

Abstract

Chronic diabetic wound is a common complication in diabetes mellitus which is caused by a prolonged wound-healing process from a persistent inflammation phase. Thus, proper wound treatment is needed to promote wound healing and protect the wound from infection. Biocellulose (BC) as wound dressing provides a moist environment to protect skin and promote cellular migration and proliferation to improve wound healing. Black tamanu oil has been reported for its wound healing and antimicrobial activity against skin bacteria. Thus, this experiment studied the wound healing and antimicrobial activity of biocellulose and black tamanu oil through an *in-vivo* study using diabetic mice and non-diabetic rabbits as animal models. The treatment groups included BC-black tamanu oil, BC-only, and gauze (control). The wound healing activity was studied by measuring the wound reduction from excisional wound. BC-black tamanu oil showed statistically significant improvement in wound reduction in non-diabetic rabbits, while it did not significantly improve diabetic mice wounds compared to BC-only and gauze groups. The microbial study was studied using Miles-Misra method and the results showed BC-black tamanu oil did not have notable antimicrobial activity compared to BC-only and gauze. Histology study was done using Hematoxylin-Eosin staining and it showed that BC-black tamanu oil treatment accelerates granulation tissue formation, collagen deposition, and re-epithelialization in both diabetic and non-diabetic wounds. Thus, it is concluded from this study, BC-black tamanu oil may be beneficial for accelerating wound healing by improving the inflammation phase and promotes them into a proliferative phase.

Keywords: *Biocellulose; Black Tamanu Oil; In-Vivo; Wound healing study; Microbial study*