

Perwitasari Fitrah Lazzary Ramadhan. 080810190, 2012. In Vitro and In Vivo Characterization of Alginate–Poly Vinyl Alcohol–Nano ZnO Composite as Anti-bacterial Wound Dressing. This thesis was under guidance of Ir. Aminatun, M.Si. and Dr Sri Sumarsih, M.Si., Physics Department and Chemistry Department, Faculty of Science and Technology, Airlangga University.

ABSTRACT

Tendency of wound healing at present is moist wound healing, which means that the environment moisture around the wound is maintained to accelerate the healing process. In this study, alginate-poly vinyl alcohol-nano ZnO hydrogel was made as wound dressing which was also characterized *in vitro* and *in vivo*. The fabrication of hydrogel was conducted using a conventional method by mixing all the materials into one solution which afterwards was molded on a plain glass plate. Alginate-poly vinyl alcohol hydrogel was made by adding different concentrations of nano ZnO (0.25, 0.5, and 0.75%). The formed hydrogel was characterized by using FT-IR, anti-bacterial, and *in vivo* test. The FT-IR test result showed the interaction between alginate and poly vinyl alcohol which was indicated by the formation of carbonyl and hydroxyl groups at the wavenumber of 1639 cm^{-1} and 3423 cm^{-1} . Anti-bacterial test result showed that as the concentration of nano ZnO was increased, the inhibition zone of *Staphylococcus aureus* culture was found broader. The MIC value was obtained in the hydrogel containing nano ZnO with the concentration of 0.25%, whereas the MBC value was obtained in the hydrogel containing nano ZnO with the concentration of 0.75%. Alginate-poly vinyl alcohol-nano ZnO hydrogel was able to accelerate wound healing. It is shown by the *in vivo* test result on mice, of which the wound was healed in the range of the third until the fifth day, compared with the control which was still unhealed even until the seventh day.

Keywords : hydrogel, alginate, poly vinyl alcohol, nano ZnO, wound dressing, anti-bacterial