3. RATIONAL FOR SELECTION OF DRUGS AND OBJECTIVE OF PRESENT STUDY:

Ensuring the safety of a new pharmaceutical compounds or drug requires that it meet the established purity standards as a chemical entity or when admixed with animals feed for toxicity studies or pharmaceutical excipients for human use. These requirements demand the robust formulation development to get stable finished product till its shelf life in market.

Class II drugs, which are highly permeable but possess low aqueous solubility are, **challenging to formulate**. To formulate it in to liquid formulation solubility is the prerequisite. **Once the drug is made soluble**; the stability of the formulation system becomes a major challenge for formulator. Therefore, a proper balance of solubility and stability must be needed to develop it for final liquid formulation with the sound knowledge of science and technology.

It is very difficult to predict behavior of class II drugs because of the large variability in the absorption or dissolution kinetics and the lack of an adequate in vitro system for evaluating the dissolution behavior.

**DRT INJECTION:**

DRT oral formulation is having poor bioavailability as per review of literature.[43] DRT is available as a tablet and Injection dosage form and marketed by many **companies** in India. It is reported that bioavailability of DRT from tablet formulations is highly variable (24 % - 91%). Along with that problems associated with available injectable DRT formulations are,

- All the marketed injectable formulations contain ethanol as a co-solvent.
- Osmolality of injection is higher as well as it causes pain at the site of administration due to use of ethanol.
- The presence of ethanol in composition make the manufacturing process challenging due to volatile nature.
- Ethanol containing formulation have to be tested for ethanol content during every batch release.
- Ethanol comes under control/bonded license having authority concerns.

Therefore, the objective of this research study is to develop safe, stable and cost effective injectable formulation of DRT which is ethanol free.
NEP AND MXP OPHTHALMIC SUSPENSION:

NEP (as a Ophthalmic suspension) and MXP (as a Ophthalmic drops) individual ophthalmic formulations are available and are used simultaneously to reduce ocular infection risk followed by cataract surgery and later to relieve postoperative inflammation. It improves visual outcomes which will reduce corneal oedema.

- Combined formulation facilitates patient comfort and ease of use. In a single dose patient get complete benefit.
- Cost effectiveness due to single processing of two medications. e.g. container closure system, manufacturing cost, excipients etc.
- As a cataract patient have dependency of helper for medication. Two different medication leads to chances of error and more drops leads to pain to patient.
- Therapeutic dose is similar as per individual formulation; site of action is different which gives synergistic effect.

Currently, there is no marketed formulation available as a combination of Nepafenac and Moxifloxacin. Therefore there is an unmet need for development of safe, stable and synergistic ophthalmic suspension formulation of NEP (1 mg/mL) and MXP (5 mg/mL).