

ABSTRACT

Wounds effect the quality of life (QoL) and have high economic impact on healthcare system worldwide. Silk sericin is a natural protein synthesized by the silkworm *Bombyx mori*. This biomaterial helps in the management of wounds by promoting the proliferation of fibroblasts and keratinocytes during healing process. *Jasminum grandiflorum* leaves contain high mucilage content and have been used to cure various dermal wounds in ancient times. Likewise, bacterial cellulose is highly biocompatible and non-toxic wound covering material. The present study was aimed to investigate the individual and synergetic effect of sericin, bacterial cellulose and *J. grandiflorum* leaves (S+B+J) extract on burns and excision wounds in mice. In first set of experiment, eight to ten-week-old mice weighing $25 \text{ g} \pm 5 \text{ g}$ were randomly divided into ten groups, each group containing 10 mice. For second set of experiment, 90 animals were equally divided into nine groups. Burn injury in mice was induced by using a hot metal rod of 12 mm² diameter. Metal rod was heated on open flame for 30s and then placed on site for 20s for injury. Excisions wounds were developed using 6 mm² biopsy punch. Primary set of animals were treated with concentrations (1%, 2% and 4%) of silk sericin, jasmine leaves and bacterial cellulose. Subsequent set was treated with 2% and 4% concentrations of biomaterials in different combinations. Wounds were evaluated morphologically and histologically. Biochemical analysis were performed to further evaluate healing process. In comparison with controls, 4% sericin + bacterial cellulose + jasmine (S+B+J) expressively improved wound contraction area. Restoration of the epidermis was also faster in 4% (S+J+B) group ($P \leq .01$) than in other groups. Increased levels of antioxidant enzymes (CAT, SOD, GSH, GPx) and decreased value of malondialdehyde (MDA) in later stages of wound healing also support the effectiveness of these biomaterials. Histopathological analysis revealed better re-epithelialization and faster healing in 4% (S+J+B) treated group. It is concluded that a mixture of sericin, jasmine leaves and bacterial cellulose effectively improved the healing process of burn and excision wounds.

Keywords: Silk sericin, *Jasminum grandiflorum* leaves, burns, excision wounds, bacterial cellulose