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DEVELOPMENT OF OIL IN WATER NANOEMULSION FORMULATIONS FOR SPONTANEOUS TRANSDERMAL DELIVERY OF DRUGS

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ABSTRACT

Nanoemulsions have attracted attention in delivery of therapeutically active agents since most of the new chemical entities are hydrophobic in nature and the delivery of poor water soluble drugs is a challenge. This study was carried out to adopt nanoemulsion as a means of entrapping Ciprofloxacin in the oil phase of the emulsion for transdermal drug delivery. Nanoemulsions were formulated as oil in water (O/W) type and prepared by self-mild mechanical nanoemulsification method. The formulation consisted of Sandbox (*Hura crepitan)* and Sesame seed (*Sesamum indicum*) as the organic phase of the emulsion, Polyethylene (20) sorbitanmonooleate (Tween 80) and Polyethylene (20) sorbitan monolaurate (Tween 20) as the surfactants and Polyehtylene glycol (PEG 400) as co-surfactant. The formulations were tested and characterized. Ciprofloxacin (0.075 g) was incorporated into the oil phase of the most stable nanoemulsion formulation prior emulsification and tested on *Escherichia Coli*. Transdermal application was done on white albino rats (R). The result showed the zones of inhibition of HCa3+Ciprofloxacin and SSA3+Ciprofloxacinn to be 26.00 and 25.00 mm respectively. The HPLC results showed, out of 75000 µg of Ciprofloxacin loaded in the oil phases of HCa3 and SSA3 formulations, 6.0076 (R2), 0.4112 (R3) and 6.7241 µg (R6) were absorbed in HCa3 while 1.9519 (R1), 1.2631 (R4) and 2.1801 µg (R5) were absorbed in SSA3. The SEM images revealed an encapsulation with globule size diameter of 94 and 63 nm respectively. The findings of this work showed that sandbox and Sesame seed oil based nanoemulsion is effective for transdermal drug delivery.

Keywords: Nanoemulsions, Hydrophobic, Transdermal.