

## ABSTRACT

### BIOMEDICAL APPLICATION OF CHITOSAN AND NATURAL COMBINATION (*ALOE VERA*, CURCUMIN, AND COLLAGEN) AS WOUND HEALING

#### *Literature Review*

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Chitosan is a natural polymer that used as wound healing because of its activity as antimicrobial agent, promoting cell proliferation, homeostatic, neovascularization, and increasing dermis regeneration in wound. Combination of chitosan with antibacterial, antiinflammation, and antioxidant agent could enhance its wound healing activity. *Aloe vera* is known for the antibacterial and antiinflammation activity, curcumin with the antioxidant activity, and marine collagen with the antibacterial and antioxidant and often combined with chitosan to increase its wound healing activity. The aim of this review was to know/understand the effect of chitosan-natural product combination on its activity as wound healing. The wound healing activity was evaluated by macroscopic evaluation through wound area and/or wound healing percentage and microscopic evaluation through histopathological evaluation. The result showed that chitosan-*Aloe vera* combination could decrease wound area 5,18 to 7,54 times compared to chitosan or *Aloe vera* itself, inhibited the growth of bacteria, and enhanced production of hydroxyproline to form new collagen. Combination of carboxymethyl chitosan-curcumin increased wound healing activity on 2<sup>nd</sup> degree burns. after 14 days of treatment, histopathological evaluation showed that the wound has undergone healing process better than chitosan gel. Chitosan-marine collagen combination showed fast wound closure and highest score average of histopathologic parameters.

**Keywords:** Chitosan, wound healing, *Aloe vera*, curcumin, marine collagen.