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Effect of lecithin concentration on permeation enhancement of clonazepam through skin via nanoethosomal carriers

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Background and Aims: Ethosome is novel lipid carrier, showing enhanced skin delivery.The ethosomal system is composed of phospholipid, alcohol and water . Due to the interdigitation effect of ethanol on lipid bilayers, it was believed that high concentrations of ethanol are detrimental to liposomal formulations. However, ethosomeswhich are novel permeation enhancing lipid vesicles embodying high concentration of alcohol were developed and investigated.
Methods: Ethosomes were prepared from Lipoid S alcohol and the drug (for final concentration of 0.05% (w/v)). The concentration of clonazepam in the receptor compartment of Franz cells was determined by HPLC method .TEM was used as a visualizing aid for ethosomal vesicles. Particle size was determined by DLS using a computerized inspection system. Rat abdominal skin from rat was used. Experiments were run in Franz diffusion cells. This stage used pH 7.4 isotonic phosphate buffer , as the receptor medium.Data were expressed as the mean±standard deviation of the mean and statistical analysis was carried out employing the Student's t test using the software excel. A value of $P<0.05$ was considered statistically significant.
Results: The ethosomes prepared using varying concentration of ethanol when examined by TEM appeared as unilamellaresicles with a predominant spherical shape. The entrapment efficiency of the ethosomal formulation that contain 3.0% w/v PC, 40% v/v ethanol showed the greatest entrapment efficiency (65.7%), and optimum size (173±10) thus presenting an ample opportunity to the clonazepam loaded ethosomal system to attain a better skin permeation profile. The greatest value of steady state transdermal flux for clonazepam loaded ethosomal formulation with 40% ethanol and 3% L, was observed to be 5.66 ± 0.01 µg/h/cm2 without a lag time.
Conclusions: This study confirmed that nanosized ethosomes are a very promising carrier for the transdermal delivery of clonazepam as revealed from an enhanced transdermal flux, higher entrapment efficiency and optimal nanometric size.

Keywords: Clonazepam; Nanoethosome; Skin permeation