Aims and Scope

Wound healing, a complex biological process involves the events categorized into the phases of hemostasis, inflammation, tissue repair and remodeling. The normal course of healing goes out of phase in conditions such as microbial infection and chronic inflammation, rendering the wound in non-healing condition. To minimize the wound associated complications and to reduce the time of healing, wound care strategies are important, which under most circumstances come with adverse effects. These hindrances can be overcome by alternate treatment strategies, mainly by using herbal medicines, which pose lesser negative effects, in spite of being efficacious. Among herbal medicines, latex and its constituents provide a major basis for wound care and management. Reports supporting the role of latex constituents in wound healing include their role in formation and dissolution of clot, vital events of healing. Based on the scientific evidences which support the ethnopharmacological usage of latex, following objectives were proposed. These details are given in chapter 1.

Plant latices were screened for proteolytic activity and nature of proteases. Further, the action of latex proteases on extracellular matrix (ECM) proteins (gelatin and fibrin) and blood coagulation protein (fibrinogen) were determined. Based on the action of latex proteases towards different substrates, their interference in events of wound healing including blood coagulation, platelet function, debridement and fibrinolysis were evaluated. On the basis of these findings, the role of latex proteases in wound healing were validated using mice excision wound model and the findings were compared with reference proteases – trypsin and papain. Among different latices screened for the observed properties, proteases from *Wrightia tinctoria* were selected for the detailed study of wound healing activity. Biochemical, physical and histological parameters, along with the molecular mechanisms involved in providing positive effect of these proteases in facilitating the healing process were studied. Further, a comparative account of pharmacological and toxicological properties of serine proteases from *W. tinctoria* latex, cysteine proteases from *P. extensa* latex and metalloproteases from *Echis carinatus* venom was studied. In the study, special emphasis was given to the effect of these proteases on ECM proteins and hemostasis. The study was aptly supported by literature.
Aims and Scope

An important pharmacological property of latex is to stop bleeding from fresh wounds, the property attributed to proteases present. Few reports provide the mechanisms of action of latex proteases exhibiting pro-coagulant effect. In this regard, chapter two aimed to:

- screen plant latices for proteolytic activity
- nature of proteases
- effect of latex proteases on blood coagulation (platelet poor plasma and citrated whole blood)
- mechanism(s) of action of procoagulant latex proteases

To stop bleeding from fresh wounds is an important property of latex which provides an important evidence for the role of latex to promote wound healing. In this regard, chapter three aimed to:

- evaluate the mechanisms of latex proteases in promoting wound healing process
- study the wound healing activity of latex proteases in excision wound model in mice and monitor the wound contraction rate
- evaluate the collagen content in granulation tissue as an important biochemical marker for monitoring the wound healing process

Based on the screening of latex proteases for wound healing, *W. tinctoria* latex proteases (WTLP) were selected for detailed study of wound healing to substantiate the use of *W. tinctoria* latex in folk medicine for treating different types of wounds and variety of skin disorders. Chapter four aimed to:

- determine the stability and nature of WTLP
- determine the action of WTLP on ECM proteins
- assess the wound healing potential of WTLP excision wound model in mice
- monitoring the healing activity using physical, histological and biochemical parameters
Assessment of toxicity is an important aspect of the use of plant based medicines in treatment and management of various clinical conditions. In this regard, comparative account of proteases from latex and venom were studied. Chapter five aimed to;

- provide comparative account on the effect of latex serine, cysteine proteases from latex and snake venom metalloproteases towards ECM and blood coagulation proteins
- assess the hemostatic and local toxic properties of proteases from either source
- evaluate the influence of nature of proteases and route of administration towards toxicological and pharmacological properties
- substantiate the findings from literature to compare pharmacological and toxicological properties of proteases from plant latex and snake venom