Uji Toksisitas Nanokitosan Dari Limbah *Black soldier fly* (*Hermetia illucens*) Sebagai Antimikrobial Luka Hiperglikemia

(*Nanochitosan Toxicity Test from Black soldier fly Waste (Hermetia illucens) As an antimicrobial for hyperglycemic wounds*)

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ABSTRACT

Maggots are larvae of the BSF type which have the potential to be used as raw material for chitosan and nanochitosan. Nanochitosan has antibacterial, antifungal, biocompatible, biodegradable and low toxicity properties. This research aims to determine the characteristics of chitosan and nanochitosan, the antimicrobial toxicity effect of hydrogel-based Hermetia illucens maggot cartridge nanochitosan on hyperglycemic skin wounds, and its effect on the skin tissue regeneration process. The characteristics of chitosan and nanochitosan were analyzed using FTIR, SEM, TEM, PSA and zeta potential. Visual observation to determine the antimicrobial toxicity of nanochitosan collagen hydrogel and histological observation of hyperglycemic skin tissue to determine its effect on skin tissue. The results of chitosan characterization produced light brown to yellowish white chitosan color, neutral pH, water content 5.48%, ash content 0.36%, total nitrogen content 6.98%, degree of deacetylation 81.75%, and yield 23.67%. The characteristics of nanochitosan based on SEM and TEM tests are small granules, a zeta potential value of -30.2 mV, and an average PSA test value of 670nm with a polydispersity index of 0.564. The antimicrobial pH value of nanochitosan collagen hydrogel ranges from 5-6. Based on observations of the toxicity effects, there were no differences in body weight, abnormal behavioral changes or death in the mice, there were no signs of irritation after application of the antimicrobial collagen nanochitosan hydrogel to the skin of hyperglycemic mice, and histology tests showed that there was no damage to the skin cells of hyperglycemic mice which showed the following characteristics. toxicity characteristics. The application of nanochitosan collagen hydrogel-based antimicrobial to hyperglycemic skin wounds contributes to the wound closure process based on skin tissue histology. Thus, nanochitosan collagen hydrogel can be said to be non-toxic and safe to use on hyperglycemic skin wounds.

Key words: *Hermetia illucens, Nanochitosan, hydrogel toxicity, hyperglycemia*