

ABSTRACT**BIODEGRADATION OF COMPOSITE SCAFFOLD BASED****HYDROXIAPATITE BALAI BESAR KERAMIK**

Background: Bone grafting with the concept of tissue engineering is a treatment option in repairing and regenerating a defective bone tissue. One of the keys in the network, the scaffold must have a balanced biodegradability. Hydroxyapatite Balai Besar Keramik (HABBK) has a character that is not easily degraded to control the rate of biodegradation. The use of chitosan and gelatin in this study as polymeric materials for scaffold constituents follows their ability to show hydrophilicity properties to obtain better biodegradable properties. **Purpose:** To analyze the increase in biodegradation percentage of HABBK: K-G scaffold composites with various ratios (w / w) after immersing in SBF for some time 1, 3, 7, 14, 21 days. **Methods:** Synthesis of the scaffold from HABBK, chitosan, and gelatin ratios of 60:40, 70:30, 80:20, and 90:10 (w: w) using the 2x24 hour freeze-drying method then carried out the biodegradation test by immersing in simulated body fluid over 1, 3, 7, 14, 21 days. Statistical data analysis in this study used the ANOVA test and Tukey HSD Post Hoc test. **Result:** The biodegradation percentage of HABBK: K-G scaffold at each ratio of 60:40, 70:30, 80:20, and 90:10 (w: w) on the 21st day was 60.22%, 50.92%, 41.82%, 27.55%. In the ANOVA test, it was found that the p-value was less than ($p < 0.05$), as well as the Tukey HSD Post Hoc test, which showed that there was a significant difference in the level of degradation of each treatment group on the research time variable. **Conclusion:** At each ratio of 60:40, 70:30, 80:20, and 90:10 (w/w) over 1, 3, 7, 14, 21 days, the percentage of biodegradation of the HABBK:KG scaffold increased by 60:40, 70:30, 80:20, and 90:10 (w/w) over 1, 3, 7, 14, 21 days, with the highest percentage of biodegradation on the 21st day being 60.22 percent on the HABBK:KG scaffold ratio of 60:40 (w/w).

Keywords: scaffold; Hydroxyapatite Balai Besar Keramik (HABBK); chitosan; gelatin; Biodegradation.

ABSTRAK

**BIODEGRADASI KOMPOSIT *SCAFFOLD* BERBASIS
HIDROKSIAPATIT BALAI BESAR KERAMIK**

Latar Belakang: *Bone grafting* dengan konsep rekayasa jaringan, merupakan salah satu pilihan perawatan dalam memperbaiki dan meregenerasi jaringan tulang yang mengalami defek. Salah satu kunci keberhasilan rekayasa jaringan yaitu *scaffold* harus memiliki kemampuan biodegradasi yang seimbang. Hidroksiapatit Balai Besar Keramik (HABBK) memiliki karakteristik yaitu tidak mudah terdegradasi sehingga dapat mengontrol laju biodegradasi. Penggunaan Kitosan dan Gelatin pada penelitian ini sebagai bahan polimer penyusun *scaffold* sesuai dengan kemampuannya dalam menunjukkan sifat hidrofilitas, sehingga didapatkan *biodegradable* yang lebih baik. **Tujuan:** Menganalisis peningkatan prosentase biodegradasi komposit *scaffold* HABBK: K-G (w/w) dengan berbagai rasio setelah direndam dalam SBF selama rentang waktu 1,3,7,14,21 hari. **Metode:** Sintesis *scaffold* dari HABBK, kitosan, dan gelatin rasio 60:40, 70:30, 80:20, dan 90:10 (w:w) dengan metode *freeze drying* 2x24 jam kemudian dilakukan uji biodegradasi dengan melakukan perendaman pada *simulated body fluid* selama rentang waktu 1,3,7,14,21 hari. Data penelitian di uji statistik menggunakan uji ANOVA dan uji *Post Hoc Tukey HSD*. **Hasil:** Prosentase biodegradasi *scaffold* HABBK:K-G pada setiap rasio 60:40, 70:30, 80:20, dan 90:10 (w:w) pada hari ke-21 yaitu 60.22%, 50.92%, 41.82%, 27.55%. Pada uji ANOVA didapatkan bahwa *p-value* kurang dari ($p < 0,05$), serta uji *Post Hoc Tukey HSD* yang menunjukkan bahwa terdapat perbedaan yang bermakna setiap kelompok perlakuan terhadap variabel waktu penelitian. **Simpulan:** Prosentase biodegradasi dari *scaffold* HABBK:K-G meningkat pada setiap rasio 60:40, 70:30, 80:20 dan 90:10 (w/w) selama rentang waktu 1,3,7,14,21 hari, dengan prosentase biodegradasi paling tinggi pada hari ke-21 sebesar 60.22% pada *scaffold* HABBK:K-G rasio 60:40 (w/w).

Kata Kunci: *scaffold*; Hidroksiapatit Balai Besar Keramik; kitosan; gelatin; Biodegradasi