DEVELOPMENT OF SUSTAINED AND CONTROLLED DRUG DELIVERY SYSTEM USING BIODEGRADABLE POLYMER TO TREAT FUNGAL KERATITIS

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Fungal keratitis, a common corneal fungal infection, can cause destruction of the cornea leading to blindness in severe conditions. About 40% - 50% of all microbial keratitis is caused by fungi. Complex anatomy and physiology of the eye limit the intraocular penetration of the drug and decreases the retention time of the drug in the eye. This makes it necessary for high-frequency administration of topical and oral formulations, which in-turn may lead to ocular and systemic toxicities. Natamycin is the only FDA approved drug for fungal keratitis. Biocompatible and biodegradable polymers like Poly (lactic-co-glycolic acid) (PLGA) can be used as a carrier for the drug. These polymers provide sustained and controlled release of the drug for prolonged duration which reduces the frequency of administration of the drug. They also improve the bioavailability of the drug and reduce the side effects. Gradual release of the drug prevents its breakdown, thus enhancing its stability in the eyes. Therefore, Natamycin loaded PLGA implant was developed for sustained and controlled drug delivery in fungal- infected eyes. *In vitro* drug release, drug loading and entrapment efficiency of the developed implant was analyzed using RP-HPLC. *In vitro* cytotoxic effect was studied on corneal epithelial cells using MTT assay. *In vitro* antifungal activity was evaluated on *Candia* by evaluating the zone of inhibition. Drug permeation study was conducted using *ex vivo* goat corneal model.