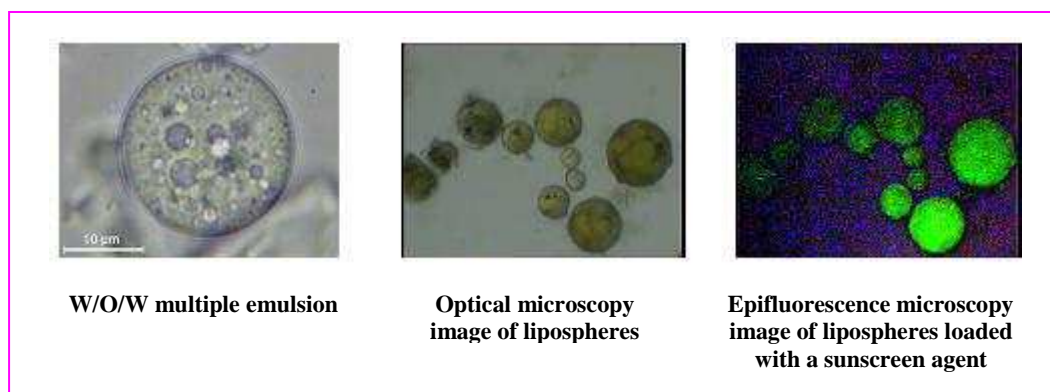


Lipid microparticles and nanoparticles for the oral drug administration and dermocosmetic skin application

Prof.ssa Valentina Iannuccelli, Prof. Gilberto Coppi – University of Modena e Reggio Emilia – Consorzio TEFARCO Innova

The research led to the development of lipid microparticles (lipospheres), by using simple or multiple emulsion techniques, or solid lipid nanoparticles (SLN), by using high pressure homogenization or sonication for pharmaceutical (improvement of the oral bioavailability of instable or poorly absorbed drugs) or dermocosmetic (irritation potential decrease of cosmetic ingredients such as glycolic acid or photostability enhancement of sunscreens) application.



1. Description of the product

Lipid microparticles (lipospheres) or nanoparticles (solid lipid nanoparticles, SLN) for oral drug administration or cosmetic skin application were developed by a melt technique of simple or multiple emulsions to entrap lipophilic or hydrophilic compounds, respectively. Lipospheres or SLN are evaluated in vitro (morphology, size, loading level, drug release, skin permeation), ex vivo (Peyer's patch uptake) and in vivo (animal models to assay the bioavailability of orally administered drugs, human beings to evaluate skin absorption by stripping test and tolerance by patch test).

2. Innovative aspect of the product

Lipid micro- or nanoparticles such as lipospheres and SLN represent suitable carrier to protect labile drugs from gastric environment and to release them gradually in the intestinal tract and to promote their absorption through the lymphatic system. In the dermocosmetic field, lipospheres utilize lipids having chemical affinity with cutaneous components, assuring stability enhancement of the encapsulated compound, modulated release reducing skin damage and skin permeation. By comparison with different lipid particles, lipospheres show higher stability and loading levels for lipophilic substances. Contrary to this, SLN could permeate the horny layer promoting skin absorption.

3. Main advantages of the offer

The development of solid lipid microparticles by a melt technique represents an easy and useful method avoiding the use of organic solvents. Owing to their nature and size, lipospheres guarantee biocompatibility for both oral administration and skin application, they can enhance drug absorption through the intestinal tract or prevent skin permeation of substances having a surface action. Contrary to this, SLN could permeate the horny layer promoting skin absorption.

4. Technology key words

Lipospheres, solid lipid nanoparticles, oral route, skin application

5. Current Stage of Development

Development phase – In vitro and in vivo skin absorption test.

6. Intellectual Property Rights

The product is not covered by patent

Technical and scientific publications

Iannuccelli V., Coppi G., Sergi S., Cameroni R. Preparation and "in vitro" characterization of lipospheres as a carrier for the cosmetic application of glycolic acid. J. Appl. Cosmetol., 2001, 19: 113-119

Iannuccelli V., Sergi S., Sala N., Coppi G. Sperimentazione "in vivo" di liposfere contenenti acido glicolico. Kosmetica, 2002, 3: 40-44

Tursilli R., Casolari A., Iannuccelli V., Scalia S. Enhancement of melatonin photostability by encapsulation in lipospheres. J. Pharm. Biomed. Anal., 2005, 40: 910-914

Iannuccelli V., Sala N., Tursilli R., Coppi G., Scalia S. Influence of liposphere preparation on butylmethoxydibenzoylmethane photostability. Eur.J. Pharm.Biopharm., 2006, 63: 140-145

Scalia S., Tursilli R., Sala N., Iannuccelli V. Encapsulation of hydroxypropyl- β -cyclodextrin/butylmethoxydibenzoylmethane complex in lipospheres. Int. J. Pharm., 2006, 320: 79-83

Scalia S., Mezzena M., Iannuccelli V. Influence of solid lipid microparticle carriers on skin penetration of the sunscreen agent, 4-methylbenzylidene camphor. J. Pharm. Pharmacol., 2007, 59: 1-7

Scalia S., Tursilli R., Iannuccelli V. Complexation of the sunscreen agent, 4-methylbenzylidene camphor with cyclodextrins: effect on photostability and human stratum corneum penetration. J. Pharm. Biomed. Anal., 2007, 44: 29-34

Scalia S., Tursilli R., Privitera L., Coppi G., Iannuccelli V. Microparticelle lipidiche - Veicolazione del Butil metossidibenzoilmetano. Cosm. Technol., 2007, 10: 35-39

Iannuccelli V., Coppi G., Sergi S., Mezzena M., Scalia S. In vivo and in vitro skin permeation of butyl methoxydibenzoylmethane from lipospheres. Skin Pharm. Physiol., 2008, 21: 30-38

V. Iannuccelli V., G. Coppi G., S. Scalia S. Comparative *in vitro-in vivo* skin permeation of cosmetic ingredients. In: Skin anatomy and physiology research developments, Leon F. Bukowskiy, Nova Publishers Ed., 2009.

CONTACT

info@biopharmanet.eu

Tel.: +39 0521 905073 Fax: +39 0521 905006