

ABSTRACT

The Effect of Glutaraldehyde Concentration on Degradation in vitro Bio Screw *Bovine Hydroxyapatite*-Gelatin-Alendronate

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Screw is one of bone fracture fixation treatment that used to stabilize bone fragments during healing. Nowadays, metal screws are frequently used, but metal screws need a second operation to remove the implantation. A bio screw made from biodegradable and bioabsorbable materials that no need for second operation.

Bio screw consist of Bovine Hydroxyapatite (BHA) and gelatin which has composition similar to bone. But gelatin is soluble in aqueous solution, so that gelatin must be submitted to crosslinking. One of the crosslinker compounds is glutaraldehyde that expected to stabilize gelatin by forming Schiff bases compounds. Alendronate is also added which can bind calcium to BHA strongly and increase the resistance of bio screw.

In this study, the bio screw is formed in pellets with composition BHA-gelatin-alendronate and addition of glutaraldehyde concentration 0.5% (F3), 1% (F4), 1.5% (F5). Bio screw pellets are tested for degradation by soaking in 5 ml Phosphate Buffer Saline (PBS) pH 7.4 ± 2 at 37°C. Pellets were observed for weight lost changes, the amount of water absorbed, and visual observations for 28 days.

The composition of BHA-gelatin (F1) and BHA-gelatin-alendronate (F2) only survive in a few hours so only visual changes are observed. In the analysis of weight lost changes and the amount of water absorbed, there was a significant difference ($p < 0.05$) between groups of glutaraldehyde concentration 0.5% and glutaraldehyde concentration 1% groups.

This study showed F4 is the best composition for in vitro degradation of bio screw pellets of BHA-gelatin-alendronate.

Keyword : Bio screw, fracture, glutaraldehyde, *Bovine hydroxyapatite*, gelatin, alendronate, degradation