5. PLAN OF WORK

3.1. Phase I: Preformulation studies

3.1.1. Literature survey
3.1.2. Selection of curcumin, betulinic acid and lenalidomide (based on docking studies).
3.1.3. Extraction, Purification and Preliminary test for mucilages and gum like test for carbohydrate/protein/mucilage/pectin/heavy metals.
3.1.4. Characterization of mucilages and gum by X-ray diffraction analysis (X-RD), Fourier transforms infra-red spectroscopy (FT-IR), Differential scanning calorimetry (DSC), Maldi analysis, Mass Spectroscopy analysis (MS), 1D and 2D NMR spectroscopy and elemental analysis.
3.1.5. Selection of polymers, mucilages and gum concentration based on preliminary examination like opalescent suspensions formation/suitable pH range/swelling behavior.
3.1.6. Drug and polymer, mucilage and gum compatibility studies by DSC and FT-IR analysis.
3.1.7. Method development of curcumin, betulinic acid and lenalidomide by UFLC method.
3.1.8. Solubility studies of curcumin, betulinic acid and lenalidomide.

3.2. Phase II: Formulation studies

3.2.1. Preparation of placebo and drug loaded polymeric nanoparticles by modified coacervation method using design of experiment employing factorial statistical design.
3.2.2. Evaluation of nanoparticles
   ✓ Determination of particle size distribution
   ✓ Surface morphology
   ✓ Sterility studies
   ✓ Determination of entrapment efficiency
   ✓ \textit{In vitro} release studies
   ✓ Stability studies

3.2.3. Formulation of drug loaded nanogels

3.2.4. Evaluation of nanogels
   ✓ Clarity
   ✓ pH
   ✓ Viscosity
   ✓ \textit{In-vitro} drug permeation studies using goat cornea
   ✓ Sterility study
   ✓ Stability studies

3.3. Phase III: \textit{In-vitro} studies
3.3.1. \textit{In-vitro} ocular irritation studies by HE-CAM and Haemolysis method
3.3.2. \textit{In-vitro} anti-proliferation studies by CAM model
3.3.3. \textit{In-vitro} tube formation studies using rabbit ocular endothelial cell line

3.4. Phase IV: \textit{In-vivo} studies
3.4.1. \textit{In-vivo} ocular irritation studies using rabbit eye
3.4.2. \textit{In-vivo} anti-proliferation studies using rabbit eye by alkali burn model

3.5. Phase V: Thesis writing, publications and patents filling.