PLAN OF WORK:

To achieve these objectives, following plan of work would be execute:

Phase-I: Literature search and review of Literature

- Review of marketed available transdermal formulation
- Advantage of the transdermal formulation

Phase II: Procurement of material and preliminary studies

- Selection of the suitable model drugs from above mention category
- Study of the physicochemical and pharmacokinetic properties of the drug
- Development of the analytical method
- Selection of the polymer combination, penetration enhancers and excipients

Phase III: Preformulation, compatibility studies and formulation development

- Drug-Excipient compatibility studies at accelerated condition
- Solubility study of drug into polymers and penetration enhancers
- Optimization of the adhesive ratio for transdermal Semi-Solid matrix patch
- Optimization of the penetration enhancers and other excipients
- Development of transdermal Semi-Solid matrix patch

Phase IV: Evaluation of formulation drug delivery system

- Thickness of the patch
- Estimation of Drug content into patch
- Uniformity of dosage unit
- Adhesion Test (Peel, Take, Shear, release force, Thumb take test)
- \textit{In-vitro} drug release study
- \textit{In-vitro} skin permeation study
• Stability study as per ICH Guidelines

Phase V: Thesis writing and research paper publication

**METHOD AND TECHNIQUE:**

1) **Selection of suitable drug candidate** –
   For the preparation of transdermal dosage form, the suitable drug candidate would be selected on basis of physicochemical properties of drug candidate.

2) **Selection of Adhesive combination for Semi-Solid matrix formulation** –
   The polymer for study would be selected on the basis of biocompatibility, physical and chemical properties, drug release property and stability.

3) **Preparation of transdermal patch** –
   Semi-Solid matrix type of transdermal patch would be prepared using suitable polymer combination by coating method.

4) **Evaluation of Semi-Solid matrix transdermal patch** –
   Prepared transdermal patch would be evaluated for following parameters.
   
   A. Chemical and physical compatibility studies with excipients
      
      • FTIR technique
      • X Ray Diffraction technique
      • UV visible or HPLC technique
   
   B. Thickness of the patch
      
      • Digital micrometer
   
   C. Estimation of Drug
      
      • Extraction method in suitable media and analyzed by UV spectrophotometer.
D. Uniformity of dosage unit

E. In-Vitro drug release
   - Dissolution technique as per United state pharmacopeia
   - UV visible or HPLC Method

F. Adhesion test (Shear, Peel, Take and release force by lloyd instrument)

G. Thumb tack test

H. In-vitro drug release study(Dissolution method)

I. In-vitro skin permeation study
   - In-vitro skin permeation study would be carried out by using Franz diffusion cell into artificial membrane and cadaver skin.

J. Stability study as per ICH Guidelines
   - Stability studies would be carried out to determine the effect of varying atmospheric condition.

CHAPTER SCHEME:

Chapter I Introduction
   a) Types of available transdermal formulation
   b) Advantages and disadvantages of transdermal patch
   c) Components of the transdermal patch
   d) Types of transdermal patch
   e) Semi-Solid matrix type of transdermal patch
   f) Technologies of transdermal Semi-solid matrix patch
   g) Information on the Research envisage
Chapter II: Selection of the suitable drug candidate

Selection of model drug candidate is based on physiochemical properties and biopharmaceutical parameters.

Chapter III: Design of semi-solid matrix type transdermal patch

- Selection of polymer candidate was based on compatibility study, physical property and drug release rate of drugs
- Selection of penetration enhancers based on compatibility study, physical property and drug release rate of drugs
- Selection of other excipients like tackifiers, filler and matrix stiffeners

Chapter IV: Formulation of semi-solid matrix type transdermal patch

- Effect of Process variables on the dosage form

Chapter V: Finalised the formulation and evaluation of Dosage Form

- Thickness of the patch
- Estimation of Drug, Amount of drug per patch
- Uniformity of dosage unit,
- Drug release (Dissolution)
- Shear Adhesion test (For matrix stiffness)
- Peel Adhesion test (For bonding between two substrate)
- Take adhesion test (For adhesion of the patch)
- Thumb tack test (For adhesion of the patch)
- *In-vitro* drug release study (Delivery of the drug from dry matrix)
• *In-vitro* skin permeation study (Delivery of the drug from skin/artificial membrane)

• Stability study as per ICH Guidelines

**Chapter VI: Results and Discussion**

It would be include information on the drug release profiles and skin permeation, effect of the different penetration enhancers, effect of various process variables on the drug release profiles.

**Chapter IIX: Conclusion based on the results and discussion.**