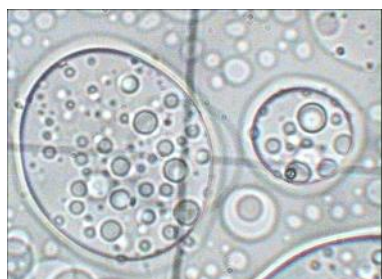


## Colloidal systems for dermal release of drugs and for cosmetic applications

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The research group of Pharmaceutical Technology of the Department of Drug Science and Technology of Turin develops colloidal systems as emulsion, microemulsions and liposomes for dermal administration of drugs and of cosmetic actives.

Moreover, such systems are also formulated carrying a superficial positive charge to improve drug permeability through external skin layers, and to obtain a longer “in situ” retention for prolonged topical pharmacological effects.



**OM Micrograph of W/O/W multiple emulsion**



**Microemulsion**



**Emulsion**

### 1. Description of the product

The main characteristics of the obtained colloidal systems can be summarized as follows:

- chemico-physical stability over time of the formulations
- use of biocompatible surfactants and non toxic positive charge inducing agents
- possibility to carry hydrophilic and lipophilic substances
- fair rheological properties
- increase in skin permeation
- protection of actives sensible to oxidation and to photodegradation
- possibility to carry in the same system molecules with incompatibility problems.

### 2. Innovative aspect of the product

Colloidal systems, particularly positively-charged systems, (by the addition of substances carrying a positive charge) are developed, able to incorporate lipophilic drugs for topical administration. In literature, several disperse systems are described, but no studies are present about the possibility to use positive microemulsions and positive deformable liposomes for improving the bioavailability of drugs administrated by topical and ocular route. Microemulsions, owing to the small dimensions of the nanodroplets of their inner phase can easily penetrate through the epidermal barrier. Deformable liposomes undergo shape changes whenever such deformations are needed, that is, when such deformations are enforced by the surrounding stress or space confinements. The deformability allows liposomes to pass easily through barriers with pores smaller than their own diameters, and probably, to penetrate into the skin through the interstices of the stratum corneum.

The formulation of multiple emulsions might protect encapsulated substances and enable incompatible substances to be incorporated in the same formulation.

In the described systems, skin-compatible, non irritating surfactants and positively-charged agents are employed.

### 3. Main advantages of the offer

The production of liposomes, microemulsion and multiple emulsion requires simple instrumentation and very short formulation times. The thermodynamic stability of microemulsion systems makes their preparation accessible without expensive equipments, both on the realization of little samples and “scale up” lots.

### 4. Technology key words

Deformable liposomes, microemulsions, multiple emulsions, skin permeation

### 5. Current Stage of Development

Work in progress – Tested in laboratory

### 6. Intellectual Property Rights

The product is not covered by patent.

### Technical and scientific publications

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