INTISARI

Penggunaan semen *alpha-tricalcium phosphate* (α-TCP) sebagai bahan substitusi tulang saat ini sangat diminati karena terbebas dari transmisi penyakit dan terhindar dari keterbatasan suplai tulang dan inkonsistensi. Reaksi pengerasan semen α-TCP terjadi karena presipitasi kristal apatit yang saling berikatan dan mempengaruhi kekuatan kompresi. Sejalan dengan waktu, kekuatan kompresi semen akan semakin meningkat. Penggunaan asam sitrat ($C_6H_8O_7$) dapat mempengaruhi kekuatan kompresi semen α-TCP. Penelitian ini bertujuan untuk mengetahui pengaruh waktu inkubasi terhadap kekuatan kompresi semen campuran α-TCP dan asam sitrat.

Semen α-TCP dibuat dengan cara mencampurkan serbuk α-TCP 125 mg dengan 62,5 µL larutan. Pada penelitian ini, digunakan larutan air distilasi (kontrol) dan larutan asam sitrat 0,5 mol/L (perlakuan). Pengadukan dilakukan diatas plat kaca dengan spatula selama 1 menit. Semen kemudian dimasukkan dalam cetakan akrilik diameter 3 mm dan tinggi 6 mm, ditunggu hingga mengalami pengerasan awal, kemudian direndam dalam larutan salin. Semen diinkubasi dengan waktu yang berbeda-beda yaitu 1, 2, 4, 8, 16, dan 24 jam, diukur kekuatan kompresinya dengan UTM dan data di monitor dicatat. Data yang sudah dimasukkan ke dalam rumus kemudian diuji *One-Way* ANOVA.

Hasil uji kekuatan kompresi semen campuran α- TCP dan asam sitrat terhadap waktu inkubasi menunjukkan adanya perbedaan yang signifikan. Perbedaan waktu inkubasi akan menghasilkan perbedaan nilai kekuatan kompresi dimana semakin lama waktu inkubasi maka kekuatan kompresi semen semakin meningkat. Oleh karena itu, dapat disimpulkan bahwa terdapat pengaruh waktu inkubasi terhadap kekuatan kompresi semen campuran α-TCP dan asam sitrat.

Kata kunci: α-TCP, asam sitrat, kekuatan kompresi, waktu inkubasi

ABSTRACT

The use of alpha-tricalcium phosphate (α-TCP) cement as a bone substitute material is currently in great demand because it is free from disease transmission and abundantly available to avoid limited and supply inconcistency. The hardening reaction of α-TCP cement occurs due to precipitation of apatite crystal which bound to each other and affects the compressive strength. With time, the cement compressive strength will increase. The use of citric acid ($C_6H_8O_7$) may affect the compressive strength of α-TCP cement. The aim of this study was to determine the influence of incubation time to the compressive strength of cement mixture of α-TCP and citric acid.

The α-TCP cement was made by mixing 125 mg of α-TCP powder and 62,5 mL of citric acid solution. Stirring done on a glass plate with spatula for 1 minute and cement was then inserted into acrylic mould, waited until setting, then immersed in saline. Cement was then incubated with varying time in 1, 2, 4, 8, 16, and 24 hours, after that the compressive strength measured with UTM and the data were recorded from the monitor. The data that has been entered into formula were tested with One-Way ANOVA.

The results show that the compressive strength of the cement with citric acid to incubation time was significantly different. Different incubation times resulted different compressive strength in which the longer the incubation time, the higher the compressive strength. Therefore, it can be concluded that there is an influence of incubation time to the compressive strength of cement mixture of α-TCP and citric acid.

Keywords: α-TCP, citric acid, compressive strength, incubation time