

## ABSTRACT

Diabetes is a multifactorial disorder which is characterized by hyperglycemia. Among various complications of diabetes, one is delayed wound healing. Hydrogel is a novel wound dressing due to its various properties i.e., low immunogenicity, antibacterial capabilities, cooling effect, easily removable, cost effective and hydro platform for drug delivery. The wound healing potential of hydrogels can further enhanced by adding different natural products which are involved in re-epithelializing the skin tissue, enhancing the adhesion and deposition of collagen. In current study, diabetes induction in Swiss albino mice was done by giving intraperitoneal injection of alloxan monohydrate (180 mg/kg). After diabetes induction in mice, excision wounds were formed via a biopsy puncture (6mm). Different types of hydrogels (5% sericin based hydrogel, 5% sericin+ 5% banyan based hydrogel, 5% sericin+ 5% onion based hydrogel and 4% sericin+ 4% banyan+ 4% onion based) were applied to the diabetic wound to check their wound healing potential. The wound healing effect of hydrogels was assessed by calculating the wound healing time, percent wound contraction, and histological analysis. Moreover, serum level of the various biochemical parameters such as pro-inflammatory cytokines (tumor necrosis factor- $\alpha$ , Interleukin-6), anti-inflammatory cytokine (Interleukin-10), tissue inhibitor metalloproteinases and matrix metalloproteinases (MMP 2, MMP 9) were also determined. All the hydrogel treatment groups showed better wound healing potential which was comparable to positive control (polyfax treatment group). However, the best results were shown by 4% sericin+ 4% banyan+ 4% onion based hydrogel. The wound was almost completely healed at day 11 with 91.77% wound contraction. Moreover, this group also showed lowest level of the pro-inflammatory cytokines, matrix metalloproteinases, highest level of the anti-inflammatory cytokines and tissue inhibitor metalloproteinases. So, it can be concluded that 4% sericin+ 4% banyan+ 4% onion based hydrogel can be used as an effective remedy for the treatment of diabetic wounds due to its high healing and regenerative properties.

**Key words:** Diabetic Wound, Hydrogel, Sericin, Ficus benghalensis, Allium cepa, Wound Contraction