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Research article

Nano-lipid particles of naproxen for topical application: In vitro / in vivo study

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Key words: Analgesic activity, Naproxen, Nano lipid particles, Osteoarthritis, Tail flick method.

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Abstract

Nano lipid particles (Nps) based Naproxen gels (Npx) have been developed as a promising topical delivery system for osteoarthritis treatment. Six formulas were developed with different polymer ratios using hot high pressure homogenization method. The characterizations of Npx-Nps for topical application were assessed for physical characteristics. Furthermore, in vitro transdermal release and the in vivo analgesic effect of the selected formula based on drug loading results (Npx-Np5) was carried out. The mean particle size was ranged between 203±10 nm and 228±30 nm for Npx1 and Npx4 respectively. Npx-Np5 showed highest drug loading (9.8±2.23%) and encapsulation capacity (98.0±3.9%). In vitro release study through rat skin showed that Npx-Nps5 had a more pronounced permeation profile compared with commercial gel. Moreover, the analgesic effect induced by Npx-Np5-carbapol gel was 1.5 times higher than that induced by Naprosyn 10%gel after 4 h. Lipid nanoparticles are carriers with good prospects of successful marketing.