


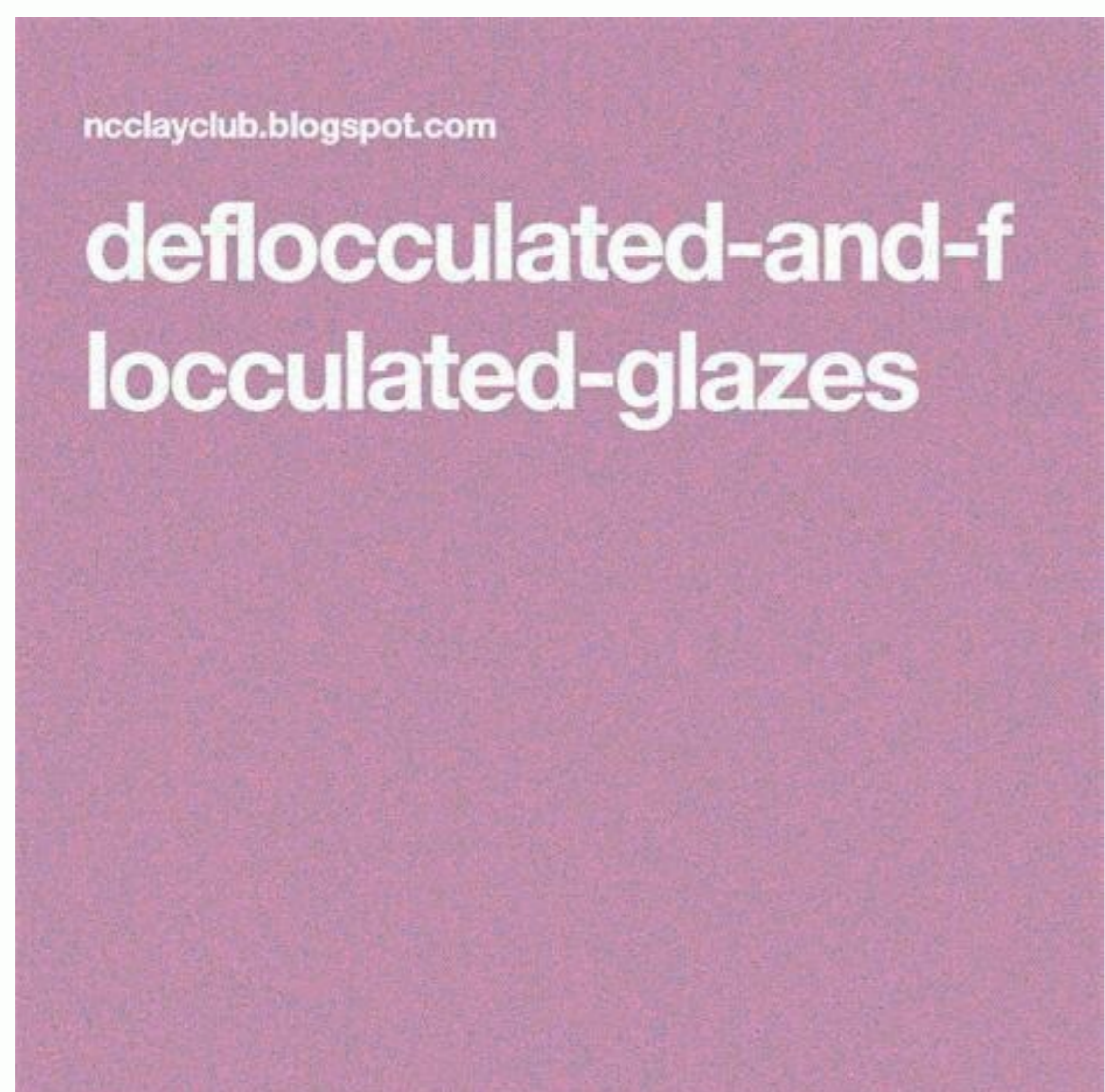
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Flocculated and deflocculated suspension pdf

A pharmaceutical suspension is the dispersion of solid particles (usually a drug) in a liquid medium (usually aqueous) in which the drug is not readily soluble. This dosage form is used for providing a liquid dosage form for insoluble drugs (hydrophobic drugs). Suspensions can be classified into flocculated and deflocculated suspensions based on the electrokinetic nature of the dispersed phase. In this article the following key areas will be covered; 1. Flocculated suspension 2. Deflocculated suspension 3. Differences between flocculated and deflocculated suspensions Read more on classifications of suspensions Flocculated suspensions Flocculation refers to the formation of a loose aggregation of discrete particles held together in a network like structure by physical adsorption of macromolecules when the longer-range van der Waals forces of attraction exceed the shorter-range forces of repulsion. Particles, therefore, experience attraction at significant interparticle distances (10 - 20 nm) and form an open network of aggregated particles known as floccules.

Such a suspension is called flocculated suspension. In this suspension type, the structure of the aggregates is quite rigid; hence they settle quickly to form a high sediment height and are easily redispersible because the particles constituting individual aggregates are sufficiently far apart from one another to preclude caking. A repulsive barrier termed the primary maximum, separates the secondary minimum from the primary minimum. The magnitude of the repulsive forces at the primary maximum determines whether a flocculated system will remain flocculated. If the thermal energy in the system is similar to, or greater than, the repulsive barrier, the particles in the system can move closer together (0.5 - 2.0 nm) and encounter strong attraction due to the primary minimum. The strong attraction in the primary minimum gives rise to the particle interaction termed coagulation. Closed aggregates, or coagula, is characterized by a tight packing and is not easily redispersed. Upon sedimentation, the aggregates tend to form a single large film-bonded aggregate, which is difficult, if not impossible, to redisperse. Deflocculated suspensions Whether a suspension is flocculated or deflocculated depends on the relative magnitudes of the electrostatic forces of repulsion and the forces of attraction between the particles. At low electrolyte concentration, the electrical repulsive force predominates and particle interactions are maximized. The individual particles are dispersed as discrete entities, resulting in a smooth-looking suspension, called deflocculated or peptized suspension. Compared with the flocculated suspension, this suspension sediment slowly and attains the lowest possible sediment height.

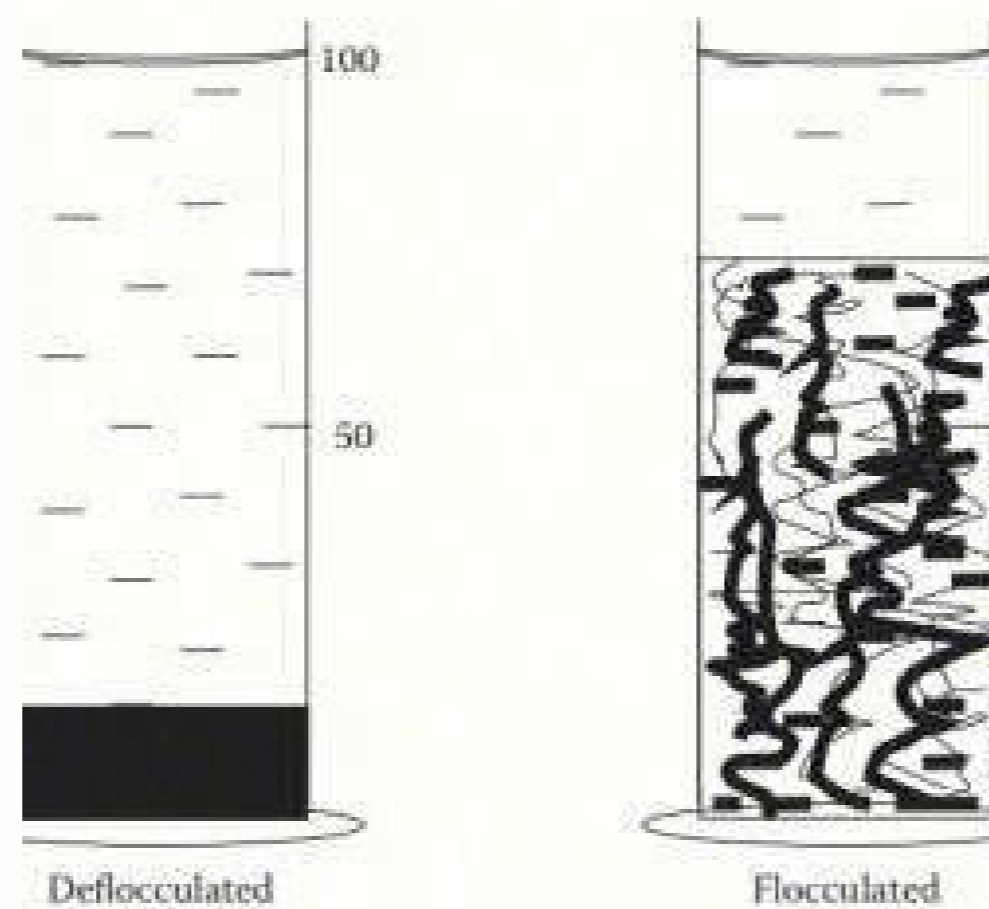


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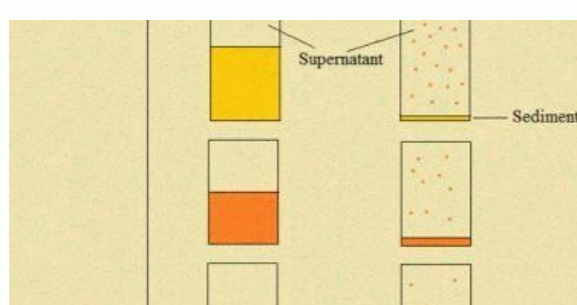


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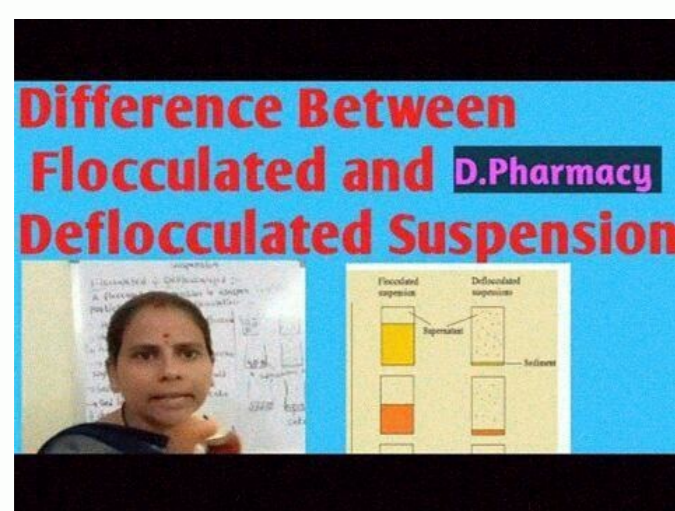
From a practical point of view, since fully aggregated suspension are often unsightly, partial aggregation is often a desired objective, as it resists caking and imparts aesthetic qualities to a suspension formulation. A pharmaceutical suspension must be redispersible on only mild agitation to ensure dosage uniformity. Differences between flocculated and deflocculated suspensions The differences between flocculated and deflocculated suspensions are summarized below Flocculated suspensions Deflocculated suspensions 1. The particles of dispersed phase aggregate and form a loose networklike structure. The particles of the dispersed phase remain as separate entities. 2. Sedimentation rate is high. Sedimentation rate is low. 3. Sediment formed is loosely packed and does not form a hard cake. Sediments formed is tightly packed and a hard cake is formed. 4. Sediment can be easily redispersed on shaking. It is difficult to redisperse the sediment on shaking 5. Lack of elegance since the particles of the dispersed phase tend to separate from the dispersion medium Elegant because of the uniform appearance of the suspension.



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