

Emulsions

Chapter 13

Emulsion= Two liquid mixed together (one of them is insoluble to another)

Dispersion system : two phase system

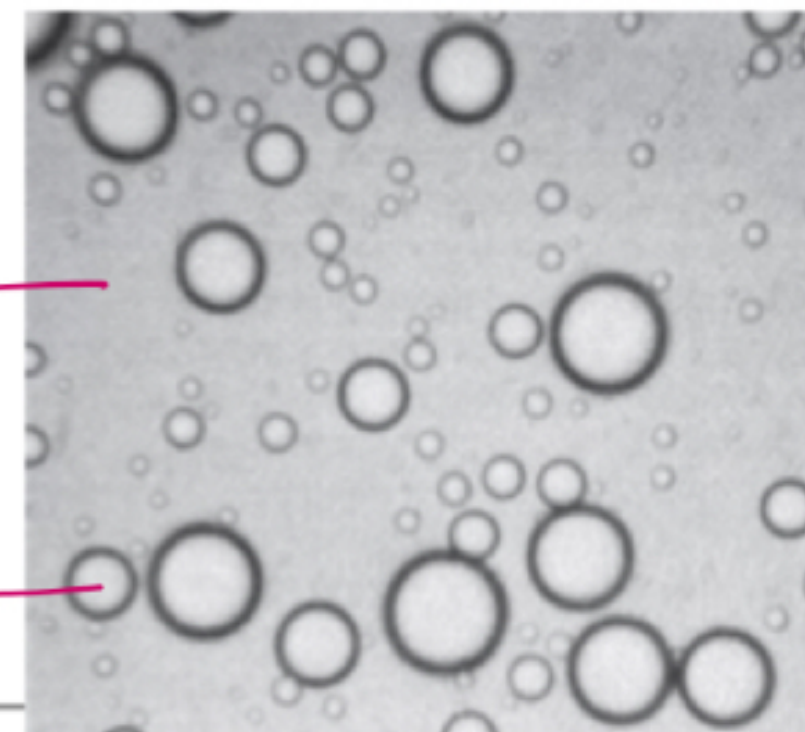
(مادتين موجودين مع بعض لكن مش)

Dissolve or Miscible)



Introduction

- An **emulsion** is a **dispersion** in which the dispersed phase is composed of small globules of a liquid distributed throughout a vehicle in which it is **immiscible** **Insoluble** (الكريات غير الذائبة) (كميتها اقل)
- In emulsion terminology, the **dispersed phase** is termed as the **internal phase** and the **dispersion medium** as the **external or continuous phase**. (الوسط) (كميتها اكبر)
- Generally to **prepare** a **stable emulsion** a third phase is necessary which is the **emulsifying agent** (**emulsifier, emulgent**).



dispersion medium

dispersed phase

بساعد المادة غير الذائبة (Dispersed phase)
انها تكون على شكل Globules
بدل ما انها تعمل
Separating layer

external & internal

كلمات خاصة فقط بال emulsion

انه ال Viscosity ممكن تتراوح ما بين Viscosity المواد
السائلة لشبه السائلة

Introduction:

Structure

- Depending on **their constituents**, the **viscosity** of emulsion can **vary greatly** (from liquid to semisolid).
- **Liquid emulsion**: can be employed **orally**, **topically** or **parenterally** (All injections with some exception)
- **Semisolid emulsions**: **topically only**
- **Many pharmaceutical preparations** that are **actually emulsions** are not classified as such because they fit some other pharmaceutical **category** more appropriately.
- For instance, **emulsions** include certain **lotions**, **liniments**, **creams**, **ointments** **that** are **discussed** **various designations**

كثير من المنتجات الصيدلانية موجودة بالسوق هي Emulsion بس معموللهم Labeling بطريقة تانية (lotion , cream ... etc)

- **Two immiscible components** formulated by:
 - 1. **Emulsifying agents**
 - 2. **Energy**: to make the three ingredients (water, oil, emulsifying agents) come together and form and emulsion

Energy

بتجربة اللاب كانت عملية التحريك بالـ

Mortar and pestle

Introduction

- **Energy** can be supplied by:

1. Triturating the ingredients in a mortar with a pestle

2. Heating the ingredients

3. Shaking the ingredients in a bottle

بثق / قذف

4. Extruding the ingredients through a small orifice of an homogenizer

جهاز (بمطلكم صورة الهم تحت هاي السلايد)

5. Mechanically blending the ingredients with a high speed mixer or blender

التحريك بآلة

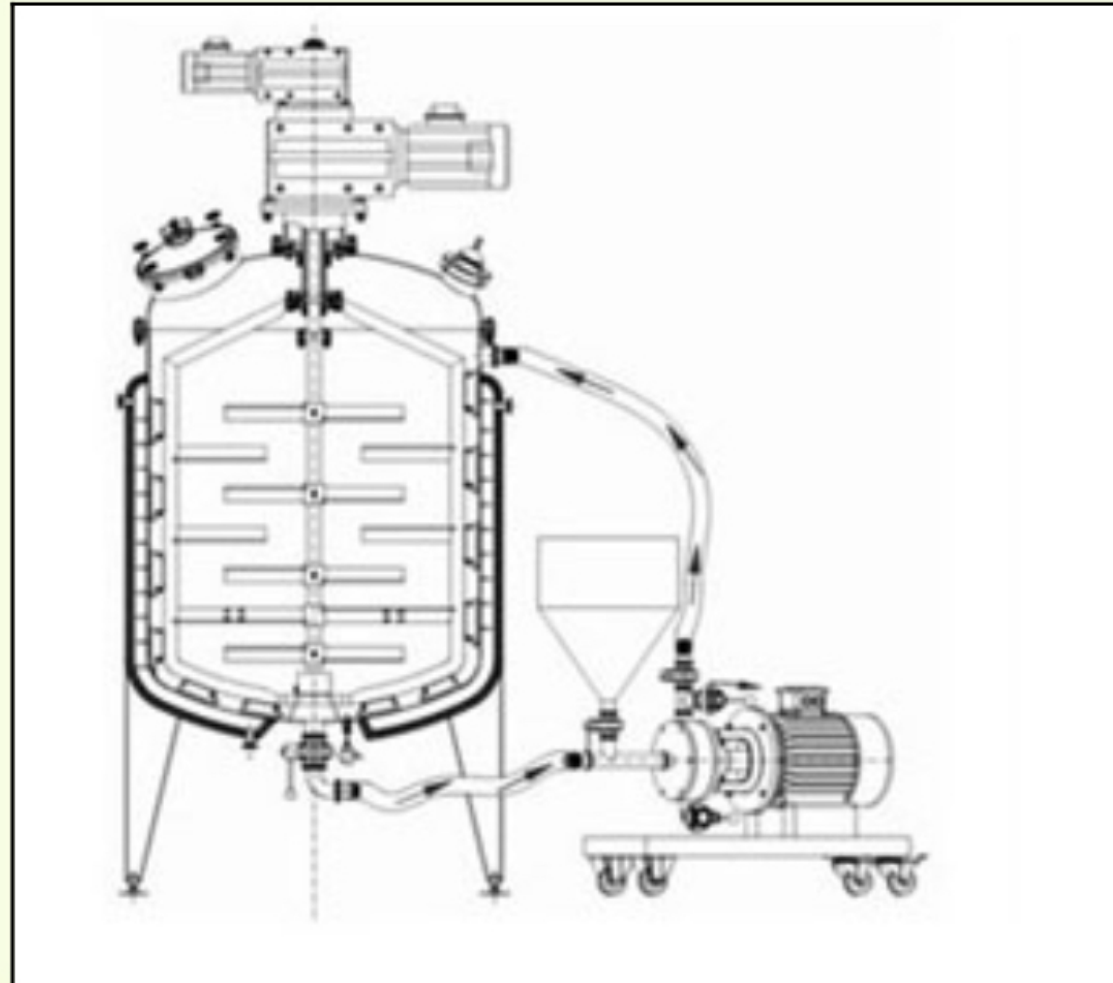
Inline Homogenizer/ High Shear Dispersion Homogenizer



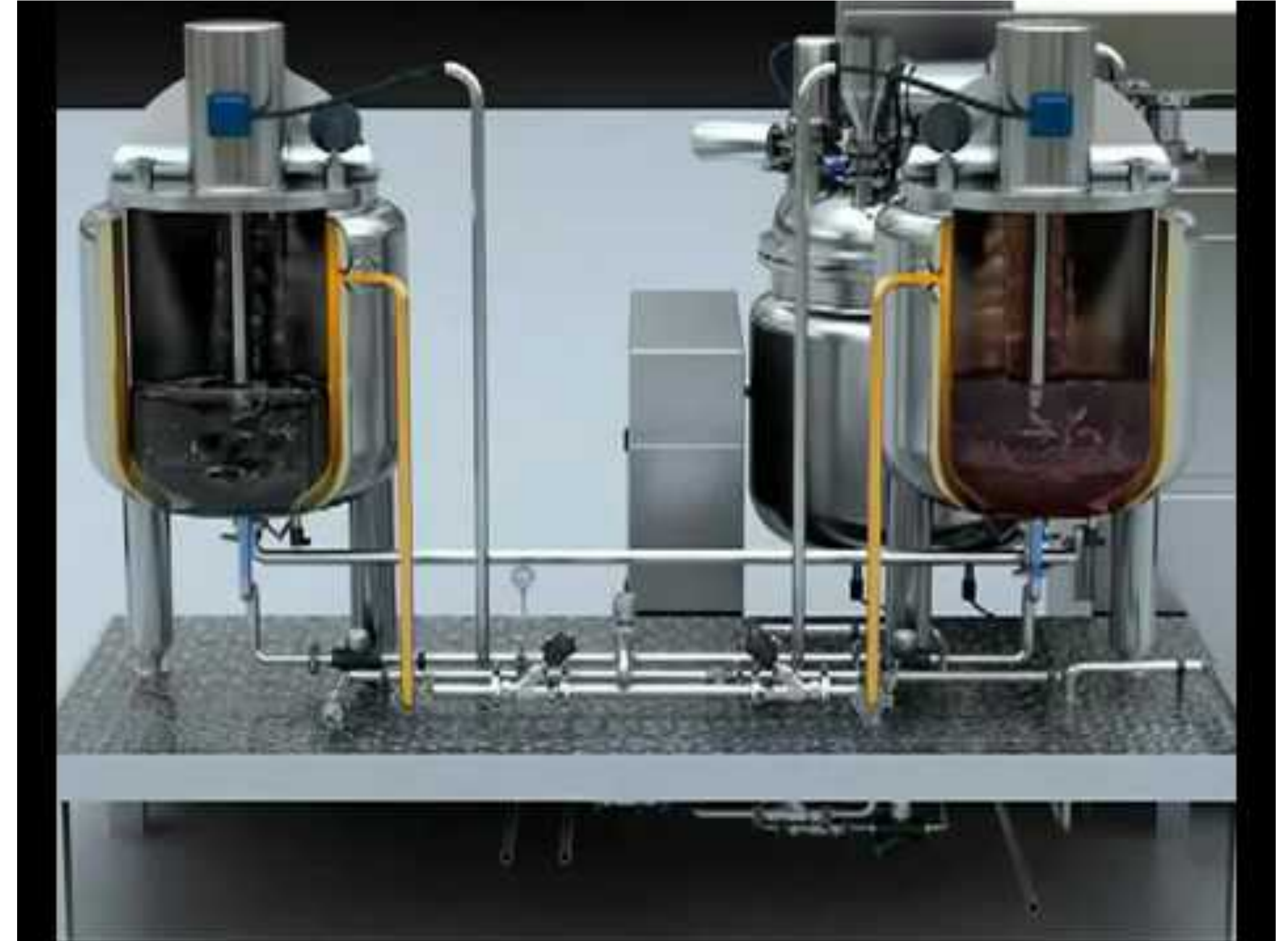
Inline Homogenizer/ High Shear Dispersion Homogenizer with Mixing Vessel



Diagram of Inline Homogenizer/ High Shear Dispersion Homogenizer with Mixing Vessel



هاد فيديو ، اكبسوا عليه بيشتغل 🎥

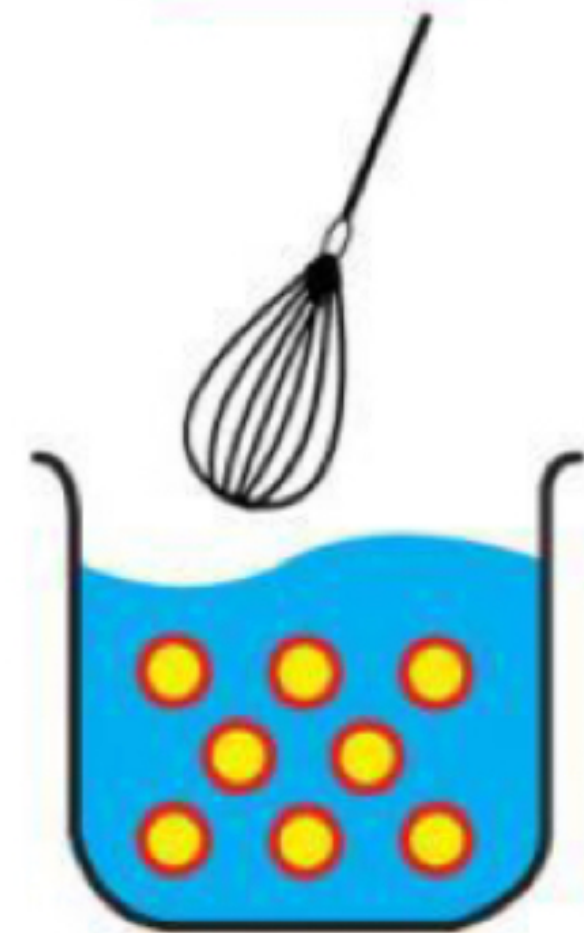
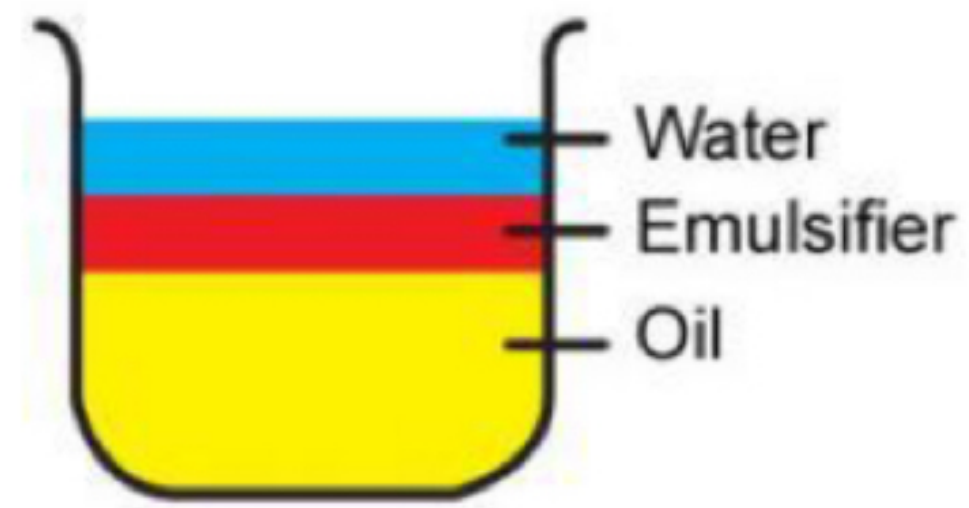
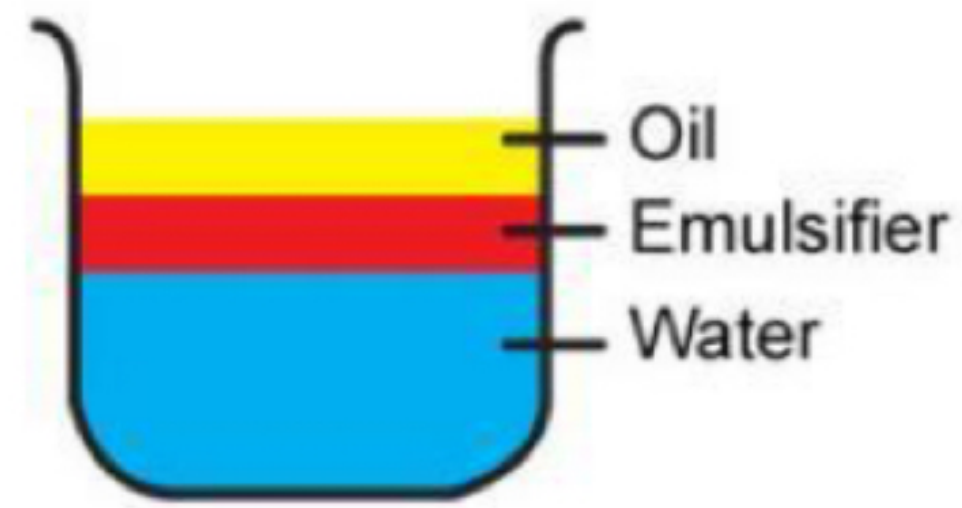


مو داخل معنا ، اجتهاد شخصي ادعولنا ❤️

Emulsions

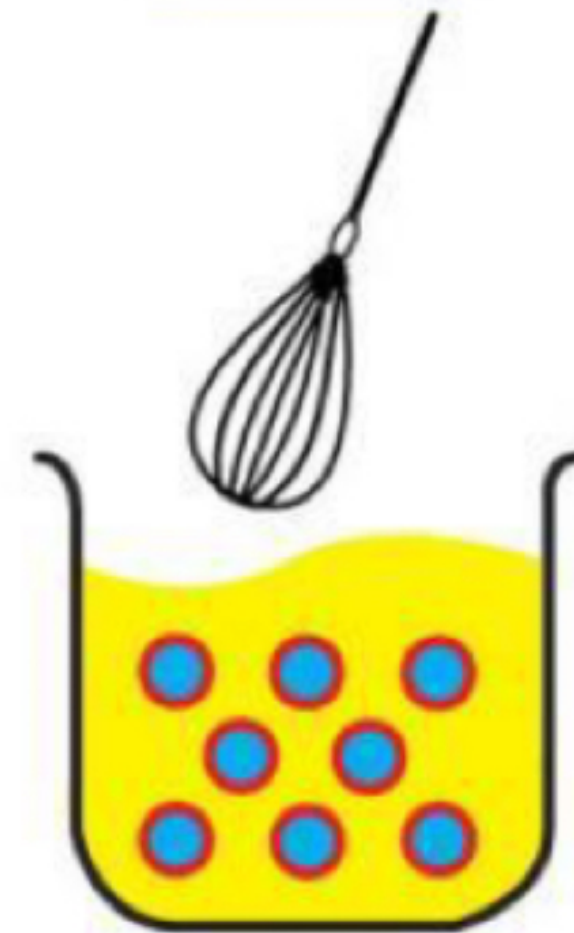
- Emulsions having an oleagenous internal phase and an aqueous external phase are referred to as oil-in-water (o/w) emulsions. كريات زيت في الماء
- Emulsions having an aqueous internal phase oleagenous and an external phase are referred to as water-in-oil (w/o) emulsions. كريات ماء في الزيت
- Emulsions are diluted in liquids miscible with their external phases. لو بدي اعمل تخفيف لـ Emulsion فالسائل اللي راح أضيفه راح يكون ذائب مع EPh

لا حول ولا قوة إلا بالله



Water-Based

O / W



Oil-Based

W/O

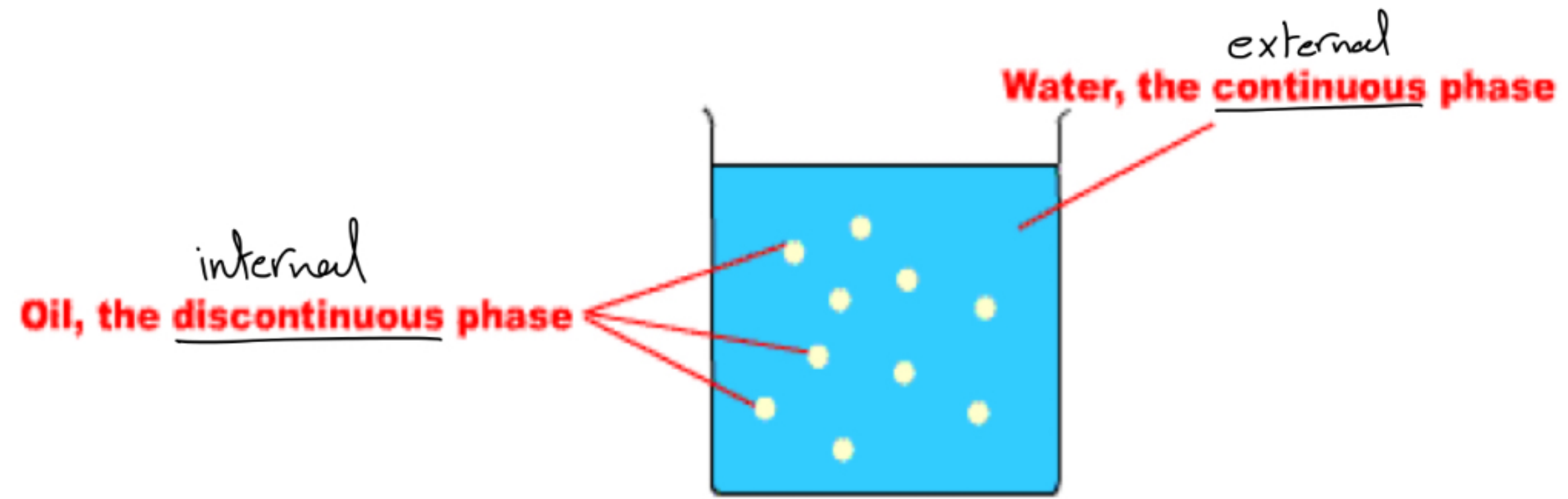


Figure 1a: O/W emulsion

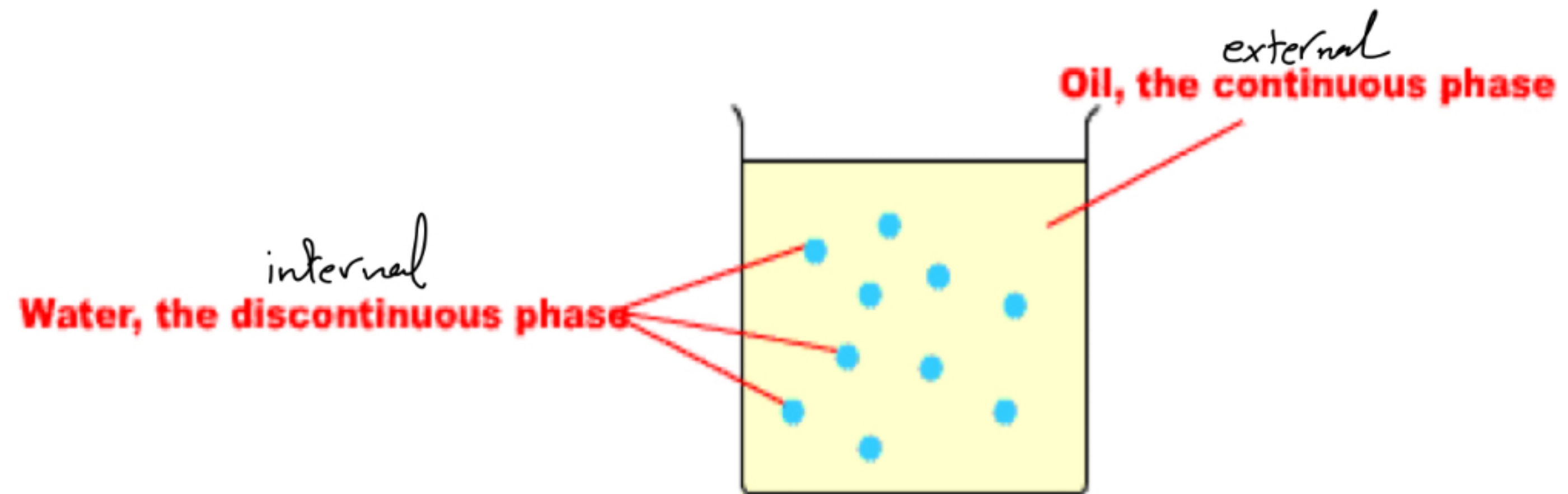
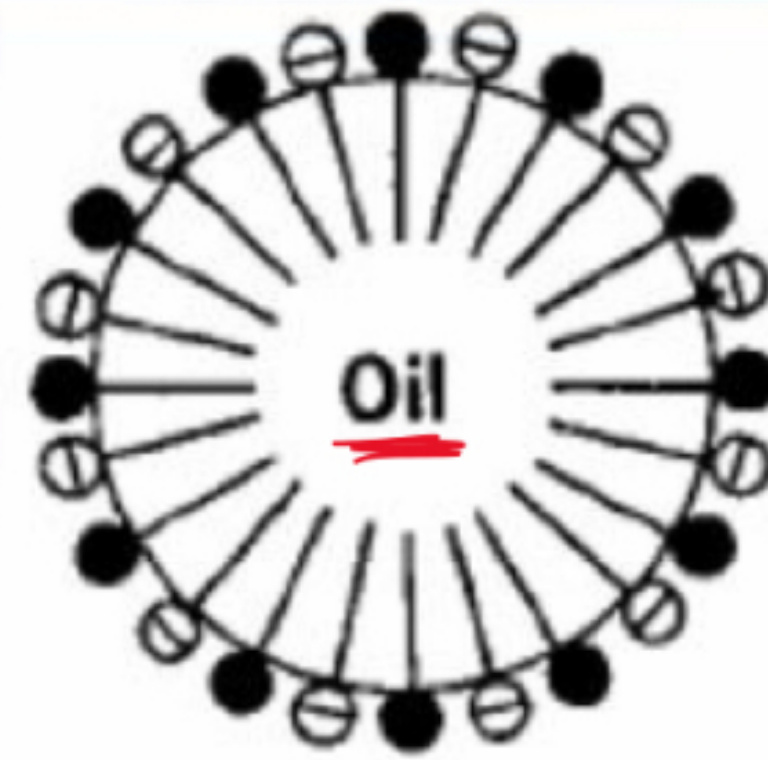


Figure 1b: W/O emulsion

Monomolecular adsorption



o/w

Rule of Bancroft: The type of the emulsion is a function of the relative solubility of the surfactant, the phase in which it is more soluble being the continuous phase.

Purpose of emulsions and of emulsification

بستخدمه حتى أقدر استفيد من الـ

Insoluble drugs in water

فبدوّب الـ Drug بالزيت وبعدين بدوّبهم بالملي

Oral administration

① Emulsions may be used to deliver drugs that exhibit a low aqueous solubility.

② Pharmaceutical emulsions may be employed to administer drugs to patients who have difficulty swallowing solid-dosage forms.

المريض الي بيواجه صعوبة ببلع الادوية الحبوب

③ Emulsions may be commonly used to administer oils that may have a therapeutic effect, e.g. liquid paraffin and castor oil. Patient acceptance for oral administration is enhanced when oils are prepared in o/w emulsion form.

الزيت نفسه الـ فوائده علاجية فهدفي من تحضير الـ Emulsion هو اني أوصل الزيت واستفيد منه

المريض بستسيغ الـ O/W أكثر من W/O عشان الطعم الزيتي واللزوجة الي مش لطيفة ما بتكون مبينه فيه كثير

Purpose of emulsions and of emulsification

Oral administration

نسبة الدواء التي يتم امتصاصها بالنسبة لكمية الكمامة

- The **bioavailability** of some oil-soluble drugs (ex. Griseofolvin and vitamin A) **may be enhanced** when they are prepared in the form of O/W emulsions.
- Pharmaceutical emulsions may be used to **mask the taste of therapeutic agents**, in which the drug is dissolved in the internal phase of an o/w emulsion. The external phase may then be formulated to contain the appropriate sweetening and flavoring agents.

لأن نضع ما حكيماً بأول نطفة ليس

صون عتسان طعم ال emulsion (o/w) ال E.ph ← يكون طعمه زكي وبقدر المريض يتقبله

Purpose of emulsions and of emulsification

Parenteral administration

- ^(IM) **Intramuscular** administration of emulsions may be used **for sustained release**.

الدوا بطلع بشكل بطيء لحد ما يوصل للدم
وتبلش فعاليته والعملية هاي بعدها وقت

حقن بالعضل وبضل مفعولها فترة طويلة (ممكن شهر)

- ^{only O/W} **Emulsions of the O/W type** are used to supply lipid ^(Vitamin A, phospholipid, etc) nutrients ^(IV) intravenously in **(Total Parenteral Nutrition (TPN))**.

بنعطيهم للناس الي عندها جفاف او سوء تغذية

Purpose of emulsions and of emulsification

Topical administration

- The greatest use of emulsions is for topical preparations.
- The emulsions are **more acceptable** and **easier to wash off** than oils.
- The **degree of greasiness**, the **viscosity** and the **appearance** can be **controlled** by the formulator.
المعنى الزيتية الي بتركها (1)
اللزوجة (2)
المظهر (3)
لم يفسد ان يحكم بال A and ص و
- emulsions may be **o/w** or **w/o** depending on:
 - The **desirability** of an **emollient** or **tissue softening effect**. **W/O** emulsions are **more occlusive** and **can be usually applied** more **evenly on skin**.
المطريات / مرطبات
تليين لنسج البشرة
← يسد (انسداد)
← متساو
 - **Medicinal agents** that are **irritating to the skin** are generally **less irritating if present in the internal phase of an emulsion topical preparation**.
المادة الطبية الي ممكن عملي تهيج للبشرة بكون هاد التهيج أقل لو كانت داخل الزيت (O/W) in.ph
 - **O/W** is **more easy to remove from skin**.

① **Disadvantages of pharmaceutical emulsions**

Physically unstable

- Pharmaceutical emulsions are **thermodynamically unstable** and therefore must be formulated to stabilize the emulsion from separation of the two phases.
- Pharmaceutical emulsions may be **difficult to manufacture.**

تحضيرها مش سهل

اللهم صلِّ على سيدنا محمد

