Chapter - VI
SUMMARY AND CONCLUSION

The aim of our investigation was to evaluate the transdermal potential of novel vesicular carrier, ethosomes containing antifungal agents (KETO, MICO). Antifungal agents were successfully entrapped into the ethosomal vesicles. Apart from ethanol, propylene glycol was also used as permeation enhancer which would improve the solubility and partitioning of drug across the membrane.

During the study three different formulations of ethosomes for each drug were developed by varying ethanol concentrations between (20-40%). Concentrations of drug and other excipients were kept constant throughout the study. The vesicles were spherical in shape. The size of the vesicles was found to be decreasing with increase in ethanol concentration up to a limit of 40%.

Entrapment efficiency considered as a significant parameter for optimizing vesicular formulations was found to be highest at 30% ethanol concentration. Further increase in ethanol concentration reduced the size and entrapment efficiency. Studies showed good drug retention in developed vesicles in presence of ethanol. Stability studies were carried out on all developed formulations for a period of eight weeks. Results indicate that ethosomes with 30% ethanol concentration were the most stable. The loss in percentage drug content as well as drop in entrapment efficiency were negligible for ethosomes with 30% ethanol concentration. Ethanol at optimum concentration was found to exert a stabilizing effect on the developed formulations.
In vitro release studies were performed on all developed formulations using rat skin. Study proved the significance of ethanol concentration on drug release from ethosomes. Ethosomes with 30% ethanol had superior drug release, which indicated that 30% is the optimum concentration for developing ethosomal vesicles for antifungal agents (KETO, MICO).

The best vesicular formulations (KET₂, MET₂) were subjected for DSC studies to identify the interactions between drug and excipients. Absence of melting thermograms suggested that interaction of drug with lipid bilayer leads to enhanced entrapment and stability of formulation. These optimized vesicles were incorporated into water miscible cream base and compared with non-ethosomal creams of Ketoconazole and Miconazole for in-vitro release and in-vivo antifungal effects. At the end of 72 hours in-vitro release study, percentage drug release from ethosomal creams was significantly higher than non-ethosomal creams. The results from in-vitro release studies were substantiated by in-vivo antifungal effects performed on selected male New Zealand rabbits. The observations made during the study clearly showed the marked improvement in mycological cure rate as well as reduction in skin irritation on animal inoculated with *C.albican* strains.

From the obtained data it can be concluded that, ethosomal formulations are excellent carriers for antifungal agents for topical and transdermal delivery. They can be stored at normal room temperature and possess excellent stability, safety and efficacy profile. Further study may be required to explore the scope of ethosomal technology in drug delivery.