

An Article :

## Interfacial chemistry and interface

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Operation and effects of surfactants can be understood as follows; Surfactants reduce the surface tension of water by adsorbing at the liquid-gas interface. They also reduce the interfacial tension between oil and water by adsorbing at the liquid-liquid interface. Many surfactants can also assemble in the bulk solution into aggregates. Some of these aggregates are known as micelles. The concentration at which surfactants begin to form micelles is known as the *critical micelle concentration* or *cmc*. When micelles form in water, their tails form a core that can encapsulate an oil droplet, and their (ionic/polar) heads form an outer shell that maintains favourable contact with water. When surfactants assemble in oil, the aggregate is referred to as a *reverse micelle*. In a reverse micelle, the heads are in the core and the tails maintain favourable contact with oil. Surfactants are also often classified into four primary groups; anionic, cationic, non-ionic and zwitterionic (dual charge). Thermodynamics of the surfactant systems are of great importance, theoretically and practically. This is because surfactant systems represent systems between ordered and disordered states of matter. Surfactant solutions may contain an ordered phase (micelles) and a disordered phase (free surfactant molecules and / or ions in the solution). Ordinary washing up (dishwashing) detergent, for example, will promote water penetration in soil, but the effect would only last a few days (although many standard laundry detergent powders contain levels of chemicals such as sodium and boron, which can be damaging to plants, so these should not be applied to soils). Commercial soil wetting agents will continue to work for a

considerable period, but they will eventually be degraded by soil micro-organisms. Some can however, interfere with the life-cycles of some aquatic organisms, so care should be taken to prevent run-off of these products into streams, and excess product should not be washed down gutters. When a water droplet is in the air, surface tension, a force to reduce the surface area acts on the surface of the water, resulting in spherical water droplets. When water and oil are present in a container, they do not mix together even after stirring and separate in two layers (Fig. 1).

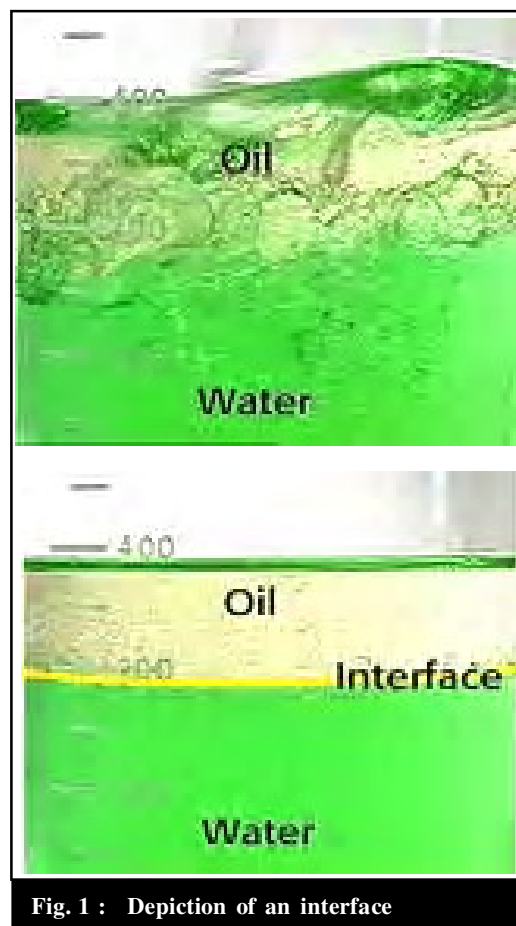


Fig. 1 : Depiction of an interface