Fungal infections are the most common skin diseases that affect the skin and adjacent structures in all environments. According to the recent unpublished survey conducted by the International foundation of dermatology designed to provide information about community patterns of skin diseases in nine different countries across the world indicates that superficial mycosis was usually reported as one of the three commonest diseases. Human skin has favorable conditions for the growth of dermatophytes. Fungi invade the stratum corneum. Dermatophytes have a battery of enzymes able to digest different substrates in their habitat. Dermatophyte fungi are enriched with keratinolytic, proteolytic and lipolytic activity. Dermatophytes also contain serine proteinases which were suggested to play a major role in the invasion of skin. Invasion of skin include two basic mechanisms - Colonization and Host-parasite interaction which is characterized in colonized skin as an intense inflammatory process, erythema and edema of the dermis and epidermis leading to breaching epidermal integrity.

Current medications for the superficial fungal infections include the variety of antifungal agents. Oral toxicity of antifungal drugs and treatment of fungal infection residing in stratum corneum focuses the need of topical delivery of antifungal agents. Topical treatment has several superiorities compared to oral and systemic delivery but still have some pitfalls such as side effects of drugs, diffusion of drug across biological tissues, drug and biological cell interaction, residence time of conventional dosage form. Various novel colloidal drug delivery systems overcome the mentioned limitation of conventional route. Amongst various colloidal carriers solid lipid nanoparticles (SLN) have shown promising healing ability in skin infection.

Butenafine hydrochloride and sertaconazole nitrate are the synthetic antifungal agents. Both antifungal agents show poor solubility, poor permeability and skin irritation potential. To subside the side effects of antifungal drugs and symptomatic effect of fungal infection as inflammation, stinging and itching, the antifungal drug were encapsulated into solid lipid nanoparticles. The synthetic steroids provide rapid symptomatic relief but
consist of many steroid related complications. Hence to provide better therapeutic and pharmacological effect for fungal infection, attempt has been made to formulate the solid lipid nanoparticles having natural lipid and surfactant excipients incorporated into aloe vera gel which have anti-inflammatory, antioxidant and healing property which will show the synergistic effect.

Experimental investigations include the preparation, optimization and evaluation of butenafine and sertaconazole loaded solid lipid nanoparticles incorporated into *Aloe vera* gel for better skin penetration. The experimental research was carried out in five stages. First stage includes analytical study of drug and the preformulation study of different concentration drug and excipients. The best formulation was obtained by applying the optimization design to the formulation study. In the second stage, a $2^3$ factorial design and taguchi design was applied to butenafine and sertaconazole solid lipid nanoparticles formulation and analysed by ANOVA. The third stage includes the characterization and evaluation of optimized formulations. Antifungal drug loaded solid lipid nanoparticles were incorporated into *Aloe vera* gel in fourth stage of study. The gel was evaluated for stability, occlusion, hydration, release, permeation, irritation and antifungal study in fifth stage.