

المادة الفعالة في الدواء اللينجيد يكون الـ Particle Size محدودة وعادةً الـ Particle Size يكون الـ 1-50  $\mu m$

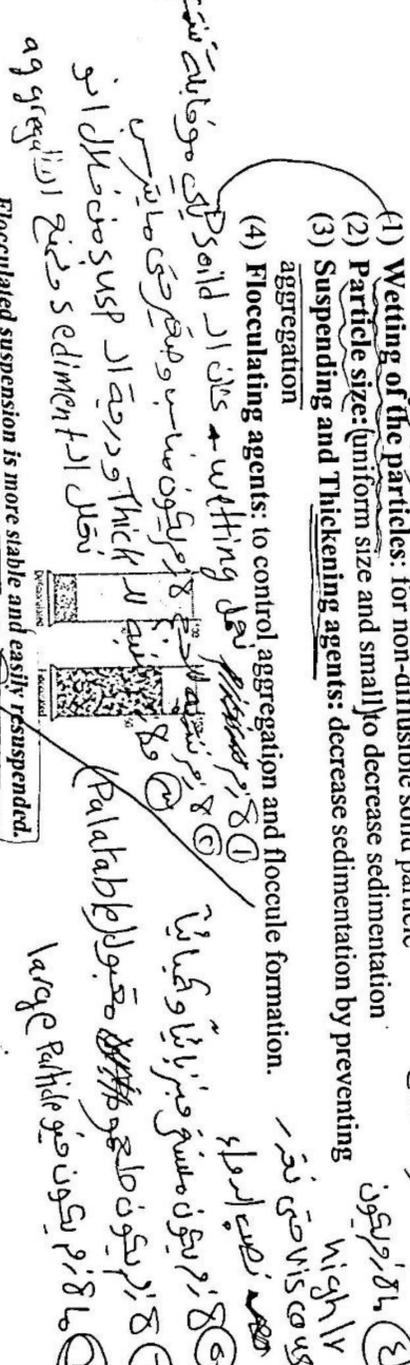
Experiment 4 Bimodal Suspensions

Liquid dosage forms: Dispersed Systems  
Suspensions  
 A well-formulated suspension should have the following properties:  
 1. The dispersed particles should not settle quickly and the if settled it should be redispersed easily with gentle shaking  
 2. Redispersion of sediment particles in a suspension is important for the uniformity of dose after shaking, the medication should stay in suspension long enough to permit taking the correct dose.  
 3. The particle should not form a cake on setting  
 4. The viscosity should be such that the preparation can be easily poured. A highly viscous suspension would make pouring difficult.  
 5. It should be chemically and physically stable  
 6. It should be palatable (orally)  
 7. It is comparatively free from large particles, which gives a bad appearance, a gritty taste to oral preparation and produces irritation on the skin if it is an external product

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On the label of a suspension, "Shake Before Use" is stated to ensure uniform dispersion of the solid particles prior to the withdrawal of the desired dose. For the dosing accuracy concerns, the suspension dosage form is not recommended for drugs with a very narrow therapeutic window

Factors to be considered when preparing suspensions:  
 (1) Wetting of the particles: for non-diffusible solid particle  
 (2) Particle size: uniform size and small to decrease sedimentation  
 (3) Suspending and Thickening agents: decrease sedimentation by preventing aggregation  
 (4) Flocculating agents: to control aggregation and floccule formation.



الجزء المعلق في الدواء اللينجيد يكون الـ Particle Size محدودة وعادةً الـ Particle Size يكون الـ 1-50  $\mu m$

reconstitutable suspensions are provided as dry powders or granules (for suspension) and should be reconstituted just before use. The proper method of reconstitution is as follows:

1. Invert the bottle and shake it well to loosen the dry powder or granules.
2. If the measured volume of water for reconstitution is provided with the product add it in two portions and shake well after each addition.
3. If not, use purified water or freshly bottled and cooled water with the provided graduated measuring cup if supplied with the product. Add the volume of water as stated in on the bottle label or the outer box in two portions, shaking after each addition until homogenous suspension is achieved.
4. Be sure that suspension surface reach the mark on the bottle.
5. Continue shaking for few minutes to ensure uniform mixing.

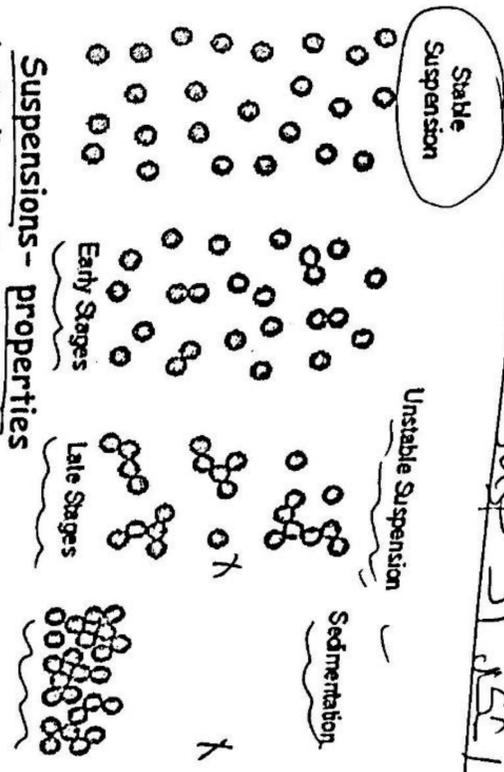
1. رجّل زجاجة الـ Dry Powder أو Granules واهزّها جيّداً لتفكك الجزيئات الجافة أو الحبيبات (المخصصة للسuspension) ويجب إعادة تركيبها قبل الاستخدام بالطريقة الصحيحة لإعادة الطلوع.

2. إذا كان مع الدواء إكليل القياس (measured volume) أو ماء مغلي مبرد (Purified water) أضفها في جزئين مع الرجّح بجزء كل إضافة.

3. إذا لم يكن مع المنتج إكليل القياس أو ماء بارد، فاستخدم ماءً مطهراً أو ماءً باردًا مع الكوب القياسي المقاس. أضف الحجم المذكور في العبوة أو على بطاقة المنتج في جزئين، مع اهزّج الزجاجة بعد كل إضافة.

4. تأكد من أن سطح السuspension يصل للعلامة الموجودة على الزجاجة أو على بطاقة المنتج.

5. استمر في اهزّج الزجاجة لبضع دقائق لضمان خلط متجانس.

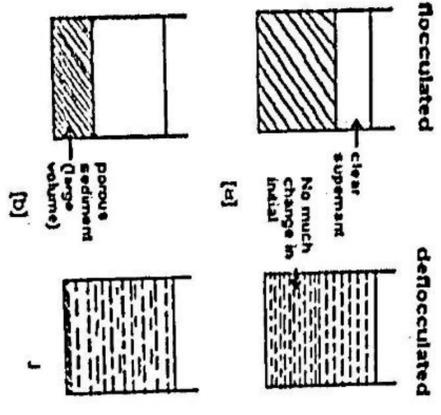


1. Sedimentation & aggregation:

(Settling and aggregation) may result in formation of cakes (e.g. in suspensions) that is difficult to resuspend or phase separation (e.g. in emulsions).  
So, suspensions are physically unstable due to particle-particle interactions and ultimately caking (compaction).

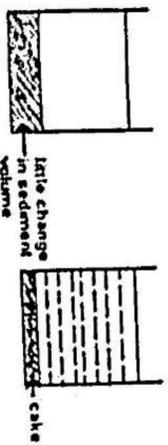
Possible interactions:  
1- van der Waals attraction.  
2- Electrostatic repulsion.

طريقاً قبل ثوبى صطينا  
انوار SUSP بى يون  
flocculated  
بكون اكن اطار  
و احسن  
وطون بو صطينا  
انوار بى كان  
flocculated



ص صارو  
caking  
لكن اطار  
ار deflocc

long period (weeks or years)



Sedimentation behaviour of flocculated and deflocculated suspensions

ص صارو لوبه حنين  
بى بال حنين  
بشكل cake

\* بختيارهون انوار SUS  
سابقه stable جبرنا بى بى  
البناعه بى صكنه بغير بى  
ار Particle بى بى ال  
caking

\* و بختيارهون انوار sedimentation  
بى بى بى caking بى بى  
بى بى (Particle) بى بى ال  
emulsion

طون بى بى بى بى بى بى  
① van der Waals  
② electrostatic  
repulsion

**Formula (1):**

*ektel wala uses*  
Lotions *or* Are (liquid suspensions) or (dispersions intended) for external application (to the skin) without friction.

Rx — ml calamine lotion U.S.P. 1980

Ingredients	Master formula	Scaled formula
Calamine	80gm	
Glycerol	20ml	
ZnO	80gm	
Bentonite magma	250ml	
Lime water Ca(OH) <sub>2</sub>	q.s. 1000ml	---ml

*مثل الجلسترينج*  
 Formulation notes: *insoluble d shir al rias*  
 Calamine is colored zinc carbonate and is practically insoluble in water, as is zinc oxide. Both are non-diffusible solids and require suspending agent (glycerol in this case). Lime water is added to control the flocculation of calamine. Bentonite is a thickening agent. Glycerol is the wetting agent (suspending agent) and it will help thicken the product that will aid in powder adherence to the skin.

*flocculation of calamine*  
 Flocculation of calamine

**Shelf life and Storage:**

Store in a cool, dry place not below (4°C). Calamine Lotion should be kept in well-closed containers (to prevent CO<sub>2</sub> from entering and so to prevent CaCO<sub>3</sub> formation (a precipitate)).  
 A shelf life of 2-3 weeks is applicable.

**Advice and Labeling:**

*For external use only*, 'Shake well before use', and 'Do not apply to broken skin'. The lotion should be applied to the affected areas when required and allowed to dry.

**Procedure:**

1. Shake bentonite magma before taking the required amount.
2. Dilute...

ماده فاسفوره: ۱۰٪ - ۲۰٪  
 و در صورت نیاز  
 در صورت نیاز

Use of Ingredients:

(1) Calamine: mild astringent, antipruritic.

(2) Zinc oxide: astringent. *ماده فاسفوره*

(3) Glycerin: wetting agent (suspending agent) and emollient. *گلیسرین*

(4) Bentonite magma: thickening agent.

(5) Calcium hydroxide (Ca(OH)<sub>2</sub>): weak alkali (lime water), to control flocculation (Flocculating agent).

Labeling:

- Main label

- Auxiliary label:

Shake well before use.

\* Do not apply to broken skin. \*

For external use only.

Storage:

Store in a cool, dry place

Lotions should be kept in well-closed containers. \*

Use of the preparation:

Cooling lotion for sunburn or skin irritation and pruritus.

①

②

③

Handwritten notes in Persian script.

mixture & solution  
شيفرة و حل  
Formula (2) shelf life 2-3 weeks

interval of use  
Mixture: (1) (2) Medicaments dissolved or  
Liquid oral preparation consisting of one or more  
suspended in aqueous vehicle.

Rx — ml pediatric kaolin mixture B.P. 1980

Ingredients	Master formula	Scaled formula
Light kaolin	200gm	
Amaranth	10ml	
Benzoic acid	20ml	
Raspberry syrup	200ml	
Chloroform water (double strength)	500ml	
Water	q.s. 1000ml	q.s. ---ml

diffusible solid  
ذائبا و صلب

Formulation Notes: agent  
Light Kaolin is a diffusible solid; therefore no wetting agent (suspending agent) is required

Shelf-life and storage:  
Store in a cool, dry place. If it is recently prepared (unless the kaolin has been sterilized), a shelf life of 2-3 weeks is applicable.

Advice and labeling:  
"Shake well before use", "for internal use".  
The importance of rehydration therapy should be stressed to the patient.

- Procedure**
1. Weigh the light kaolin and place it in the mortar and add the syrup.
  2. Mix well to get paste, add amaranth and mix to get homogenized color.
  3. Add benzoic acid and chloroform water, mix, then transfer to a graduated cylinder and complete the required volume with water.

120

Use of Ingredient: مصدر الدواء

- (1) Kaolin: antidiarrhea - حصى
- (2) Amaranth: coloring agent. - لون
- (3) Benzoic acid: preservative - حافظ
- (4) Raspberry syrup: Flavoring agent - رائحة
- (5) Chloroform water: preservative and flavoring vehicle - حافظة, حافظة
- (6) Water: vehicle or solvent - مذيب