

*ABSTRACT*

**THE EFFECT OF GLUTARALDEHID ON THE TENSILE  
STRENGTH OF BIOSCREW BASED ON GELATIN-BOVINE  
HYDROXYAPATITE-ALENDRONATE IN FIXATION OF BONE  
FRACTURE**

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Fracture is a breakage of the continuity in cartilage structure and growth plate caused by traumatized or non-traumatized incident. Not only the fracture or separation of the cortex, the incident of fracture more often results in complete damage and separates the bone fragments. Fracture occurs because the activity of osteoclast is greater than osteoblasts. One of healing method is uniting bones using bioscrew. This method will form new bones through osteoblasts, which grows directly between fractured bone fragments.

In manufacture process of bioscrew, we use BHA-Gelatin as one of composition with 90 : 10 ratio and 1% Alendronate of the total base composition. Those formula are processed into granule form. Then, we do crosslinking process by using a cross-link agent in the form of glutaraldehyde in a variety of concentrations namely 0.5%, 1.0% and 1.5%. After the crosslinking process, the granules will be pressed into a pellet, afterwards those are threaded became a screw.

In the bioscrew characterization test, the tensile strength measurements results show that there are no significantly difference between bioscrew that crosslinking using glutaraldehyde with bioscrew without crosslinking using glutaraldehyde ie  $p = 0.073$ . Increasing the concentration of glutaraldehyde is quite influential on the tensile strength of bioscrew that tends to decrease, where the highest average tensile strength is 0.8354 N/mm<sup>2</sup> and the lowest tensile strength is 0.4854 N/mm<sup>2</sup>.

In this study, based on the results of tensile strength measurement, it can be concluded that the concentration of glutaraldehyde 0.5%, 1.0% and 1.5% have not been able to produce optimal tensile strength in bioscrew, so it is necessary to optimize glutaraldehyde levels.

Keywords : Alendronate, BHA, bioscrew, fracture, cross-link, tensile test, glutaraldehyde