View metadata, citation and similar papers at core.ac.uk

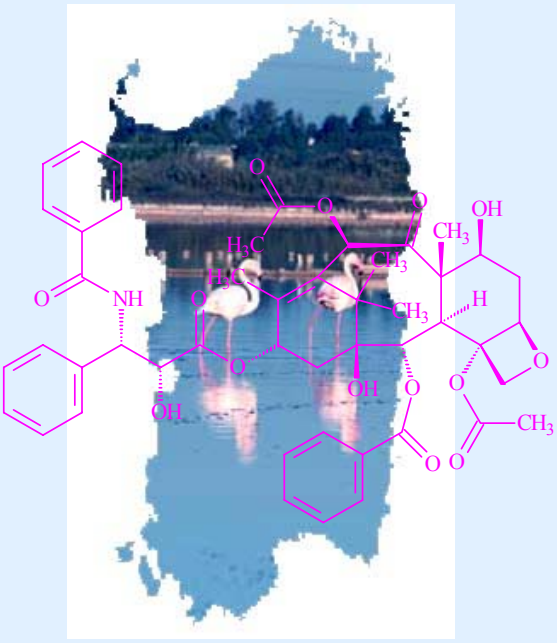
brought to you by CORE

provided by UnissResearch

SardiniaChem 2006

GIORNATA DI STUDIO DEDICATA ALLA CHIMICA ORGANICA DELLE MOLECOLE BIOLOGICAMENTE ATTIVE

5 Giugno 2006, Complesso Universitario di Monserrato, Cagliari



COMITATO ORGANIZZATORE:

Salvatore Cabiddu - Università di Cagliari, Giovanna Delogu - CNR Sassari,

Pier Paolo Piras - Università di Cagliari, Giampaolo Giacomelli - Università di Sassari

HANNO CONTRIBUITO ALLA REALIZZAZIONE DEL CONVEGNO:

UNIVERSITÀ DI CAGLIARI; UNIVERSITÀ DI SASSARI-Dipartimento di Chimica; CNR-Istituto di Chimica Biomolecolare, Sezione di Sassari; SIGMA-ALDRICH Srl; EXACTA+OPTECH Sardegna S.r.l., CARLO ERBA REAGENTI; VWR INTERNATIONAL s.r.l.

EX VIVO CUTANEOUS PENETRATION OF ECONAZOLE NITRATE FROM SLN INCORPORATED IN HYDROPHILIC GELS

G.Canu, V.Sanna, E.Gavini, M.Cossu, G.Rassu, P.Giunchedi[1]

[1]*Department of Drug Sciences University of Sassari, via Muroni 23/A, 07100 Sassari, Italy*

Solid lipid nanoparticles (SLN) are considered as innovative drug carrier for topical application [1]. The small size of the lipid particles ensures close contact to the stratum corneum and can increase the amount of the drug penetrating into the skin and it allows controlled drug release [2].

The aim of this study was to develop controlled release gels containing SLN dispersions loaded with Econazole Nitrate (ECN) and to evaluate *ex vivo* skin penetration of the drug released from the particles.

The SLN dispersion compositions prepared by oil in water emulsification technique, using a rotor-stator homogeniser, is reported in Table 1. Precirol ATO® (PCR) as lipid carrier and Tween 80 as emulsifying agent were used.

Batch	**PCR (w/w)**	**Tween 80 (w/w)**	**ECN (w/w)**	**Water (w/w)**
SLN 0	5.0	2.5	0	92.5
SLN 1	5.0	2.5	1.0	91.5
SLN 2	10.0	2.5	1.0	86.5

Table 1: composition of SLN dispersions

After preparation, SLN 1 and SLN 2 dispersions were added of a gelling agent (HPMC K100M 2.0% w/w) to yield gels (named SLN 1 gel and SLN 2 gel) containing a final concentration of 1.0% w/w ECN . A gel containing only ECN was prepared as reference formulation (ECN gel).

SLN dispersions were characterized in terms of drug content and encapsulation efficiency. The particle size of SLN was determined before and after incorporation into gels. The stability of nanoparticles in original dispersions and into gels was monitored over one month.

Ex vivo drug penetration tests through the porcine stratum corneum were carried out using a modified USP Apparatus n. 1.

The encapsulation efficiency for SLN 1 and SLN 2 range between 96%-102%.

The SLN dispersions show a narrow particle size distribution; the mean diameter of nanoparticles was about 480 nm. For all formulations, the particle size remains constant over the period of 30 days.

The results of *ex vivo* permeation of ECN from gels were reported in Fig. 1.

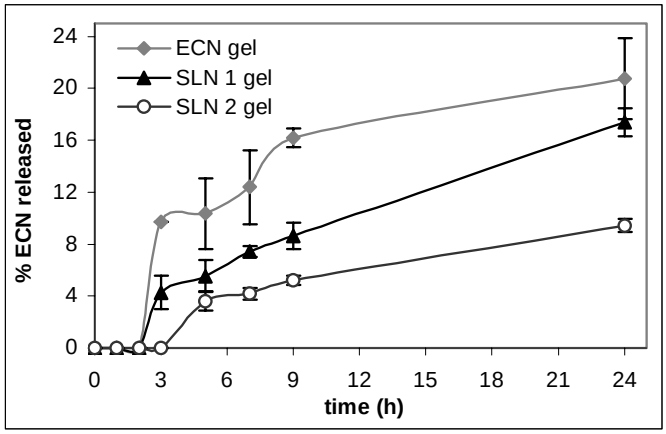


Figure 1: *ex vivo* ECN permeation from gels

The amount of drug released after 2 h from gels is negligible. The release of ECN is higher and more irregular from the formulation without SLN (ECN gel) with respect to the gels containing SLN because of the controlled drug diffusion from the solid crystalline lipid. The ECN release rate from SLN gels depends on the total lipid concentration in nanoparticles. For SLN 1 gel containing 5% w/w of lipid, the release rate is about two fold higher than the SLN 2, containing 10% of Precirol; the higher lipid content leads to the formation of lipid-enriched shell SLN which determines slower release.

These preliminary results suggest that SLN formulated in gels are promising controlled release dosage forms for the topical delivery of ECN.

References

[1] Mehnert W, Mader K. Adv Drug Deliv Reviews. (2001);47:165–196

[2] Wissing SA., Muller RH. Int J Cosm Science. (2001);23:233-243