

DAFTAR PUSTAKA

1. Liu J, Zeng J, Wang X, Zheng M, Luan Q. P53 mediates lipopolysaccharide-induced inflammation in human gingival fibroblasts. *J Periodontol*. 2018;89(9):1142-1151. doi:10.1002/JPER.18-0026
2. Lertpimonchai A, Rattanasiri S, Vallibhakara SA, Thakkinstian A. The association between oral hygiene and periodontitis : a systematic review and meta-analysis. 2017;(May 2016):1-12. doi:10.1111/idj.12317
3. Siswanto, dr., MHO., DTM. Laporan Nasional RISKESDAS. Kementerian Kesehatan RI. Badan Penelitian dan Pengembangan Kesehatan, 2018. Indonesia
4. Valente JFA, Valente TAM, Alves P, Ferreira P, Silva A, Correia IJ. Alginate based scaffolds for bone tissue engineering. *Mater Sci Eng C*. 2012;32(8):2596-2603. doi:10.1016/j.msec.2012.08.001
5. Alvarez K, Nakajima H. Metallic Scaffolds for Bone Regeneration. 2009:790-832. doi:10.3390/ma2030790
6. American Academy of Orthopaedic Surgeons Home Page. Available online: <http://www.aaos.org/news/aaosnow/jan08/reimbursement2.asp> (accessed on 21 Juni 2020).
7. Giannoudis, P.V.; Dinopoulos, H.; Tsiridis, E. Bone substitutes: An update. *Injury* 2005, 36, S20–S27
8. Venkatesan J, Bhatnagar I, Kim S. Chitosan-Alginate Biocomposite Containing Fucoidan for Bone Tissue Engineering. 2014:300-316. doi:10.3390/md12010300
9. Lickorish, D., Guan, L., and Davies, J.E. (2007) A three-phase, fully resorbable, polyester/calcium phosphate scaffold for bone tissue engineering: evolution of scaffold design. *Biomaterials*, 28 (8), 1495–1502.
10. Venkatesan J, Kim S. Marine Algae Derived Polysaccharides for Bone Tissue. 2015:509-521.
11. Bernardini G, Minetti M, Santucci A. Pro-Apoptotic Activity of French Polynesian *Padina pavonica* Extract on Human Osteosarcoma Cells. *marinedrugs*. 2018;16. doi:10.3390/md16120504
12. Hamed I, Yesim O, Fatih O, Regenstein JM. Marine Bioactive Compounds and Their Health Benefits : A Review. *ComprehensiveReviews inFoodScienceandFoodSafety*. 2015;14. doi:10.1111/1541-4337.12136
13. Minetti M, Bernardini G, Biazzo M, et al. *Padina pavonica* Extract Promotes In Vitro Differentiation and Functionality of Human Primary

- Osteoblasts. 2019.
14. Ponce NMA, Pujol CA, Damonte EB. Fucoidans from the brown seaweed *Adenocystis utricularis*: extraction methods , antiviral activity and structural studies. 2003;338:153-165.
 15. Li B, Lu F, Wei X, Zhao R. Fucoidan: Structure and Bioactivity. 2008:1671-1695. doi:10.3390/molecules13081671
 16. Chevolut L, Mulloy B, Ratiskol J, Foucault A. A disaccharide repeat unit is the major structure in fucoidans from two species of brown algae. 2001;330:529-535.
 17. Ag C, Bilan MI, Grachev AA, et al. Structure of a fucoidan from the brown seaweed *Fucus vesiculosus*. *Carbohydr Res.* 2002;337:719-730.
 18. Nishino T, Nagumo T. Structural characterization of a new anticoagulant fucan sulfate from the brown seaweed *Ecklonia kurome* ". 1991;11.
 19. Jin, G. and Kim, G.H. (2011) Rapidprototyped PCL/fucoidan composite scaffolds for bone tissue regeneration: design, fabrication, and physical/biological properties. *J. Mater. Chem.*, 21 (44), 17710–17718.
 20. Huang Y, Liu T. Acta Biomaterialia Mobilization of mesenchymal stem cells by stromal cell-derived factor-1 released from chitosan / tripolyphosphate / fucoidan nanoparticles. *Acta Biomater.* 2012;8(3):1048-1056. doi:10.1016/j.actbio.2011.12.009
 21. Carson MA, Clarke SA. Bioactive Compounds from Marine Organisms : Potential for Bone Growth and Healing. *Mar Drugs.* 2018;16:340. doi:10.3390/md16090340
 22. Chandika P, Jung W. Marine Algae Based Biomaterials for Osteoblast. 2015.
 23. Funosas ER, Escovich L, Maestri L. The Use Of Topical Subgingival Gelsof Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) as an Adjunct toNon-Surgical Management of Chronic Periodontitis. *Acta Odontol.Latinoam* 2009:215-219.
 24. Anwar A, Amir Q, Khan MW. Chronic Periodontitis , A Silent Hazardous Disease. *Biomedica* Vol. 30, Issue 1, Jan-Mar 2014;30(1):34-39.
 25. Tatakis DN, Kumar PS. Etiology and Pathogenesis of Periodontal Diseases.*Dent Clin N Am* 49 2005; 491-516.
 26. Silva N, et al. Host Response Mechanisms in Periodontal Diseases.*J Appl Oral Sci* 2015;23(3):329-355.
 27. Bascones A, et al. New Knowledge of The Pathogenesis of Periodontal Disease. *Quintessence International* 2004;35(9).
 28. Tawfig N. Proinflammatory Cytokines and Periodontal Disease. *Journal of Dental Problems and Solutions* 2016;3:12-17. 20.
 29. Takai M, Miyazaki Y, Tachibana H, Yamada K. The Enhancing Effect of Fucoidan Derived From *Undaria Pinnatifida* on Immunoglobulin

- Production by Mouse Spleen Lymphocytes. *Biosci Biotechnol Biochem.* 2014;78(10):1742-1745.
30. Kang Mo, Trabert C kenneth MS. *Newman and Carranza's Clinical Periodontology.* 13 th. (Carranza, Fermin N, Micheal, eds.); 2019.
 31. Baron R. Anatomy and Ultrastructure of Bone – Histogenesis, Growth and Remodeling. *Endotext.* 2000:1-23.
<http://www.ncbi.nlm.nih.gov/pubmed/25905372>.
 32. Nam S, Lee JC, Kim HJ, Park J, Lee J. Serotonin Inhibits Osteoblast Differentiation and Bone Regeneration in Rats. 2015:5-7.
doi:10.1902/jop.2015.150302
 33. Wang IE, Shan J, Choi R, et al. Role of Osteoblast – Fibroblast Interactions in the Formation of the Ligament-to-Bone Interface. 2007;(December). doi:10.1002/jor
 34. D LBRP, S HRB, S EJTB, et al. Activation of RANKL and Matrix Metalloproteinase Production in Periodontal Fibroblasts by Endothelin Signaling. 2015:1-16. doi:10.1902/jop.2015.150397
 35. Whetman J, Mealey BL. Effect of Healing Time on New Bone Formation Following Tooth Extraction and Ridge Preservation With Demineralized Freeze-Dried Bone Allograft . A Randomized Controlled Clinical Trial. 2016:1-13. doi:10.1902/jop.2016.160139
 36. Koyama T. *Chapter 34 - Extracts of Marine Algae Show Inhibitory Activity Against Osteoclast Differentiation.* Vol 64. 1st ed. Elsevier Inc.; 2011. doi:10.1016/B978-0-12-387669-0.00034-X
 37. Fillingham Y, Jacobs J. Bone grafts and their substitutes. 2016:6-9. doi:10.1302/0301-620X.98B1.36350
 38. Saito E, Saito A. A Novel Regenerative Technique Combining BMP-2 With FGF-2 for Circumferential Defects in Dog Incisors. 2016:1-16. doi:10.1902/jop.2016.150746
 39. Koga T, Minamizato T, Kawai Y, Miura K, Takashi I. Bone Regeneration Using Dentin Matrix Depends on the Degree of Demineralization and Particle Size. 2016:1-12. doi:10.1371/journal.pone.0147235
 40. Yang S, Leong K, Du Z, Chua C. Review The Design of Scaffolds for Use in Tissue Engineering. Part I. Traditional Factors. *Tissue Eng.* 2001;7(6):679-689. doi:10.1089/107632701753337645
 41. Zeltinger J, Sherwood JK, Graham DA, Müller R, Griffith LG. Effect of Pore Size and Void Fraction on Cellular Adhesion , Proliferation , and Matrix Deposition. *Tissue Eng.* 2001;7(5):557-572. doi:https://doi.org/10.1089/107632701753213183.
 42. Kheirallah M, Almeshaly H. International Journal of Dentistry and Oral Science (IJDOS) ISSN : 2377-8075 Bone Graft Substitutes for Bone Defect Regeneration . A Collective Review Biological properties of bone Bone graft substitutes Bone grafts into the recipient site. *Int J Dent Oral*

- Sci.* 2016;03(5):247-257.
43. Um I, Kim Y, Mitsugi M. Demineralized dentin matrix scaffolds for alveolar bone engineering. 2017:120-127. doi:10.4103/jips.jips
 44. Suparmi, Sahri A. Mengenal Potensi Rumput Laut : Kajian Pemanfaatan Sumber Daya Laut Dari Aspek Industri Dan Kesehatan. *Sultan Agung*. XLIV(118):95-116.
 45. Minetti M, Bernardini G, Biazzo M, et al. Padina pavonica Extract Promotes In Vitro Differentiation and Functionality of Human Primary Osteoblasts. 2019.
 46. Cho Y, Jung W, Kim J, Choi I, Kim S. Beneficial effects of fucoidan on osteoblastic MG-63 cell differentiation. *Food Chem.* 2009;116(4):990-994. doi:10.1016/j.foodchem.2009.03.051
 47. Purbomartono C, Mulia DS, Priyambodo D. Respon Imun Non-spesifik Ikan Gurami (*Osphronemus gouramy*) yang Diberi Fucoidan dari Ekstrak Rumput Laut Cokelat. *Saintek*. 2019;16(1):9-17.
 48. Prasetya, T. 2009. Pembuatan Natrium Alginat dari Rumput Laut Cokelat (*Phaeophyceae*) dengan Proses Ekstraksi. Skripsi. Departemen Teknik Kimia. Fakultas Teknik. Universitas Sumatera Utara. Medan
 49. Park S, Lee KW, Lim D, Lee S. The Sulfated Polysaccharide Fucoidan Stimulates Osteogenic Differentiation of Human Adipose-Derived Stem Cell. *Stem Cell Dev.* 2012;21(12):2204-2211. doi:10.1089/scd.2011.0521
 50. Rajeshkumar S, et al. Review Article Development in Therapeutic Importance of Most Sought Marine Algal Polysaccharide Fucoidans. *International Journal of Research in Biomedicine and Biotechnology* 2013;3(2):37-43.
 51. Fitton JH, Stringer DN, Karpinić SS. Therapies from Fucoidan : An Update. *Marine Drugs* 2015,13; 5920-5946.
 52. Phull AR, Kim SJ. Fucoidan as Bio-functional Molecule : Insights Into The Anti-inflammatory Potential and Associated Molecular Mechanisms. *J Funct Foods*. 2017;38:415-426.
 53. Park J, et al. Fucoidan Inhibits LPS-induced Inflammation In vitro and During the Acute Response In vivo. *Int Immunopharmacol.* 2017;43:91-98.
 54. Do H, Kang NS, Pyo S, Billiar TR, Sohn EH. Differential Regulation by Fucoidan of IFN- γ -Induced NO Production in Glial Cells and Macrophages. *J Cell Biochem.* 2010;111(5):1337-1345.
 55. Andrew M. The Role of Inflammation in Wound Healing and Periodontal Disease [Tesis]. University of Illinois Chicago 2014.
 56. Bunnell BA, Estes BT, Guilak F, Gimble JM. Differentiation of Adipose Stem Cells. *Methods Mol Biol.* 2008;456:155-171. doi:10.1007/978-1-

59745-245-8_12

57. Meliga E, Strem BM, Duckers HJ, Serruys PW. Adipose-Derived Cells. *Cell Transplant.* 2007;16:963-970. doi:<https://doi.org/10.3727/096368907783338190>
58. Strem BM, Hicok KC, Zhu M, et al. Multipotential differentiation of adipose tissue-derived stem cells. *Keio J Med.* 2005;54(3):132-141. doi:<https://doi.org/10.2302/kjm.54.132>
59. Zuk PA, Zhu M, Ashjian P, et al. Human Adipose Tissue Is a Source of Multipotent Stem Cells □. 2002;13(December):4279-4295. doi:10.1091/mbc.E02
60. Zuk PA, Ph D, Zhu MIN, Mizuno H, Benhaim P, Lorenz HP. Multilineage Cells from Human Adipose Tissue: Implications for Cell-Based Therapies. *Tissue Eng.* 2001;7(2):211-228. doi:<https://doi.org/10.1089/107632701300062859>
61. Elabd C, Chiellini C, Massoudi A, et al. Human adipose tissue-derived multipotent stem cells differentiate in vitro and in vivo into osteocyte-like cells. 2007;361:342-348. doi:10.1016/j.bbrc.2007.06.180
62. Hattori H, Sato M, Masuoka K, Ishihara M. Osteogenic Potential of Human Adipose Tissue-Derived Stromal Cells as an Alternative Stem Cell Source. *Cell Tissue Organs.* 2004;8513:178:2-12. doi:10.1159/000081088
63. Weinzierl K, Hemprich A, Frerich B. Bone engineering with adipose tissue derived stromal cells. *J Cranio-Maxillofacial Surg.* 2006;34(8):466-471. doi:10.1016/j.jcms.2006.07.860
64. Zhu M, Kohan E, Bradley J, Hedrick M, Benhaim P, Zuk P. The effect of age on osteogenic , adipogenic and proliferative potential of female adipose-derived stem cells. *J Tissue Eng Regen Med.* 2009;(March):290-301. doi:10.1002/term
65. Liao X, Li F, Wang X, Yanoso J. Distribution of Murine Adipose-Derived Mesenchymal Stem Cells In Vivo Following Transplantation in Developing Mice. *Stem Cell Dev.* 2008;314(March 2006):303-314. doi:10.1089/scd.2007.0086
66. Solutions EV. The Freeze-Drying Theory and Process: Things to Consider. *Online Artic.* https://www.ellab.com/Files/Files/White-Papers/The-Freeze-Drying-Theory-and-Process_ellab-whitepaper.pdf.
67. Garg P, Mazur MM, Buck AC. Prospective Review of Mesenchymal Stem Cells Differentiation into Osteoblasts. *Orthopaedic Surgery.* Volume 9999. Number 9999. 2017. DOI: 10.1111/os.12304
68. Dreger T, Watson JT, Akers W, et al. Intravenous application of CS271-selected mesenchymal stem cells during fracture healing. *J Orthop Trauma,* 2014, 28: 15–19.

69. Shen FH, Visger JM, Balian G, Hurwitz SR, Diduch DR. Systemically administered mesenchymal stromal cells transduced with insulin-like growth factor-i localize to a fracture site and potentiate healing. *J Orthop Trauma*, 2002, 16: 651–659.
70. Hughes FJ, Turner W, Belibasakis G, Martuscelli G. Effects of growth factors and cytokines on osteoblast differentiation. *Periodontology*. 2006;41:48–72.
71. Panetta NJ, Gupta DM, Longaker MT. Bone regeneration and repair. *Curr Stem Cell Res Ther*. 2010;5:122–128.
72. Jang HO, Park YS, Lee JH, Seo JB, Koo KI, Jeong SC, et al. Effect of extracts from safflower seeds on osteoblast differentiation and intracellular calcium ion concentration in MC3T3-E1 cells. *Nat Prod Res*. 2007;21:787–797.
73. Kim BS, Kim YC, Zadeh H, Park YJ, Pi SH, Shin HS, et al. Effects of the dichloromethane fraction of *Dipsaci Radix* on the osteoblastic differentiation of human alveolar bone marrow-derived mesenchymal stem cells. *Biosci Biotechnol Biochem*. 2011;75:13–19
74. Manton KJ, Leong DF, Cool SM, Nurcombe V. Disruption of heparan and chondroitin sulfate signaling enhances mesenchymal stem cell-derived osteogenic differentiation via bone morphogenetic protein signaling pathways. *Stem Cells*. 2007;25:2845–2854
75. Chizhov AO, Dell A, Morris HR, Haslam SM, McDowell RA, Shashkov AS, et al. A study of fucoidan from the brown seaweed *Chorda filum*. *Carbohydr Res*. 1999;320:108–119
76. Bilan MI, Grachev AA, Ustuzhanina NE, Shashkov AS, Nifantiev NE, Usov AI. Structure of a fucoidan from the brown seaweed *Fucus evanescens* C.Ag. *Carbohydr Res*. 2002;337:719–730
77. Mourao PA. Use of sulfated fucans as anticoagulant and antithrombotic agents: future perspectives. *Curr Pharm Des*. 2004;10:967–981.
78. Angstwurm K, Weber JR, Segert A, Burger W, Weih M, Freyer D, et al. Fucoidin, a polysaccharide inhibiting leukocyte rolling, attenuates inflammatory responses in experimental pneumococcal meningitis in rats. *Neurosci Lett*. 1995;191:1–4.
79. Fukahori S, Yano H, Akiba J, Ogasawara S, Momosaki S, Sanada S, et al. Fucoidan, a major component of brown seaweed, prohibits the growth of human cancer cell lines *in vitro*. *Mol Med Rep*. 2008;1:537–542
80. Kim BS, Kang HJ, Park JY. Fucoidan promotes osteoblast differentiation via JNK- and ERK-dependent BMP2–Smad 1/5/8 signaling in human mesenchymal stem cells. *Exp Mol Med*. 2015 Jan; 47(1): e128. doi: [10.1038/emm.2014.95](https://doi.org/10.1038/emm.2014.95)
81. Niedermair T, Schirner S, Seebröcker R. Substance P Modulates Bone Remodeling Properties of Murine Osteoblasts and Osteoclasts. *Journal Sci Rep*. 2018; 8: 9199 doi: [10.1038/s41598-018-27432-y](https://doi.org/10.1038/s41598-018-27432-y).

82. Kresnoadi U, Rahayu RP. Stimulation of osteoblast activity by induction of Aloe vera and xenograft combination. *Dental Journal. Majalah kedokteran Gigi*. Vol. 44. No. 4 December 2011.
83. Bracey DN, Jinnih AH, Willey JS. Investigating the Osteoinductive Potential of a Decellularized Xenograft Bone Substitute. *Cells Tissues Organs*. 2019; 207(2): 97–113
84. Heo SY, Oh GW, Jung WK. 3D Printed Marine Biomaterials Composites for Bone Tissue Engineering. *Encyclopedia of Marine Biotechnology* Chapter 54. Book Editor(s): Professor Se-Kwon Kim. 11 August 2020. doi.org/10.1002/9781119143802.ch54
85. Lee K. Jin G. Jang C. H. et al. (2013) Preparation and characterization of multi-layered poly(ϵ -caprolactone)/chitosan scaffolds fabricated with a combination of melt-plotting/in situ plasma treatment and a coating method for hard tissue regeneration. *Journal of Materials Chemistry B*, 1 (42), 58315841.

LAMPIRAN FOTO-FOTO PENELITIAN

Persiapan & proses pembuatan fucoidan



Pengambilan alga coklat.



Proses pencucian & pemotongan alga coklat.



Proses penjemuran hari ke 1 hingga hari ke 3.

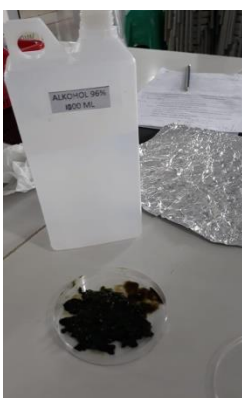
Proses pembuatan ekstrak gel fucoidan.



salah proses pembuatan ekstrak fucoidan



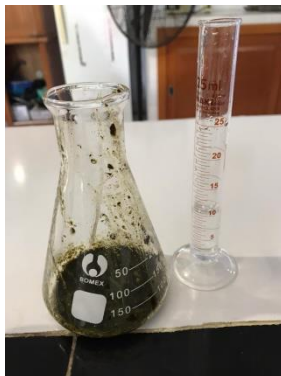
Penimbangan & proses blender alga kering.



Ditambah larutan etanol & diuapkan menghasilkan endapan.



Larutan methanol.



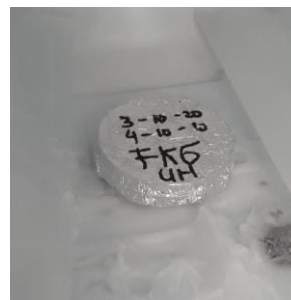
Pencampuran dengan larutan methanol selama 3 jam, lalu di stir (aduk) selama 6 jam.



Penyaringan filtrate dilanjutkan dengan teknik sentrifugasi.



Proses sentrifugasi dengan kecepatan 5000 rpm selama 10 mnt.



Filtrat setelah di sentrifugasi & di simpan di dalam freezer untuk dimasukkan di mesin freeze dried.



Mesin Freeze dried.



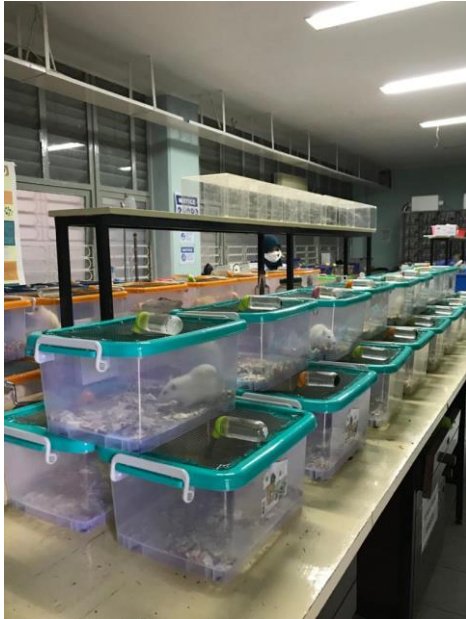
Hasil freeze dried fucoidan ditimbang lalu ditambahkan dengan PGE menghasilkan gel fucoidan.



Hasil ekstrak gel fucoidan.



Kondisi ruangan penangkaran dan adaptasi hewan coba



Kondisi kandang/ Box tikus wistar



Menimbang Tikus Wistar sebelum implantasi



Proses Implantasi Bahan Pada Tikus Wistar



Persiapan Implantasi



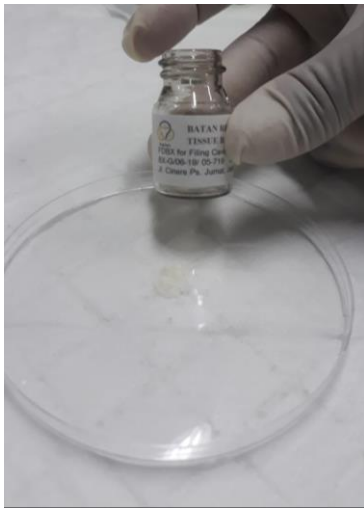
Proses pembiusan menggunakan anestetikum ketamine 100 HCL.



Proses Pengeburan tulang femur.



Aplikasi larutan salin. Pada tikus berbeda diaplikasikan ekstrak gel fucoidan.



Xenograft Batan





Proses aplikasi campuran ekstrak gel fucoidan dengan sediaan xenograft.



Suturing dan perban luka.

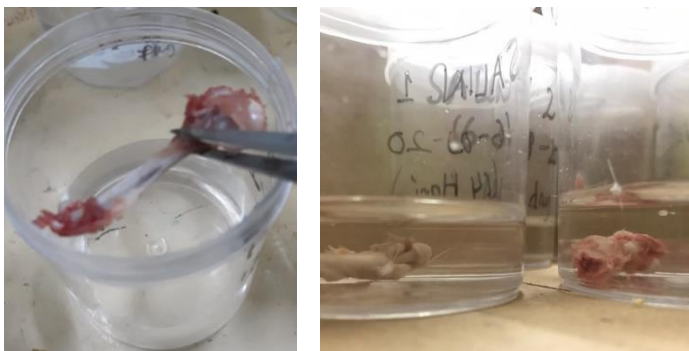
Proses Sacrificed & Pengambilan Preparat Tulang



Dimasukkan ke dalam toples yang berisi kapas eter hingga pingsan lalu di keluarkan dislokasi.



Pemotongan paha atas kanan; pembersihan daging & otot pada femur.



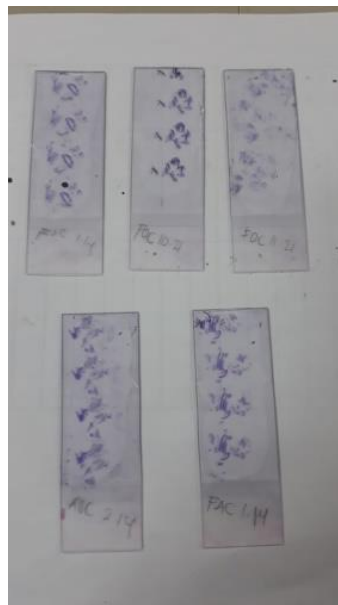
Perendaman di dalam larutan formalin 10%.



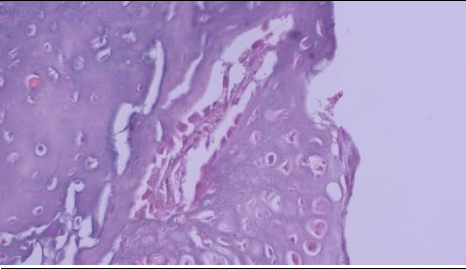
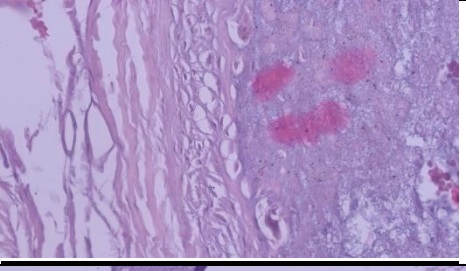
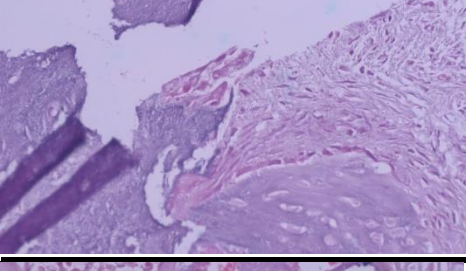
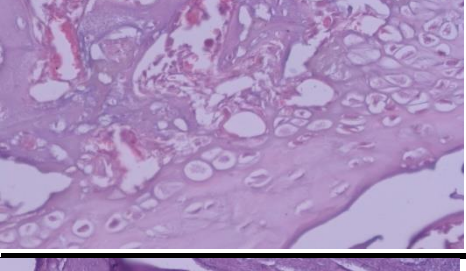
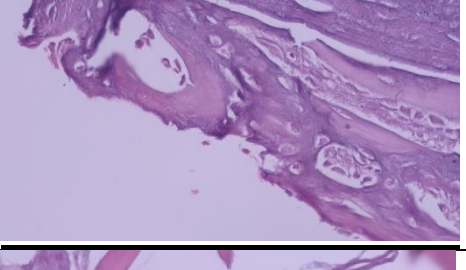
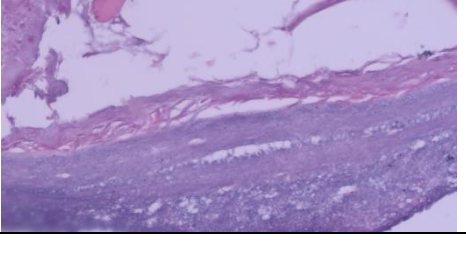
Fiksasi bagian tulang femur dengan BNF 10 % dalam botol



Salah satu cara pemberian kode pada botol sediaan tulang yang diambil



Perwarnaan Slide Sampel

No	Kode	Tampakan Histologis	Keterangan
1.	FX114		FUCO+XENO PENGAMATAN HARI KE 14
2.	FX521		FUCO+XENO PENGAMATAN HARI KE 21
3.	SA114		SALINE PENGAMATAN HARI KE 14
4.	SA521		SALINE PENGAMATAN HARI KE 21
5.	F114		FUCOIDAN PENGAMATAN HARI KE 14
6.	F721		FUCOIDAN PENGAMATAN HARI KE 21

Lampiran Output SPSS Explore

Kelompok Perlakuan

Tests of Normality

Kelompok Perlakuan	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Jumlah Osteoblast Overview	,250	7	,200*	,782	7	,027
Salin	,271	5	,200*	,882	5	,321
Fucoidan	,384	5	,015	,697	5	,009
Fucoidan+Xenograft	,216	6	,200*	,856	6	,175
Fucoidan+Aloevera	,247	6	,200*	,905	6	,405

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Kelompok Perlakuan

Tests of Normality

Kelompok Perlakuan	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Jumlah Osteoblast Overview	,205	7	,200*	,907	7	,377
Salin	,190	5	,200*	,980	5	,934
Fucoidan	,428	5	,003	,642	5	,002
Fucoidan+Xenograft	,358	5	,035	,671	5	,005
Fucoidan+Aloevera	,220	5	,200*	,930	5	,599

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

T-Test (Salin)

Group Statistics

waktu perlakuan	N	Mean	Std. Deviation	Std. Error Mean
Jumlah Osteoblast Hari ke 14	5	44,3800	7,49213	3,35058
Hari ke 21	5	47,7400	8,94025	3,99820

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Jumlah Osteoblast									
Equal variances assumed	,261	,623	-,644	8	,538	-3,36000	5,21651	-15,38930	8,66930
Equal variances not assumed			-,644	7,763	,538	-3,36000	5,21651	-15,45365	8,73365

T-Test (Fucoidan)

Group Statistics

	waktu perlakuan	N	Mean	Std. Deviation	Std. Error Mean
Jumlah Osteoblast	Hari ke 14	5	51,3400	15,67396	7,00961
	Hari ke 21	5	64,2600	21,35610	9,55074

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Jumlah Osteoblast	Equal variances assumed	,332	,580	-1,091	8	,307	-12,92000	11,84699	-40,23921	14,39921
	Equal variances not assumed			-1,091	7,340	,310	-12,92000	11,84699	-40,67267	14,83267

T-Test (Fucoidan Xeno)

Group Statistics

	waktu perlakuan	N	Mean	Std. Deviation	Std. Error Mean
Jumlah Osteoblast	Hari ke 14	6	57,0000	19,82100	8,09189
	Hari ke 21	5	82,8000	14,46859	6,47055

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Jumlah Osteoblast	Equal variances assumed	,454	,517	-2,415	9	,039	-25,80000	10,68383	-49,96849	-1,63151
	Equal variances not assumed			-2,490	8,893	,035	-25,80000	10,36082	-49,28073	-2,31927

Oneway (Hari ke-14)

Descriptives

Jumlah Osteoblast									
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	
					Lower Bound	Upper Bound			
Overview	7	40,3714	13,36659	5,05210	28,0094	52,7335	27,00	55,30	
Salin	5	44,3800	7,49213	3,35058	35,0773	53,6827	32,30	51,30	
Fucoidan	5	51,3400	15,67396	7,00961	31,8782	70,8018	41,70	79,00	
Fucoidan+Xenograft	6	57,0000	19,82100	8,09189	36,1991	77,8009	40,70	92,30	
Total	23	47,9652	15,45994	3,22362	41,2798	54,6506	27,00	92,30	

ANOVA

Jumlah Osteoblast

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1014,638	3	338,213	1,514	,243
Within Groups	4243,574	19	223,346		
Total	5258,212	22			

Oneway (Hari ke-21)

Descriptives

Jumlah Osteoblast

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Overview	7	48,1286	18,21325	6,88396	31,2841	64,9730	27,00	72,30
Salin	5	47,7400	8,94025	3,99820	36,6392	58,8408	36,70	59,70
Fucoidan	5	64,2600	21,35610	9,55074	37,7429	90,7771	52,00	102,30
Fucoidan+Xenograft	5	82,8000	14,46859	6,47055	64,8349	100,7651	74,70	108,30
Total	22	59,5864	21,15247	4,50972	50,2079	68,9648	27,00	108,30

ANOVA

Jumlah Osteoblast

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4424,228	3	1474,743	5,339	,008
Within Groups	4971,738	18	276,208		
Total	9395,966	21			



**LABORATORIUM BIOFARMASI
FAKULTAS FARMASI
UNIVERSITAS HASANUDDIN**

KAMPUS UNHAS TAMALANREA JL. P. KEMERDEKAAN KM. 10
Tlp. 0411 588566, 580216, 586200, Ext. 1093, Fax. 0411 590663 MAKASSAR 90245

SURAT KETERANGAN TELAH MENYELESAIKAN PENELITIAN
Nomor: 01 /Lab.Biofar-UH/IX/2020

Kepala Laboratorium Biofarmasi, Fakultas Farmasi Universitas Hasanuddin,
menerangkan bahwa mahasiswa tersebut di bawah ini :

Nama : drg. Ira Farwiany Syafar

Nomor Pokok : J035 181007

Program Pendidikan : Program Pendidikan Dokter Gigi Spesialis (PPDGS) Peripdnesia,
PKG Unhas

Telah menyelesaikan penelitian di Laboratorium Biofarmasi dengan judul penelitian
"Efektivitas Ekstrak Fucoidan Alga Coklat (*Phaeophyta*) sebagai bahan Tambahan pada
Xenograft terhadap Regenasi Tulang (Penelitian pada *Rattus Norvegicus*)".

Demikian surat keterangan ini dibuat untuk dipergunakan sebagaimana mestinya.

Makassar, 05 September 2020

Kepala Laboratorium Biofarmasi

Prof. Dr. rer. nat. Hj. Marianti A. Manggau, Apt
Nip. 19670319 199203 2 002



REKOMENDASI PERSETUJUAN ETIK
Nomor: 0076/PL.09/KEPK FKG-RSGM UNHAS/2020

Tanggal: 12 Agustus 2020

Dengan ini menyatakan bahwa protokol dan dokumen yang berhubungan dengan protokol berikut ini telah mendapatkan persetujuan etik:

No. Protokol	UH 17120357	No Protokol Sponsor	
Peneliti Utama	Drg. Ira Farwiany Syafar, M. Adm. Kes	Sponsor	Pribadi
Judul Peneliti	Efektivitas Ekstrak Fucoidan Alga Cokelat (<i>Phaeophyta</i>) sebagai Bahan Tumbuhan pada Xenograft terhadap Regenerasi Tulang (Penelitian Pada <i>Rattus Norvegicus</i>)		
No. Versi Protokol	1	Tanggal Versi	12 Agustus 2020
No. Versi Protokol		Tanggal Versi	
Tempat Penelitian	1. Laboratorium Biofarmaka PKP Unhas 2. Laboratorium Biologi dan Penelitian STIFA Makassar 3. Laboratorium Histopatologi RSW Unhas 4. Laboratorium Biofarmasi Fakultas Farmasi Unhas		
Dokumen Lain			
Jenis Review	<input type="checkbox"/> Exempted <input checked="" type="checkbox"/> Expedited <input type="checkbox"/> Fullboard	Masa Berlaku 12 Agustus 2020-12 Agustus 2021	Frekuensi Review Lanjutan
Ketua Komisi Etik Penelitian	Nama: Dr. drg. Marhamah, M.Kes	Tanda Tangan 	Tanggal
Sekretaris Komisi Etik Penelitian	Nama: drg. Muhammad Iqbal, Sp.Pros	Tanda Tangan 	Tanggal

Kewajiban peneliti utama:

- Menyerahkan Amendemen Protokol untuk persetujuan sebelum diimplementasikan
- Menyerahkan laporan SAE ke Komisi Etik dalam 24 jam dan dilengkapi dalam 7 hari dan lapor SUSAR dalam 72 jam setelah peneliti utama menerima laporan.
- Menyerahkan laporan kemajuan (*progress report*) setiap 6 bulan untuk penelitian resiko tinggi dan setiap setahun untuk penelitian resiko rendah.
- Menyerahkan laporan akhir setelah penelitian berakhir.
- Melaporkan penyimpangan dari protokol yang disetujui (*protocol deviation/violation*)
- Mematuhi semua aturan yang berlaku.

