Abstract

Tissue regeneration is a typical physiological healing response to the damaged tissue to recuperate its normal functionality. Wound healing is now a challenging global clinical problem in which fibroblast, microvascular cells, keratinocytes, and immune cels play key roles. Many types of antimicrobial and moisturized wound dressings are being developed with a variety of features to heal the wound. The current study has been designed to prepare the zinc nanoparticles (ZnNPs) based hydrogels in combination with curcumin to accelerate tissue regeneration process. The conjugation of curcumin with ZnNPs was confirmed by UV-Vis spectroscopy and Fourier Transform Infrared Spectroscopy (FTIR). A biopsy punch (6mm) was used for the excision of experimental wounds. The tissue regeneration potential of ZnNPs-curcumin conjugates was evaluated by the wound contraction percentage, serum proteins, liver enzymes and histology. The ZnNPs-curcumin hydrogel application resulted in complete wound healing in 12 days only. The level of serum proteins significantly increased in different treatment groups as compared to control groups. Catalase, and GST level significantly decreased ($P<0.05$), while SOD level significantly increased ($P<0.05$) in Zn-Curcumin NCs hydrogel as compared to control and treatment groups. These results indicate minimal oxidative stress allowing the fast recovery of wound. Histological examination further confirmed the same.