1. **Introduction:**

Following route of drug delivery are selected to target the different disease condition using the specially designed non pressurized spray devices:

**1.1 Oral route:** This route is specially selected for the onset of action. There are many ways to deliver drugs into the body, viz oral (through swallowing), sub mucosal (through buccal and sublingual mucosa), parenteral (through injection), transdermal (through skin), pulmonary (through inhalation) etc. Among these deliveries oral delivery (by swallowing) is widely accepted. In oral drug delivery, many scientific challenges and breakthrough technologies are required to generate novel dosage forms raising drug delivery to higher level. Some are self emulsifying systems, solid self nanoemulsion, polymeric micelles, spray freezing, pH controlled systems, time delayed system, osmotic pumps, prodrugs etc.¹

**1.2 Nasal route:** This route is specially selected for improving the bioavailability of drug. Nasal delivery is considered to be a promising technique for the following reasons: the nose has a large surface area available for drug absorption due to the coverage of the epithelial surface by numerous microvilli, the subepithelial layer is highly vascularized, the venous blood from the nose passes directly into the systemic circulation and therefore avoids the loss of drug by first-pass metabolism in the liver, it offers lower doses, more rapid attainment of therapeutic blood levels, quicker onset of pharmacological activity, fewer side effects, high total blood flow per cm³, porous endothelial basement membrane, it is easily accessible, and drug is delivered directly to the brain along the olfactory nerves. However the primary function of the nose is olfaction, it heats and humidifies inspired air and also filters airborne particulates. Consequently, the nose functions as a protective system against foreign material. There are three distinct functional zones in the nasal cavity, namely: vestibular, olfactory, and respiratory areas. The vestibular area serves as a baffle system; it functions as a filter of airbone particles. The olfactory epithelium is capable of metabolising drugs. The respiratory mucosa is the region where drug absorption is optimal.²
1.3 **Topical route:** Topical route is specially selected for the local as well as deep penetration drug in to tissue. Although the formulation of effective topical drug delivery system is one of the most sophisticated pharmaceutical preparations, it has attracted researchers due to many medical advantages associated with it. Topical drug delivery systems can act superficially on skin surface, locally in dermal layer of the skin or transdermally to provide successful delivery of drug molecules to the systemic circulation avoiding the traditional problems and limitations of conventional routes of drug delivery. Many novel formulations have been utilized topically to enhance either permeability or drug targeting to a specific layer of the skin such as Liposomes, ethosomes, transfersomes, niosomes and catezomes. The main problem with all of these formulations is that there is no distinct barrier between the targeting and localization action to a certain layer of the skin and the transdermal action to the circulation of these preparations. Any minimal change in the formulation could transform it from a local targeting preparation to a systemic one.

1.4 **Rectal route:** Rectal drug administration is amenable, however, to both local and systemic drug delivery. It has been effectively utilized to treat local diseases of the anorectal area as well as to deliver drugs systemically as an alternative to oral administration. Spray dosage form are provides relatively better effect then other dosage forms like rectal suppositories or tablets as it is in solution form. It gives better patient compliance as compare to painful intramuscular injections and complicated application of rectal suppositories. It will be dispensed in suitable spray device that can give the formulation in form of fine droplets. Hence, it is easy to deliver in to rectal orifice. The spray device assembly is specifically designed to give drug dispensing in to anal cavity.

1.5 **Vaginal route:** Vaginal drug delivery is specially selected to achieve the more patient compliances and to improve the bioavailability of some drug. Some drugs are poorly absorbed after the oral administration. Over the last twenty years, extensive efforts have been made towards the administration of poorly absorbed drugs through different delivery systems and routes but the presence of a mucus laden cervix (vagina) in women provides an opportunity as a conjoint site for such drug delivery. The vaginal route has been rediscovered as a potential route for systemic delivery of various therapeutically important drugs. However, fruitful delivery of drugs through the vagina remains a challenge because of poor absorption of drugs across vaginal
epithelium. The various factors like vaginal physiology, age of patient, menstrual cycle are affecting the rate of drug absorption after vaginal administration. According to previous literature, there are various vaginal drug delivery systems like suppositories, creams, gels, tablets and vaginal rings. In current study, further attention has been made on various polymers which are used in hydrogel which provide bioadhesive property to the vaginal formulations, so that the formulation remains on vaginal tissues for 3 to 4 days.\textsuperscript{5}