

Good Luck :) ♡

# Suspensions

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Solution

\* حينا في one-phase  
 \* رح يكون كامل soluble سواء كان في سوليت عوازل  
 \* Co-solvent مثل الـ

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## Dispersed system:

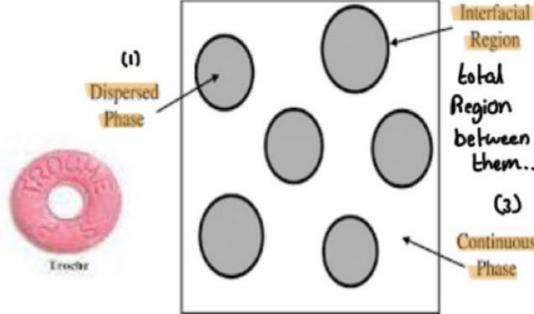
\* تحتوي على دواء غير قابل للذوبان أو امتزاج ..

\* undissolved  
 \* immiscible ingredient  
 \* unsoluble solid on liquid  
 \* unSoluble liquid on liquid

Dispersed system: contain an un-dissolved or immiscible drug distributed throughout a vehicle

Dispersed particles(phase) and dispersed medium(phase)  
 Dosage forms based on dispersed system could be

1. suspension,
2. emulsion,
3. a colloid,
4. gel,
5. lotion,
6. cream,
7. ointment,
8. suppository,
9. troche, or medication stick



The phase existing as small droplets is called the dispersed phase and the surround liquid is known as the continuous phase.

Important factors that determine which type:

- Size of the dispersed particles: e.g. colloids and gels have the smallest size particles

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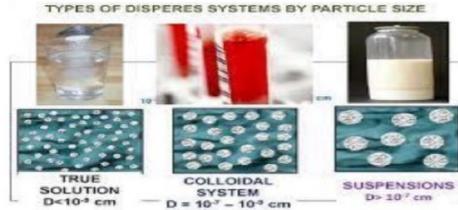
2 Dispersed phase: two-phase system divided particles distributed through another substance.

Two or three phase..

بكون من وسائط مختلفة  
 + جسيمات مختلفة ..

احتمال العزم الي رح يأخذ  
 على الـ form ويخزن اياهم ..

## Dispersed system:



- The particles of the dispersed phase vary widely in size, from large particles visible to the naked eye down to particles of colloidal dimension, falling between 1.0 nm and 0.5  $\mu\text{m}$ :  
الذرات المبعثرة (السوائل)

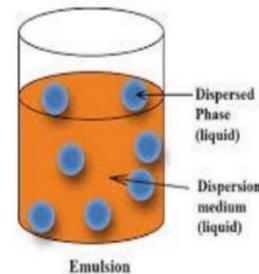
- Coarse dispersions:** Dispersions containing coarse particles, usually 10 to 50  $\mu\text{m}$ , are referred to as; Example: suspensions and emulsions.  $\rightarrow$  immiscible liquid -
- Fine dispersions:** Dispersions containing particles of smaller size are termed (0.5 to 10  $\mu\text{m}$ ), creams, ointments, etc
- Colloidal dispersions:** Dispersion containing particles in the colloidal range (falling between 1.0 nm and 0.5  $\mu\text{m}$ ), are termed such as Magmas and gels.

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## Dispersed system:

- The particles of the dispersed phase are either:

- solid materials** that are **insoluble** in the dispersion medium as in the case of suspension.
- Or, in the case of **emulsions**, the dispersed phase is a **liquid** that is neither soluble nor miscible with the liquid of the dispersing phase.
- Or, In the case of an **aerosol**, the dispersed phase may be small **air** bubbles (**gas**) throughout a **solution** or an **emulsion**.  
Or, droplets of a liquid in air.



External Continuous



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Dispersing medium	Dispersed phase		
	Solid	Liquid	Gas
Liquid (L)	<b>Solid on liquid</b> Colloidal system (sol), Suspension S/L	<b>liquid on liquid</b> Emulsion L/L	<b>Gas on liquid</b> Foam G/L
Solid (S)	<b>Solid on Solid</b> Alloys, minerals S/S	<b>Liquid on Solid</b> Solid emulsion, gel L/S	<b>Gas on Solid</b> Porous bodies, solid foam G/S
Gas (G)	<b>Solid on Gas</b> Smoke (aerosols), dust (S/G)	<b>liquid on Gas</b> Fog, mist (aerosol) L/G	-

Hydrophobic (محبوب الماء) →

← Hydrophilic (محبوب الماء)

No Gas on Gas →

**Colloids**

Colloid- A mixture of two phases of matter

emulsions	aerosols
smoke	fog
foams	gels
milk	clouds

Gel & Foam
Clouds
Milk

Dispersed Phase

Interfacial Region

Continuous Phase

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Examples of colloidal systems for daily life

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Foam

Milk

Smoke

Detergents  
.. مُنظفات

Gel

Blood

Paint

Cosmetics

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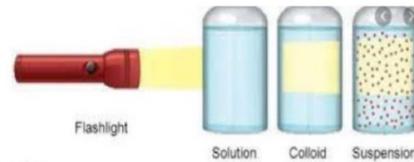
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## Dispersed systems: Suspensions

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### Suspensions:



يشكل ناعم

- Suspensions are dispersions of a finely divided insoluble solid that is evenly dispersed (suspended) in a liquid (the dispersing medium) \* مشتتة بالتأري
- A suspension is classified according to particle size to:
  1. **Colloidal suspension:** Suspension containing particles between 1 nm to 0.5  $\mu\text{m}$ .
  2. **Coarse suspension:** Suspension containing particles between 1 to 100  $\mu\text{m}$ ,.

حسنة ←

Most of the pharmaceutical suspensions are **coarse suspension**.

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# Suspensions



Usage: \* يا إما بجمع عليه (فحاي أو نكحات) ..

1. Oral administration (sweetened, flavored)
2. Topical application → مثل اللوشن
3. Parenteral routes (non-sweetened, non-flavored):  
intramuscular, intradermal, SC) **Subcutaneous** تحت الجلد
4. Intraocular and intranasal suspensions (non-sweetened, non-flavored)

← إما عن طريق الفم

← موهجي

← (عافية فحليات

أو نكحات) ..  
لأن أصلًا نكح الكحات والمكبات  
عشان أزيو Accept إلها ..  
بين هادام بالورير ما في رايه أوف ..

IM + Sc

\* important

No IV

إذا إجابي سؤال إنه بيطيه  
بار (IV) بسكي غلط ..

← لا يُجمعي بالورير ← embolism  
بتسكركي الشرايين

\* بالجين أو بالأنفا  
ونفس اللي ما في فحليات أو فحطات ..  
لاي شي **sterile**

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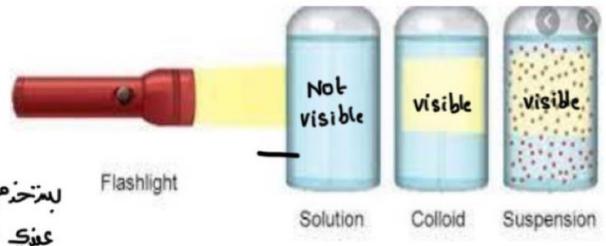
\* صليب متى بستخدم ال Suspension ؟ :

## When they are used?

- ✓ 1. When the active drug is **not soluble** in a solvent
- ✓ 2. When the active drug is **not stable** in a solution.

In this instance, the suspension ensures **chemical stability** while **permitting liquid therapy**.

Tyndale Effect



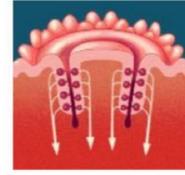
بستخدم هاي الالوريات عشان أكشف إذا اللي  
عندي Suspension ولا Solution ولا Colloid

\* تشتت الضوء لما يمر بال Colloid  
\* Scattering of light as light beam  
pass through a colloid.. or Suspension.  
→ by particles ..

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## Advantages of suspensions



1. An ideal dosage form for insoluble drugs for patients who have **difficulty swallowing tablets or capsules** (i.e. **children, elderly**).  
 the liquid form is preferred to the solid form of the same drug because of the ease of swallowing liquids and the flexibility in administration of a range of doses.

1. **Mask the undesirable tastes of drugs:** The disadvantage of a disagreeable taste of certain drugs in solution form is overcome when the drug is administered as **un-dissolved particles** of an oral suspension.

In fact, chemical forms of certain poor-tasting drugs have been specifically developed for their **insolubility** in a desired vehicle for the sole purpose of preparing a **palatable** liquid dosage.

1. Drugs are **chemically more stable** compared to solution
2. Oral suspensions can be given for both **local or systemic** therapeutic effects

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\* مزايانيتها لا Suspension ← إنها أكثر الاستقرار من ال Solution

أصل ال stability هاي من عيوب ال insoluble لأن يكون على شكل liquid فهو عرضة للتفككات .

مناسب للتي عندهم صعوبات بلع الحبوب والعادة نضعها insoluble حتى أحولها ال solution

تزيير نكهة ال insoluble يكون ذائب (Soluble) ..

بنتهناكي إي أحسن بالهم الغير مرغوب فيه ..

الاصم الغير مرغوب فيه مازح أحسن فيه مثل ما هو موجود بال insoluble لأن مازح يكون على شكل سزيئات غير ذائبات - (بس هو كالعقم) ..

ال liquid أفضل أكثر form

لسهولة بلع + مرنة باوجهاد مجرى من امركات ..

مرنة يعني بقدر اخذ اي ml مناسب عكس ال solid

لا ذوية الغير مقبول طوعا بطورها كيميائيا متدعي بار بال palatable in الهدف واحد .. الذي هو يكون مقبول ازلي ال palatable .

## \* الخصائص المرغوبة لا Suspension .. Desirable properties



ممكن يا فده لا انتخاب الحلق وممكن لمرح التحليلات ممكن يكون Local يا Systemic

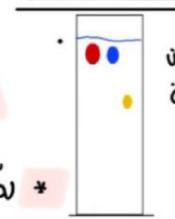
1. A properly prepared pharmaceutical suspension should settle **slowly** and should be readily redispersed upon gentle shaking of the container
2. Of correct **viscosity** to pour freely from bottles and or to flow through an administration needle (pourability) → **قابلية التسب**
3. The particle **size** of the suspension should remain fairly constant throughout long periods of undisturbed standing.
4. In dermatology, the suspension must be sufficiently fluid to **spread** over the skin with no resistance and adhere to skin after application
5. In ophthalmic suspension, the particle size must be kept to a **minimum** to prevent **irritation** of the eye.

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\* لما يكون ال Suspension لاين ال size لا particle لازم يكون صغير عشان أجنب تهيج العين .



لازم ما يكون حفيف يزل بركة أو ثقيل بعلق وما ينزل -



بالأمراض الجلدية لازم يكون Suspension سهل كتابت عشان لما أحصله إي الجلدا يصطبب بسهولة وما يهزل صلب مع الجلدا ..

أوله شي لازم ال تعلقات لما أحضرها تستقر ببطء ..

لما أكمل Shaking بحيث يخلص لازم العلقات تستقر بسهولة ..

لا لازم ال size لا particle يكون ثابت طول فترة ال undisturbed standing

## Disadvantages of suspensions:

\* فيزيائياً غير مستقر بين مراح مرور الوقت مع يتغير ..

1. Physical instability → settle over time → lack of uniformity of dose → shake before administering each dose
2. Texture may be unpleasant to patients

غير جاذب بالنسبة للمرضى .  
لأنه عبارة عن particales هوذا لثبات بشكل جيد ..



غير متجانس

لها أخذ جرعات دواء ال Form  
والك Suspension لازم أعل  
من Shakein للطبقة لأن الجزيئات  
مماح تكون متوزعة بشكل جيد  
وأيام متريبات تحت ضغط من  
مساوي Suspension.

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Artery Academy ♡.  
Saja Dwaikat.