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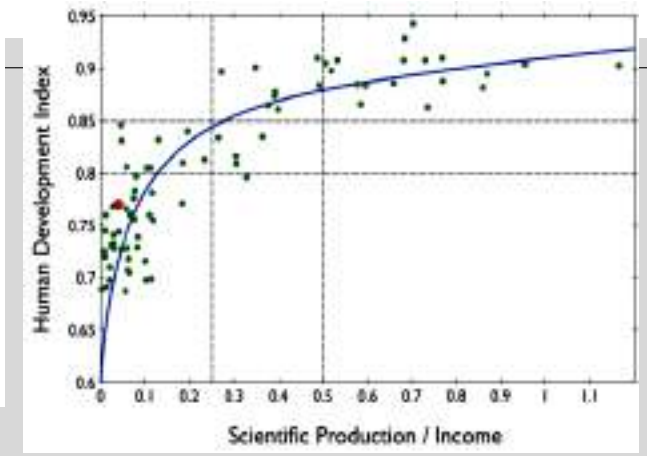

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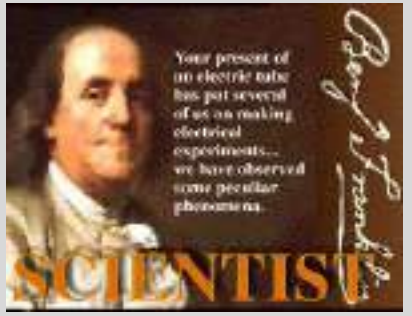

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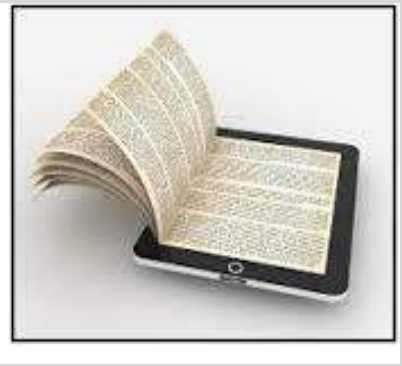

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Insisiva Dental Journal : Majalah Kedokteran Gigi Insisiva (IDJ) is peer reviewed journal published by Universitas Muhammadiyah Yogyakarta. Since the first issued in May 2012, IDJ is publishing scientific articles consistently, both research, literature review and case report. IDJ publishes the new editions every May and November. By November 2018, IDJ has published both printed (book) and electronic (PDF) versions. Electronic articles are accessible openly on the web page: **http://journal.umy.ac.id/index.php/di/index. ISSN: 2252 - 9764 (print)** and **2685-9165 (online).** IDJ is indexed by **Google Scholar** and **Garuda (Garba Rujukan Digital).**

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Naskah Publikasi

- Abstract (keywords)
- Introduction/pendahuluan/background/latar belakang
- Material and Method
- Result
- Discussion
- Conclusion
- Acknowledgement
- References

MENULIS KARYA ILMIAH

- Judul
- Afiliasi
- Corresponding authors
- ABSTRACT

Pendahuluan/Latar belakang

- Latar belakang mengapa penelitian dilakukan, uraian permasalahan yang akan diteliti
- Cantumkan sumber acuan yang up to date
- Pernyataan umum tidak perlu sumber acuan
  - Gigi berlubang disebut sebagai karies gigi. (ABC, 2010).
- Tujuan penelitian
- Singkat dan padat, 3-4 paragraf
- Tunjukkan *state of the art*

Material & Method

- Uraian terperinci metode yang dilakukan
- keberulangannya dapat dilakukan (peneliti maupun peneliti lain)
- Metode yang diadopsi ~ ditulis sumbernya; modifikasi harus dijelaskan
- Kegiatan ditulis sesuai urutan dg kalimat pasif
- Bahan analisis, cara penarikan sampel, prosedur analisis, pengumpulan data, cara perhitungan atau analisis sampai diperoleh hasil terolah diuraikan dengan terperinci

Hasil

Uraian mengenai hasil analisis

- Penyajian dg sistem, mudah dipahami
- Diperjelas dengan ilustrasi: tabel & gambar
- Data ilustrasi sederhan, mudah dipahami, sesuai masalah

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Contoh Ilustrasi Hasil – kurang baik

PERKEMBANGAN PMDN/PMA TAHUN 1997-2002

Tahun	PMDN		PMA	
	Proyek	Investasi (Rp Triliyun)	Proyek	Investasi (US $ Milyar)
1997	723	119,9	781	33,8
1998	327	57,9	1.034	13,6
1999	237	53,5	1.177	10,9
2000	392	93,9	1.541	16,1
2001	264	58,8	1.333	15,0
2002	185	25,3	1.148	9,8

Sumber: Badan Koordinasi Penanaman Modal (2003:2-4)

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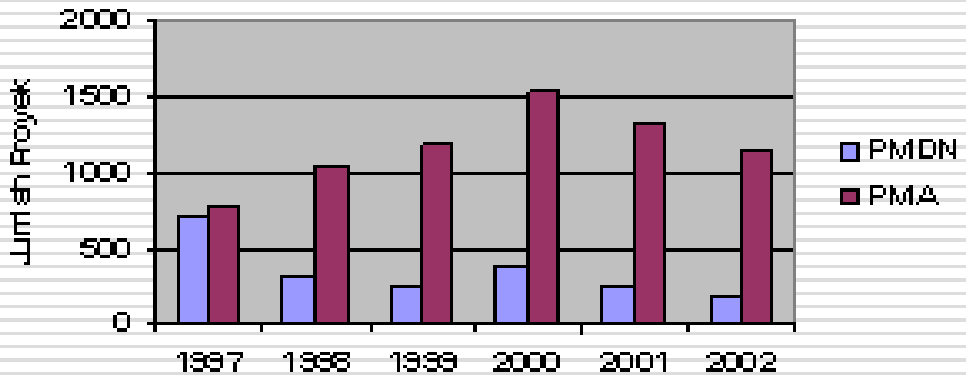
Contoh Ilustrasi Hasil – perbaikan



Gambar 1. Keadaan jumlah proyek yang didanai PMDN dan PMA tahun 1997-2002 (Badan Koordinasi Penanaman Modal 2003)

Pembahasan

- Membandingkan hasil penelitian dengan teori yang diacu
- mengemukakan pendapat dan argumentasi secara singkat dan sesuai logika
- Menghubungkan hasil penelitian dg penelitian sebelumnya, membahas persamaan dan perbedaannya
- Menjelaskan arti temuan untuk memperluas cakrawala ilmu dan teknologi

Simpulan

- Singkat, padat dan tergeneraliasasi
- Hati-hati supaya tdk disimpulkan dg pengertian yang lain oleh pembaca

PLAGIARISM ?

- Refrase dari yang kita baca
- Menyalin pendapat, gunakan “”
- Plagiarism checker, software

Originalitas dan kejujuran

URGENT NEWS

- STAP Cell, NATURE retracted
- **Stem cell tragedy: Prof. Yoshiki Sasai commits suicide**
- A series of allegations surfaced over the credibility of two papers on STAP cells that were published in British science journal Nature in January but then were retracted in July.
- Sasai supervised Obokata's writing. A Riken investigative committee has said Sasai bore heavy responsibility for not confirming data for the STAP study and for Obokata's misconduct.

NATURE | ARTICLE

日本語要約

Stimulus-triggered fate conversion of somatic cells into pluripotency

Haruko Obokata, Teruhiko Wakayama, Yoshiki Sasai, Koji Kojima, Martin P. Vacanti, Hitoshi Niwa, Masayuki Yamato & Charles A. Vacanti

Affiliations | **Contributions** | **Corresponding authors**

Nature **505**, 641–647 (30 January 2014) | doi:10.1038/nature12968

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Retraction (July, 2014)

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The fates of the somatic cells that form the bulk of the mammalian body are thought to be largely determined by the time the cellular differentiation processes of development have been completed. Repr...

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The Effects of Platelet Rich Plasma Incorporation Towards Swelling Profile and Gel Fraction of Synthetic Coral Scaffold

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abstract— Platelet Rich Plasma (PRP) contains of bioactive molecule which is able to accelerate or scaffold for promoting bone healing. Scaffold will absorb PRP, with this result objective may affect the structural stability, shape, and degradation process result. Consequently, this study aims to observe the influence of incorporated PRP to synthetic coral scaffold towards the swelling profile and gel fraction. Platelet-rich plasma was prepared by a double-spinning method. The blood sample was taken from lateral cubital vein of Rattus norvegicus. The synthetic coral scaffold were made of gelatin and calcium carbonate (CaCO3). They were divided into two groups. First is PRP incorporation group and the second is non-PRP synthetic coral scaffolds as control group. The incorporation process was done by inserting scaffold into 75ul of PRP for 15 minutes. Swelling observation was examined by soaking scaffold in phosphate buffer saline and incubated in 37 c degree for 24 hours. Scaffold weight was measured every 30 minutes to observe the profile swelling and gel fraction. Data were analyzing was Independent T-test. The result showed no significant difference between two groups. However, the initial macroscopic graphic showed that PRP incorporated scaffold swelling profile had higher number compared to the non-incorporated one. As swelling is like study, it can be concluded that the incorporation of PRP in synthetic coral scaffold affects in swelling profile and gel fraction.

Keywords— swelling, gel fraction, synthetic coral scaffold, platelet rich plasma, incorporation

I. INTRODUCTION

Bone damage which results in critical defect requires external intervention such as surgery and the application of tissue engineering technology for bone regeneration [1]. Tissue engineering has 3 factors that influence the success of tissue regeneration, i.e., cell, scaffold, and molecule signal. Scaffold is essentially needed in cell's micro environment to proliferate, differentiate, until it generates the tissue matrix [2]. Previous study has shown that animal sea coral is beneficial as a bone regeneration matrix. Besides, the engineering use of coral may literature are inclusive. Therefore, scaffold may be the most alternative. It is an artificial coral like framework that provides mechanical support for cells to perform, form functions. Bioactive ones bone tissues. It was decalcified to natural coral which has biodegradable and biocompatible properties. These characteristics also genes scaffold to be loaded by molecule signal to influencing proliferation and differentiation process [3]. Platelet-rich plasma (PRP) is defined as a platelet concentration that contains bioactive molecules. It has been widely used in oral and maxillofacial surgery to promote bone healing. Growth factors can be obtained from PRP. Platelet concentration in plasma is rich in growth factors. Platelet-rich plasma can be used combined with scaffolds or old bone regeneration [4]. However, when PRP is unorganized, it will cause scaffold is swell. Once it is implanted into body, the swelling process will continue due to body fluids. In the other hand, scaffold has an ability to absorb fluid and maintain structural stability of its shape until the gel fraction occurs or the scaffold degraded. Further information about swelling profile and gel fraction of synthetic coral scaffold is not available yet. Corresponding design is needed by bone regeneration [5]. Therefore, this study is needed to observe the effect of PRP incorporation on synthetic coral scaffold to swelling profile and gel fraction.

II. MATERIAL AND METHOD

Scaffold Preparation

Synthetic coral scaffold was made of gelatin (Nitta Co., Osaka, Japan) and calcium carbonate ($CaCO_3$) from Wako (Osaka, Japan), as weight ratio 1 : 1. It is prepared as thick film-like scaffold with interconnected porosity as 3.1 mm diameter. Sodium EDTE (Sigma-Aldrich, Germany) was used as dispersant to the solution. Scaffolds were frozen for 24 hours and freeze dried. The physical crosslinking was done to strengthen the structure of scaffold [6]. They were divided into two groups. PRP incorporation group and non-incorporated group. In advance of its using, scaffold's weight was stabilized using oven in 50°C degrees. Initial weight of every scaffold was measured.

PRP Preparation

Platelet-rich plasma is obtained from lateral vein tail of Rattus norvegicus Wistar (Fig 1a). Rattus strain that collected in the experiment after overnight acid citrate dextrose as anticoagulant (BD, USA). Isolation of PRP followed Marina and Tobias method with multi centrifugation process, 450 rcf in 7 minutes, and 3600 rcf in 3 minutes at 4°C degrees (Fig. 1b-c) [7].

Fig. 1. Blood collection (a) and centrifugation (b) for PRP

Incorporation of PRP

The process of PRP incorporation on synthetic coral scaffold was done by drop method. The 70 ul of PRP was taken using a micropipette, dripped on scaffold. Wait for 15 minutes until PRP incorporated to the scaffold. Subsequently, the undoubted PRP residues was disposed using filter paper.

Measurement of Swelling Capability

Scaffold was inserted in chambers containing phosphate buffer saline and then being incubated in 37°C degrees for 24 hours. Swelling profile was observed by measuring the scaffold's weight after absorbing liquids using laboratory balance for every 30 minutes, until the first 4 hours. Thereafter, it is being re-incubated until 24 hours is observe scaffold's gel fraction. Simple measurement was performed for three times. Swelling ratio can be calculated by the formula : Swelling ratio (%) = ((Ww−Wo) / Wo) × 100

Ww: soaked weight ; Wo: wet weight

Gel Fraction

The gel fraction was taken after 12 hours immersion. Raw samples were dried and weight measured. The calculation of gel fraction percentage was measured by this formula below:

Gel fraction formulation (%) =(Wd/Wi) × 100
Wi: dry weight before immersion
Wd: dry weight after immersion
The data of gel fraction were analyzed by independent t-test.

III. RESULT AND DISCUSSION

Result

Synthetic coral scaffold in Fig. 2 was fabricated as thick film-like with interconnected porosity, which makes platelet possible incorporates in scaffold. Synthetic coral scaffold in Fig. 3 was fabricated in thick film-like, with interconnected porosity make possible platelet to incorporate in scaffold.

Fig. 2. Thick film-like scaffold

The scaffold appeared to swell after being immersed in phosphate buffer saline (Fig.3a is shown in Fig. 3

Fig. 3. Synthetic coral scaffold; before and after swelling

The swelling ability of incorporated and non-incorporated scaffold were obtained from swelling ratio formulations, it is shown in Table 1.

Table 1. Swelling ratio of synthetic coral scaffold

Time of immersion	Swelling ratio	
	PRP	Non-PRP
30 min	181.16 %	180.85 %
1 h	434.50 %	334.32 %
1.5 h	290.75 %	342.39 %
2 h	362.16 %	384.47 %
2.5 h	394.28 %	333.18 %
3 h	334.03 %	331.18 %
3.5 h	228.64 %	238.15 %
4 h	283.87 %	240.28 %
4.5 h	183.83 %	248.28 %
5 h	187.95 %	241.28 %
5.5 h	187.15 %	260.46 %
6 h	168.17 %	261.75 %
24 h	181.16 %	187.66 %

The swelling profile between incorporated PRP and non-incorporated PRP could be observed in graph, which is presented in Fig. 4.

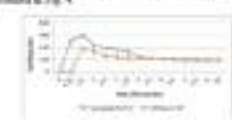

Fig. 4. Swelling profile

The graph shows the difference in swelling profiles between two groups. Scaffolds with incorporated PRP have higher swelling capability compared to non-PRP group until the 3rd hour. Then, both groups of scaffold samples tend to experience a gradual decrease in swelling capability. Besides

a study to maintain an equilibrium, called the equilibrium phase until the 24th hour.

The data analysis of independent T test is shown on Table 2. Swelling ratio had significant differences over the 30-minute observation time and still had no significant difference until the end of observation. This due to scaffold in the equilibrium phase, as there is no increase of swelling.

Table 2. Independent test of swelling ratio

Time of immersion	Sig. (2-tailed)
30 min	0.0249
1 h	0.130
1.5 h	0.183
2 h	0.880
2.5 h	0.187
3 h	0.068
3.5 h	0.682
4 h	0.744
4.5 h	0.083
5 h	0.091
5.5 h	0.448
6 h	0.576
24 h	0.888

The gel fraction of scaffold was observed after 24th hour, presented in Table 3. The results showed, that gel fraction of incorporated PRP group was higher than the non-PRP group. This is indicated by the weight of remaining scaffold which experiences gel fraction process.

Table 3. Gel fraction of scaffold

Weight	Gel Fraction (%)
Incorporated PRP 1	91.35
Incorporated PRP 2	94.81
Incorporated PRP 3	90.36
Without PRP 1	87.11
Without PRP 2	84.67
Without PRP 3	79.95

Discussion

The data analysis showed no significant differences between groups. However, the graph presented that there is a difference in swelling profiles movements between PRP and non-PRP group. The PRP incorporated group was encountering a faster swelling process to the early of 3 hours compared scaffolds PRP. Essentially, the swelling process of scaffolds consisted in early time, then decreased due to fluid undergoing equilibrium until 24th hour called equilibrium phase. It is supported by the previous study as PVA/HA hydrogel composite. The swelling process is divided into four stages, i.e. increase rapidly, increase decrease slowly, and then stabilize [8]. The initial swelling is expected to increase porosity to facilitating cell attachment. However, continuous swelling causes loss of mechanical strength and prevent to the surrounding area [9].

When synthetic coral scaffold incorporated to PRP, it will activate PRP, due to the presence of Ca^{2+} ion. It releases growth factors that act as molecule signal [8]. Generally, the coagulation component in plasma will form a fibrin matrix with 3-dimensional formation that can act as a natural scaffold for cell attachment in tissue repair process [10]. Ca^{2+} ion applies as a fibrinolysis co-factor, it could activate the prothrombin into thrombin and change the fibrinogen (contained in PRP) into fibrin fibrils. It can be assumed that Ca^{2+} ion in synthetic coral scaffolds will form fibrin fibrils as well. It is supported by Mamoto's study. Fibrin network could promote the electrolytic bonds that strengthen the mechanical properties of scaffold [11].

PRP incorporated scaffolds has stronger structures due to electrostatic bonding between fibrin network from PRP interaction and ion Ca^{2+} in scaffold [5,9]. Increasing mechanical strength of scaffolds provides cell attachment, proliferation, differentiation for newly formed bone tissue [12].

After 24 hours of immersion in PBS, scaffold will undergo a structural breaking process called gel fraction. This process is characterized by the decreasing of scaffold mechanical properties which will soon be degraded. There is a difference in gel fraction percentage between synthetic coral scaffolds PRP incorporated and without PRP. Gel fraction value determines the final weight of scaffold as in dry state after immersion in PBS. In this case, the weights dry scaffolds have higher gel fraction percentage [13, 14]. Results showed that gel fraction values on PRP incorporated scaffold had higher values compared to non-incorporated ones. This means that PRP incorporated scaffold has stronger structures characterized by the weight of decomposed scaffold structure in the PBS less than non-PRP incorporated scaffold.

CONCLUSION

PRP incorporated synthetic coral scaffold has higher swelling profile and gel fraction percentage comparing the ones incorporated non. But demineralized the weights structure characterized.

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REFERENCES

[1] R. A. Shahwan, N. Budi, T. E. Darmayadi, & M. A. Nordin, "Scaffold for Growth Factor (PRP/rh) in Applied in Bone Tissue Engineering," International Journal of Pharmacy Sciences, 2017, 7–17.

[2] P. J. G Rosa, Biomaterials & scaffolds for tissue engineering. Materials Today, 13(5), 2010, 89–91.

[3] D. Dutta, T. Ozkan, and T. Tsawalu, "Scaffold Design for Tissue Engineering," Mechanical Basis, 2002, 57–77.

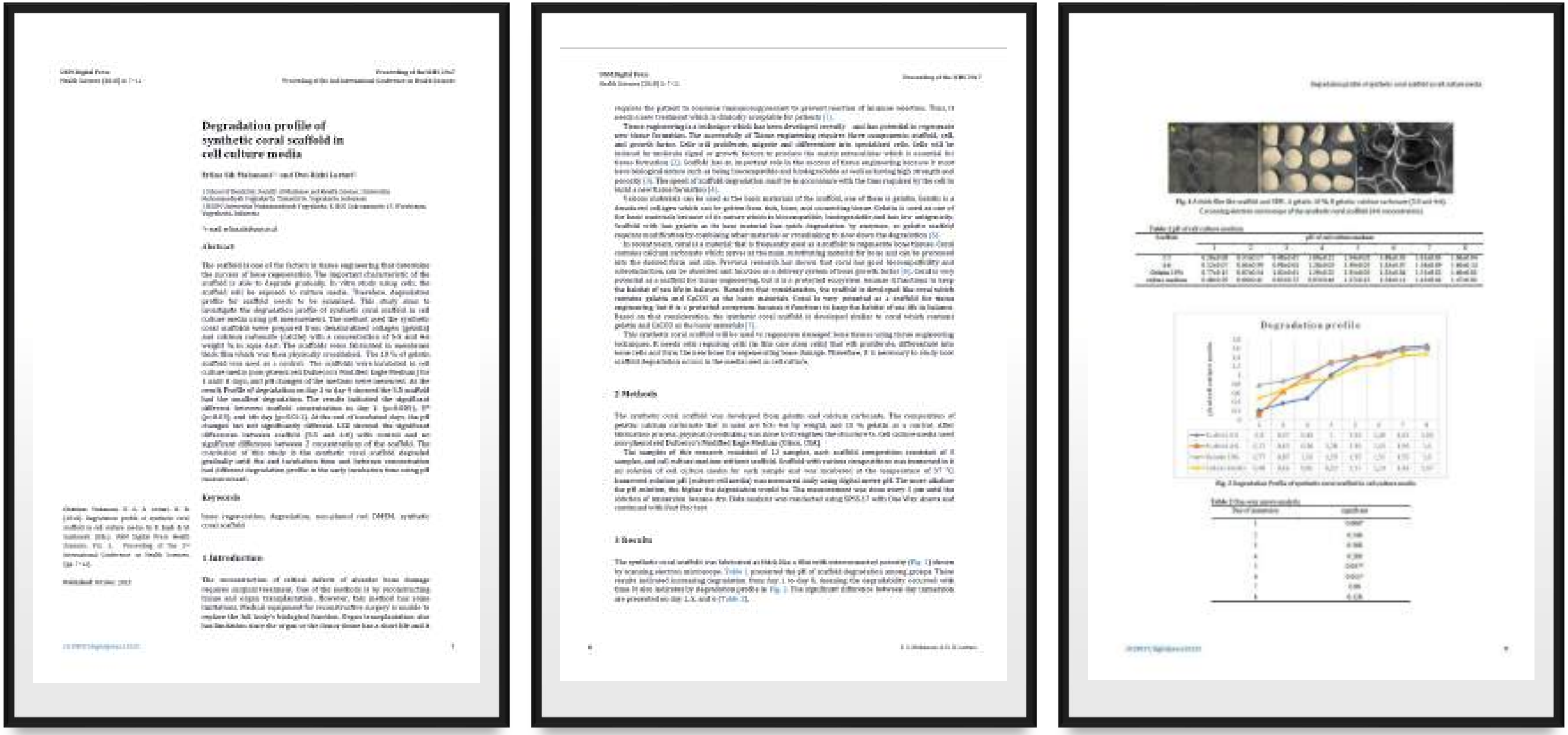
[4] I. A. Rodrigues, N. A. Khalil, N. G. Miranda, and V. A. Sol, "Platelet-Rich Plasma in Bone Regeneration: Engineering the Delivery for Improved Clinical Efficacy," BioMed Research International, 2014, 1–17.

[5] D. E. Zhang, D. G. Wang, J. J. Dong, and Y. a. Jin, "Towards to the Long Term Swelling Responses of Poly (vinyl alcohol)/Hydroxyapatite Composite Hydrogel," Journal of Bionic Engineering, 2015, 12–24.

[6] C. C. Laomeephinyo, J. O. Jeon, and J. a. Jansen, "Sodium Dextran as an effective dispersant for synthesis of nanogenic organic-inorganic soft nanohybrid network plates," Acta Biomaterialia, 6(5), 2010, 1793–1804.

[7] M. Marina, and T. Tobias, "Enhanced angiogenesis by multiple release of platelet-rich plasma contents and basic fibroblast growth factor from polymeric scaffolds," Acta Biomaterialia, 8(5), 2012, 1793–1805.

[8] Y. Hu, J. Jiang, F. Ren, F. Chi, Y. Li, and Z. Deng, "Nanocrystal from matrix gelatin as scaffold for bone engineering," Journal of Biotechnology, 149, 2010, 167–70.



Degradation profile of synthetic coral scaffold in cell culture media
Abstract
Keywords
1 Introduction
2 Methods
3 Results
Degradation profile

4 Discussions

The result showed that increasing degradation from day 1 to day 8 presented degradability occurs with time. The mean of the highest pH on day 1 (shown in Table 1) was the gelatin 10 % group. This showed that on day 1, gelatin 10 % had the highest degradation compared to other groups. The hydrophilic properties of the gelatin 10 % are capable of binding more water than the composition of gelatin scaffolds with $CaCO_3$. It is known that crosslinked scaffolds could enlarge for 3 days before become degraded, while pure gelatin scaffolds are completely degraded after ± 16 hours of immersion [8]. In day 6 there was a significant difference between groups, and the highest pH was also in the gelatin 10 % group.

The cell culture media is liquid that designed to support cell growth, in order for cells to live and proliferate [9]. This media usually contains inorganic salts (calcium chloride, ferric nitrate, calcium chloride, Magnesium Sulphate, Natrium Bicarbonate, Natrium chloride and Natrium Phosphate), D'Glukosa, Phenol red, amino acid (L-Arginine Hydrochloride, L-Cysteine.2HCl, L-Glutamine, Glycine, L-Histidine.HCl.H2O, L-Isoleucine, L-leucine, L-Lysine Hidroklorida, L-Methionine, L-Phenylalanine, L-Serin, L-Threonine, LTriptofan, L-Tyrosin.2Na.2H2O and L-Valine), Vitamin (D-Kalsium Pantothenate, Choline chloride, folic acid, L-Inositol, Niacinamide, Pyridoxine HCl, Riboflavin dan Thiamine Hydrochloride) [10].

This study used DMEM cell culture media without phenol red because phenol red will change the color of the solution in case of increase or decrease in pH. The color change due to phenol red will give the not accurate data because the color change it is difficult to distinguish the pH change of the cell culture media due to environmental factors of research or due to the effect of scaffold degradation [11].

The scaffold containing gelatin will swell when immersing in the liquid media. It indicates that the polymer in the scaffold is capable of absorbing the liquid without dissolving in it [8]. The scaffold polymer will swell gradually and begin to degrade when there is high hydration (highly swollen), because the force among molecule chains cannot restrain the force from the outside [12]. Degradation of the scaffold is influenced by several factors such as temperature, incubation duration, acidity level, solvent and crosslinking. These factors will influent the stability of the scaffold. The degradation process will continue to occur and increase until the scaffold is totally degraded [13]. The pH measurements were performed to determine the condition and amount of degradation. The higher of pH (alkali) shows the higher degradation. Gelatin is a polypeptide chain consisting of various amino acids which have zwitterion nature or dipolar because the chemical structure has a negative functional cluster (COO-) and positive functional cluster (NH3+). The amino acid is also amphoteric – it can be acid, neutral or alkaline based on the environment condition [14].

5 Conclusions

There is difference degradation profile of synthetic coral scaffold between 5:5, 4:6, and gelatin 10 % composition. The synthetic coral scaffold degraded gradually until the end incubation time and between concentration had different degradation profile in the early incubation time using pH measurement.

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References

1. Tabata, Y.: Current status of regenerative medical therapy based on drug delivery technology. Reproductive BioMedicine Online 16 (1), 70-80 (2007). doi://doi.org/10.1016/S1472-6483(10)60558-5
2. Sachlos, E., Czernuszka, J.T.: Making tissue engineering scaffold work. Review: The application of solid freeform fabrication technology to the production of tissue engineering scaffolds. European Cells and Materials 5, 29–40 (2003). doi:10.22203/eCM
3. Kitamura, C., Nishihara, T., Terashita, M., Tabata, Y., Jimi, E., Washio, A., Ohshima, K.: Regenerative approaches for dental pulp and periapical tissues with growth factor, biomaterials, and laser irradiation. Polymers 3(4), 1776–1793 (2011). doi://doi.org/10.3390/polym3041776
4. Gaikwad, V.V., Patil, A.B., Gaikwad, M.V.: Scaffold for drug delivery in tissue engineering. International Journal of Pharmaceutical Sciences and Nanotechnology 1(2), 113–122 (2008).
5. Ratanavaraporn, J., Damrongsakkul, S., Sanchavanakit, N., Banaprasert, T., Kanokpanont, S.: Comparison of gelatin and collagen scaffold for fibroblast cell culture. Journal of Metals, Materials and Minerals 16(1), 31–36 (2006).
6. Hou, R., Chen, F., Yang, Y., Cheng, X., Gao, Z., Yang, H.O., Mao, T.: Comparative study between coral mesenchymal stem cells-rhBMP-2 composite and auto-bone-graft in rabbit critical-sized cranial defect model. Journal of Biomedical Materials 80(1), 85–93 (2007).
7. Mahanani, E.S., Bachtiar, I., Ana, I.D.: Human mesenchymal stem cells behavior on synthetic coral scaffold. Key Engineering Materials 696, 205–211 (2016). doi://doi.org/10.4028/www.scientific.net/KEM.696.205
8. Tronci, G.: Synthesis, characterization, and biological evaluation of gelatin-based scaffolds pp. 23-61. [Dissertation]. Mathematisch-Naturwissenschaftlichen Fakultät, Universität Potsdam (2010).
9. Freshney, R.I.: Culture of animal cells: A manual of basic technique and specialized applications. 6th edition, pp. 115–146. John Wiley & Sons, Inc., New York (2011).
10. Mather, J.P., Roberts, P.E.: Introduction to cell and tissue culture, pp. 41–62. Plenum Press, New York (1998).
11. Young, S., Wong, M., Tabata, Y., Mikos, A.G.: Gelatin as a delivery vehicle for the controlled release of bioactive molecules. Journal of Controlled Release 109(1–3), 256–274 (2005).
12. Guo, C., Gemeinhart, R.A.: Understanding the adsorption mechanism of chitosan onto poly(lactide-co-glycolide) particles. European Journal of Pharmaceutics and Biopharmaceutics 70(2), 597–604 (2008).
13. Haugh, M.G., Murphy, C.M., McKiernan, R.C., Altenbuchner, C., Brien, F.J.O.: Crosslinking and mechanical properties significantly influence cell attachment, proliferation, and migration within collagen glycosaminoglycan scaffolds. Tissue Engineering Part A. 17(9-10), 1201–1208 (2011).
14. Winarno, F.G.: Kimia pangan dan gizi [Food chemistry and nutrition], pp. 136–153. Gramedia Pustaka Utama, Jakarta (2002). [in Bahasa Indonesia].

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