ABSTRACT

Traditional medicinal systems like *Ayurveda* and Indian folk medicine have used Honey (H), Ghee (G), *Glycyrrhiza glabra* (GG), & *Nerium indicum* (NI) effectively for treating wounds. However, there are rarely any studies that have been carried out to explain the exact cellular, biochemical and molecular mechanisms involved in wound healing by these medicinal preparations. Further, the involvement of these traditional medicines in the treatment of chronic wounds such as diabetic wounds is less explored.

Therefore the current study was designed to explore the efficiency of these traditional medicines singly and in combinations on both normal and diabetic rat models. At two different intervals biomechanical, histological, immunohistochemical (IHC), biochemical and molecular parameters were assessed in the tissues procured from the wound site. Further, the survival and proliferation of the dermal fibroblasts and keratinocytes were also evaluated using *in vitro* culture models.

The results showed, increased wound breaking strength, rapid epithelialization, early wound closure, increased vascularity, systematic rearrangement of collagen, favorable antioxidant activity in the wounds treated with the above mentioned traditional medicines both in normoglycemic and hyperglycemic conditions. In addition, we also found the complementary activity of IL-1 beta and myofibroblasts which are crucial for better wound healing. Further, the enhanced expression of growth factors like TGF β, FGF2, VEGF and PDGF in the groups treated with the traditional medicines also affirmed their wound healing benefits. The preliminary results of the cell culture experiments also proved the efficacy of these natural wound healing compounds.
The present study concludes that these traditional medicines singly and in combination can play a vital role in treating the medically challenging wounds. The study also provides scientific explanations to the mode of action of these medications and renders an increased value to the efficacy of the traditional Indian medicines in the national and international scenario. Additionally, the findings derived from the present study may serve as the stepping stones for further evaluation of various other intricate mechanisms which may lead to the development of new therapeutic approaches to the treatment of medically challenging wounds.