3. Aim and Experimental Protocol

3.1 Aim of work

Drugs can be administered by various routes depending upon needs; however oral route is the oldest and familiar mode of drug management in many diseases. The solid dosage form includes powder, tablets, capsule, moulds, etc. The tablets are compact and produces accurate dose, so that patient generally preferred to take tablets as compared to other dosage form. The cost of this dosage is low as compared to other dosage form such as parenteral. The tablet has numerous advantages but apart from this, the pediatric and geriatric patient expertise difficulties in swallowing tablets. The prevalent tablets and capsule required water to administer it, but some time it cause unsuitable for some patient to swallow; because of this, the intentional therapeutic drug reply cannot be ascertained. The conventional tablets become useless for the patient during:

- Kinetosis
- Unexpected event of allergic offensive or wheezing
- Inaccessibility of aqua during traveling

The mouth dissolving tablets becomes best choice to overwhelm the complications integrated with prevalent tablets. The mouth dissolving tablets easily disintegrates with saliva on keeping on tongue. The active ingredient present in mouth dissolving tablets is start absorbing from the mouth, pharynx and esophagus as the saliva passes through the stomach. This can increase the bioavailability of mouth dissolving tablets compared to conventional tablet dosage form.

The Nonsteroidal anti-inflammatory drugs are generally recommended for the remedy of acute or chronic pain and inflammation. The low aqueous solubility problem of analgesic and anti-inflammatory drugs can be overcome by formulating it into a solid dispersion or by complexation. Common side effects
such as dyspepsia, nausea, diarrhea, constipation, gastritis and vomiting encounter by analgesic and anti-inflammatory drugs. Thus in order to improve these problems, it was attempted to prepare mouth dissolving tablets of some analgesic and anti-inflammatory drugs using some super-disintegrient.

Further mouth dissolving tablets offers following advantages

- Improved taste of the tablets has patient acceptability
- More rapid drug absorption through pre-gastrum area
- It improve safety of drug because it is free from the risk of suffocation
- The mentally ill, disabled, amulatory and non-cooperative patient can easily administered MDTs
- It does not require water during administration

3.2 Selection of drug

Tolperisone hydrochloride is a centrally acting muscle relaxant having half life of 2 to 3 h, bioavailability of 20% and more stable in acidic than basic media with high solubility in water. It is recently prescribed by Indian physician for the treatment of back pain, arthrosis of large joints (degeneration of cartilage tissue in joints), spastic muscle cramps, paralysis, and muscle pain. The half-life of Tolperisone hydrochloride is short. It is quick and absolutely absorbed from the gastrointestinal tract. Conventional tablet formulations release the active substance in the intestine at pH 4 to 7. In this pH range, tolperisone breaks down into 2-methyl-1-(4-methylphenyl)-propenone (4-MMPPO) and piperidine. Thus, the patient is exposed to an uncontrollable quantity of 4-MMPPO$^{101-103}$.

Conventional Tolperisone tablets available in the market are unsuitable for geriatric and pediatrics patient who experiences problem in swallowing, and by those who are crippled or who are travelling and do not have a facile access to water. The mouth dissolving tablets can be swallowed with a little supply of water or saliva. The tablet prepared by any of the aforementioned approaches is composed of drug and other excipients, which disintegrate in small quantity of water in the mouth within 30 seconds. Consequently, an effort was prepared to enhance the dissolution of Tolperisone through the
formulation of mouth-dissolving tablets with appropriate mechanical strength, which would disintegrate in oral cavity, in less than 30 seconds, and would provide an immediate relief from pain due to its faster dissolution in gastrointestinal tract.

Celecoxib is belonging to nonsteroidal anti-inflammatory category drug. It is considered as the first cyclooxygenase-2 inhibitor drug, and it is employed in the remedy of rheumatoid arthritis, osteoarthritis and dysmenorrhea. But Celecoxib is poor soluble in water & poor absorption in large intestine. Generally the poor water soluble drugs are poorly absorbed in body due to its rate-limiting dissolution. The Celecoxib generally absorbed in stomach. Compared to conventional NSAIDs, the Celecoxib is mostly preferred. The long term use of Celecoxib tablets produce serious gastrointestinal complications such as ulcer, severe bleeding and perforation, resulting in hospitalization, and even death.

Therefore, we aimed to enhance the dissolution of Celecoxib tablets by preparing its mouth dissolving tablets. This can be accomplished by adding superdisintegrates agents namely Crospovidone and Sodium starch glycolate in different ratio.$^{104-106}$

### 3.3 Objective of study

- To formulate and assess fast dissolving tablets of Tolperisone and Celecoxib
- To carry out compatibility study of the drug and excipients
- To study the physical parameters of the dosage form
- To estimate the drug content in the formulation
- To study the disintegrating and dissolution time of the dosage form using suitable *in-vitro* method
- To carry out the stability studies

### 3.4 Experimental protocol

The plan of the tendered task is as follows:
(1) Preformulation studies
   a) Identification of drug
   b) Drug excipients interaction study
   c) Melting Point
   d) Solubility of drug

(2) Preparation of standard curve
   a) in pH 6.8 Phosphate buffer
   b) in 0.1N NaOH

(3) Formulation of mouth dissolving tablets

(4) The following evaluation parameters were studied based on laboratory experiments

**A. Evaluation of blends**

(a) Angle of repose
(b) Apparent bulk density
(c) Tapped bulk density
(d) Percent compressibility
(e) Hausner’s Ratio

**B. Evaluation of tablets**

(a) Tablet description
(b) Tablets thickness and diameter
(c) Hardness
(d) Friability
(e) Weight variation
(f) Drug Content
(g) Wetting Time
(h) Water absorption ratio
(i) *In-vitro* disintegration time
(j) *In vitro* dissolution study
(k) Kinetic model of drug release
(l) Full factorial design
Aim and Experimental Protocol

Preformulation studies
- Identification of drug
- Drug excipients interaction study
- Melting Point
- Solubility of drug

Preparation of standard curve
- pH 6.8 Phosphate buffer
- 0.1N NaOH

Formulation of Tablets

Evaluation of blends
- Angle of repose
- Apparent bulk density
- Tapped bulk density
- Percent compressibility
- Hausner's Ratio

Evaluation of tablets
- Tablet description
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- Kinetic model of drug release
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