also other essential nutrients such as omega 3 fatty acid as it contain both protenic part as well as fats so it is partially soluble and partly in soluble.