1. ABSTRACT

More than 80 types of herpes viruses have been identified and eight of them are pathogens for human. Human herpes simplex virus (HSV) is a topical contagious infection with a large reservoir in the general population and also possesses potential for significant complications in the immune-compromised subjects. HSV-associated diseases are amongst the most widespread infections, affecting nearly 60% to 95% of human adults. Herpes infections are generally incurable and persist during the lifetime of the host often in latent form. Acyclovir is an anti-viral drug made up of acyclic guanosine analogue which target viral polymerase and viral DNA replication. It undergoes sequential phosphorylation by virally-induced thymidine kinase (TK) and host cellular kinases in order to convert to the biologically active triphosphate form. Poor bioavailability (10%-20%) and short plasma half-life are the major drawbacks of Acyclovir leads to frequent dosing.

Ganciclovir is a guanosine derivative that inhibits DNA replication of herpes simplex viruses (HSV) upon phosphorylation. Ganciclovir is transformed by viral and cellular thymidine kinases (TK) to Ganciclovir triphosphate works as an antiviral agent by inhibiting the synthesis of viral DNA and results in DNA chain termination and ultimately prevents the replication. Absorption of the oral form is very limited, i.e. about 5% fasting, about 8% with food. It achieves a concentration in the central nervous system of about 50% of the plasma level. About 90% of plasma Ganciclovir is eliminated unchanged in the urine, with a half-life of 2-6 hours, depending on renal function.

Human immunodeficiency virus infection / acquired immunodeficiency syndrome (HIV/AIDS) is well known disease from past few decades. Human immunodeficiency virus infection / acquired immunodeficiency syndrome (HIV/AIDS) is a disease of the human immune system caused by infection with human immunodeficiency virus (HIV). Currently no sure shot treatment or effective HIV vaccine is available in market. Treatment consists of high active antiretroviral therapy (HAART) which slows progression of the disease. Zidovudine (INN) or azidothymidine (AZT) (also called ZDV) is a nucleoside analog reverse-transcriptase inhibitor (NRTI), a type of antiretroviral drug used for the treatment of HIV/AIDS infection. AZT is the first U.S. government-approved treatment for HIV, marketed under the brand name Retrovir.
The present investigation was aimed towards formulation, development and characterization of vesicular drug delivery system for anti-viral drugs. The in-focus viral diseases for current investigation are herpes and HIV. The three different vesicular drug delivery based formulations were prepared and evaluated as per their intended use. Acyclovir niosomal gel for the topical treatment of herpes, Ganciclovir liposomal eye drops for ocular herpes treatment and Zidovudine ethosomal gel as alternate route of administration of Zidovudine were formulated and evaluated. The selected formulations were further characterized by e-vivo studies.

**Keywords:** vesicular drug delivery system, anti-viral, topical niosome, ocular liposome, transdermal ethosome