DAFTAR PUSTAKA

1. Kemenkes Kesehatan Republik Indonesia. Laporan Riset Kesehatan Dasar (Riskesdas) Nasional 2018. Badan Penelitian dan Pengembangan KesehatanKementerian Kesehatan RI. 2018.
2. Passarelli PC, P agnoni S, Piccirillo GB, Desantis V, Benegiamo M, Liguori A, et al. Reasons for tooth extractions and related risk factors in adult patients: A cohortstudy. Int J Environ Res Public Health. 2020;17(7).
3. Cai J, Gao Y, Zhu X, Shen Z, Su Q. Alveolar Socket Healing : What Can We Learn ? J Periodontol 2000. 2004;16(3–4):1660–6.
4. Chappuis V, Araújo MG, Buser D. Clinical relevance of dimensional bone and soft tissue alterations post-extraction in esthetic sites. Periodontology 2000. 2017 Feb 1;73(1):73–83
5. Hämmerle CHF, Araújo MG, Simion M. Evidence-based knowledge on the biology and treatment of extraction sockets. Clin Oral Implants Res. 2012;23(SUPPL. 5):80–2.
6. Šupová M. Problem of hydroxyapatite dispersion in polymer matrices: A review. J Mater Sci Mater Med. 2009;20(6):1201–13.
7. Fee L. Socket preservation. Br Dent J. 2017;222(8):579–82.
8. Chappuis V, Araújo MG, Buser D. Clinical relevance of dimensional bone and soft tissue alterations post-extraction in esthetic sites. Periodontol 2000. 2017;73(1):73–83.
9. Lin HK, Pan YH, Salamanca E, Lin Y Te, Chang WJ. Prevention of bone

resorption by ha/β-tcp + collagen composite after tooth extraction: A case series. Int J Environ Res Public Health. 2019;16(23):1–11.

10. Hansson S, Halldin A. Alveolar ridge resorption after tooth extraction: A consequence of a fundamental principle of bone physiology. Journal of Dental Biomechanics. 2012;3(1):1–8.
11. Ramesh N, Ratnayake JTB, Moratti SC, Dias GJ. Effect of chitosan infiltration on hydroxyapatite scaffolds derived from New Zealand bovine cancellous bones for bone regeneration. Int J Biol Macromol [Internet]. 2020;160:1009–20. Available from: https://doi.org/10.1016/j.ijbiomac.2020.05.269
12. Kattimani VS, Kondaka S, Lingamaneni KP. Hydroxyapatite–-Past, Present, and Future in Bone Regeneration. Bone Tissue Regen Insights. 2016;7:BTRI.S36138.
13. Kamadjaja MJK, Abraham JF, Laksono H. Biocompatibility of Portunus Pelagicus Hydroxyapatite Graft on Human Gingival Fibroblast Cell Culture. Med Arch (Sarajevo, Bosnia Herzegovina). 2019;73(6):378–81.
14. Patrulea V, Ostafe V, Borchard G, Jordan O. Chitosan as a starting material for wound healing applications. Eur J Pharm Biopharm. 2015;97:417–26.
15. Priyana A. Peran pertanda tulang dalam serum pada tatalaksana osteoporosis.Universal medicina 2007; 26: 152-159
16. Alfian Nasir Madin. Produksi kitosan dari limbah cangkang kepiting rajungan (Portunidae) secara enzimatis dan aplikasinya sebagai penurun

kolesterol. Universitas Hasanuddin; 2017.

17. Chien RC, Yen MT, Mau JL. Antimicrobial and antitumor activities of chitosan from shiitake stipes, compared to commercial chitosan from crab shells. Carbohydr Polym. 2016;138:259–64.
18. Danilchenko SN, Kalinkevich O V., Pogorelov M V., Kalinkevich AN, Sklyar AM, Kalinichenko TG, et al. Characterization and in vivo evaluation of chitosan- hydroxyapatite bone scaffolds made by one step coprecipitation method. J Biomed Mater Res - Part A. 2011;96 A(4):639–47.
19. Cross AR LD. Fracture management bone healing and grafting. Fundam orhodonticSurg. 2021;
20. Dym H OO. Atlas of Minor Surgery. Philadelphia: Wb Sander Co; 2001. 209–210p.
21. Dash M, Chiellini F, Ottenbrite RM, Chiellini E. Chitosan - A versatile semi- synthetic polymer in biomedical applications. Vol. 36, Progress in Polymer Science(Oxford). Elsevier Ltd; 2011. p. 981–1014.
22. Ika Devi Adiana, Lasminda Syafiar. Penggunaan Kitosan Sebagai Biomaterial Di Kedokteran Gigi. Dentika Dental Journal. 2014;18(2):190–3.
23. Achmad H, Djais AI, Jannah M, Carmelita AB, Uinarni H, Arifin EM, et al. Antibacterial chitosan of milkfish scales (Chanos chanos) on bacteria prophyromonas gingivalis & agregatibacter actinomycetemcomitans. Systematic Reviews in Pharmacy. 2020;11(6):836–41.

24. Keller L, Regiel-Futyra A, Gimeno M, Eap S, Mendoza G, Andreu V, et al. Chitosan-based nanocomposites for the repair of bone defects. Nanomedicine: Nanotechnology, Biology, and Medicine. 2017 Oct;13(7):2231–40.

25. Ahmed S, Ikram S. Chitosan Based Scaffolds and Their Applications in Wound Healing. Achiev Life Sci [Internet]. 2016;10(1):27–37. Available from: http://dx.doi.org/10.1016/j.als.2016.04.001

26. Jennings JA BJ. Chitosan Based Biomaterials Vol 1 : Fundamental. Duxford:Elseiver; 2017.

27. Ezoddini-Ardakani F, Navab Azam A, Yassaei S, Fatehi F, Rouhi G. Effects of chitosan on dental bone repair. Health (Irvine Calif). 2011;03(04):200–5

28. Muzzarelli R. Chitosan Scaffolds for Bone Regeneration. In : Chitin, Chitosan, Oligosaccharides and Their Derivatives. CRC Press; 2010. 222–239 p.

29. Aguilar A, Zein, Harmouch, Hafdi, Bornert, Offner, et al. Application of Chitosanin Bone and Dental Engineering. Belinha J, Natal Jorge RM, Reis Campos JC, Vaz MAP, Manuel J, Tavares RS, editors. Molecules [Internet]. 2019 Aug 19;24(16):3009. Available from: https://www.taylorfrancis.com/books/9780429555848

30. Matica MA, Aachmann FL, Tøndervik A, Sletta H, Ostafe V. Chitosan as a wound dressing starting material: Antimicrobial properties and mode of action. Int J Mol Sci. 2019;20(23):1–34.

31. Arifin A, Mahyudin F, Edward M. THE CLINICAL AND RADIOLOGICAL OUTCOME OF BOVINE HYDROXYAPATITE (BIO HYDROX) AS BONE GRAFT. (JOINTS) Journal Orthopaedi and Traumatology Surabaya. 2020 Apr 30;9(1):9.
32. Labres XR, Camps ÀR, Salas EJ, Albuquerque R, Ortega E, López-López J. Graft Materials in Oral Surgery: Revision. Journal of Biomimetics, Biomaterials, and Tissue Engineering. 2014;19.
33. Xu F, Wu Y, Zhang Y, Yin P, Fang C, Wang J. Influence of in vitro differentiation status on the in vivo bone regeneration of cell/chitosan microspheres using a rat cranial defect model. Journal of Biomaterials Science, Polymer Edition. 2019 Aug;30(12):1008–25.
34. Gordon PW. Buku Ajar Praktis Bedah Mulut (4th ed). Jakarta: EGC, 2013; p. 36- 44, 93-100. 2013;36–44.
35. Araújo MG, Silva CO, Misawa M SF. Alveolar socket healing: What can welearn? periodontal 2000. 2015;68(1):122–34
36. Gomes P de S, Daugela P, Poskevicius L, Mariano L, Fernandes MH. Molecular and Cellular Aspects of Socket Healing in the Absence and Presence of Graft Materials and Autologous Platelet Concentrates: a Focused Review. J Oral Maxillofac Res [Internet]. 2019 Sep 5 [cited 2021 Mar 17];10(3):3–5. Available from: /pmc/articles/PMC6788423/
37. Cohen N, Cohen-Lévy J. Healing processes following tooth extraction in orthodontic cases. J Dentofac Anomalies Orthod. 2014;17(3):304.
38. Ismardianita E, Elianora D, Rosalina W, Nofrike L, Khairani VY. The

effectiveness methanol extract clausena excavate on number of fibroblast and density of collagen fibers after tooth extraction. J Dentomaxillofacial Sci. 2019;4(3):170–5.

39. Isabel Fernández-Tresguerres Hernández-Gil , Miguel Angel Alobera Gracia , Mariano del Canto Pingarrón LBJ. Physiological bases of bone regeneration II. The remodeling process. Med Oral, Patol Oral y Cirugía Bucal [Internet].2004;11(2):151–7. Available from: http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S1698-

40. Jayaprakash R. A Review of Healing Potential of Moringa olifera Leaves in Wound. Int J Pharm Sci Rev Res. 2017;43(12):42–8.

41. Velnar T, Bailey T, Smrkolj V. The wound healing process: An overview of the cellular and molecular mechanisms. J Int Med Res. 2009;37(5):1528–42.

42. Hienz SA, Paliwal S, Ivanovski S, Cells B, Homeostasis B. Mechanisms of bone resorption in periodontitis. J Immnology Res. 2015;1–10.

43. Wijaya S, Prameswari N, Lisdiana M. Pengaruh pemberian gel teripang emas terhadap jumlah osteoklas di daerah tekanan pada remodeling tulang pergerakan gigi ortodonti: laporan penelitian. Denta jurnal kedokteran gigi. 2015; 9(2): 1-5.

44. Chappuis V, Araújo MG BD. Clinical relevance of dimensional bone and soft tissue alterations post-extraction in esthetic sites. periodontal 2000. 2017;73(1):73–83.

45. Truesdell SL, Saunders MM. Bone remodeling platforms: Understanding

the need for multicellular lab-on-a-chip systems and predictive agent-based models. Math Biosci Eng. 2020;17(2):1233–52.

46. Setiawatie e m, widiyanti p, ryan m, rubianto m. Carbonate hydroxyapatite- hyaluronic acid as bone healing accelerator: in-vitro and in-vivo studies on the alveolar bone of wistar rats. Journal of international dental and medical research. 2019; 12(4): 1280-1286.

47. Morjaria KR, Wilson R, Palmer RM. Bone healing after tooth extraction with or without an intervention: A systematic review of randomized controlled trials. Clin Implant Dent Relat Res [Internet]. 2014 Feb [cited 2021 Mar 17];16(1):1–20. Available from: https://pubmed.ncbi.nlm.nih.gov/22405099/

48. Landén NX, Li D, Ståhle M. Transition from inflammation to proliferation: a critical step during wound healing. Cell Mol Life Sci. 2016;73(20):3861– 85.

49. Komori Toshihisa. Functions of Osteocalcin in Bone, Pancreas, Testis, and Muscle. Int J Mol Sci. 2020; 21(7513): 4-5.

50. Berezovska O, Yildirim G, Budell W, Yagerman S et all. Osteocalcin Affects Bone Mineral and Mechanical Properties in female Mice. Bone. 2019; 128(115031): 6-9.

51. Miron RJ, Zhang Y. Next-Generation Biomaterials for Bone & Periodontal Regeneration. 1st ed. Illnois: Quintessence Publishing Co, Inc; 2019.

52. Labres XR, Camps ÀR, Salas EJ, Albuquerque R, Ortega E, López-López

J. Graft Materials in Oral Surgery: Revision. Journal of Biomimetics, Biomaterials, and Tissue Engineering. 2014;19.

53. Chaves MD, De Souza Nunes LS, De Oliveira RV, Holgado LA, Filho HN, Matsumoto MA, et al. Bovine hydroxyapatite (Bio-Oss®) induces osteocalcin, RANK-L and osteoprotegerin expression in sinus lift of rabbits. Journal of Cranio-Maxillofacial Surgery. 2012 Dec;40(8).
54. Akin r, herawati d, murdiastuti k. Pengaruh penambahan asam hialuronat pada demineralized freeze-dried bovine bone xenograft terhadap keberhasilan perawatan kerusakan intraboni. Jurnal kedokteran gigi. 2014; 5(3): 298-303.
55. Wahyudi tc, sukmana i, savetlana s. Potensi pengembangan material implan tulang hidroksiapatit berbasis bahan alam lokal. Fakultas teknik universitas lampung. 2019: 2-4.
56. Ling A H S, Bolander J, Rustom L E, Johnson A W, Luyten F P, Picart C. Bone Regeneration Strategies: Engineered Scaffolds, Bioactive Molekules and Stem Cells Current Stage and Future Perspective. J of Biomaterials. 2018: 3-4.
57. Wahyuningtyas E, Sugiatno E. Stichopus Hermanii Collagen with Lokal Hydroxyapatite as Bone Subtitute Material Toward Osteoclasts Number and Toxicity. 1st International Conference on Bioinformatics, Biotechnology, and Biomedical Engineering (BIOMIC). 2018: 1-3.
58. Arundina I, Suardita K, setiabudi H, Ariani M D. Golden Sea Cucumber (StichopusHermanii) as Growth Factors Steam Cells. J of Int Dent and Med

Res. 2016; 9(3):242-247.

59. Bansal J, Kedige S D, Anand S. Hyaluronic acid: a promising Mediator for Periodontal Regeneration. Indian J Dent Res. 2010; 21(4): 575-8.

60. Keller L, Pijnenburg L, Idoux-Gillet Y, Bornert F, Benameur L, Tabrizian M, et al. Preclinical safety study of a combined therapeutic bone wound dressing for osteoarticular regeneration. Nat Commun [Internet]. 2019;10(1):1–10. Available from: http://dx.doi.org/10.1038/s41467-019-10165-5

61. Huynh-Ba G, Pjetursson BE, Sanz M, Cecchinato D, Ferrus J, Lindhe J, et al. Analysis of the socket bone wall dimensions in the upper maxilla in relation to immediate implant placement. Clin Oral Implants Res. 2010;21(1):37–42.

62. Elango J, Saravanakumar K, Rahman SU, Henrotin Y, Regenstein JM, Wu W, et al. Chitosan-collagen 3d matrix mimics trabecular bone and regulates rankl- mediated paracrine cues of differentiated osteoblast and mesenchymal stem cells for bone marrow macrophage-derived osteoclastogenesis. Biomolecules.2019;9(5).

63. Dahlan A, Hidayati HE, Hardianti SP. Collagen fiber increase due to hydroxyapatite from crab shells (*Portunus pelagicus*) application in post tooth extraction in Wistar rats. Eurasia J Biosci. 2020;14:3785-9.

64. Kamadjaja MJ, Abraham JF, Laksono H. Biocompatibility of Portunus pelagicus hydroxyapatite graft on human gingival fibroblast cell culture.

Med Arch. 2019;73(6):378-81. https://doi.org/10.5455/medarh.2019.73.303-306

65. Jennings J. Chitosan based biomaterials volume 1:Fundamental. Elsevier, editor. Duxford; 2017.

66. Aguilar A, Zein, Harmouch, Hafdi, Bornert, Offner, et al. Application of Chitosanin Bone and Dental Engineering. Belinha J, Natal Jorge RM, Reis Campos JC, Vaz MAP, Manuel J, Tavares RS, editors. Molecules [Internet]. 2019 Aug 19;24(16):3009.Available from: https://www.taylorfrancis.com/books/9780429555848

67. Vaca-Cornejo F, Reyes HM, Jiménez SHD, Velázquez RAL, Jiménez JMD. Pilot Study Using a Chitosan-Hydroxyapatite Implant for Guided Alveolar Bone Growth in Patients with Chronic Periodontitis. J Funct Biomater. 2017 Jul;8(3).

68. Sularsih S. Perbandingan Jumlah Sel Osteoblas pada Penyembuhan Luka Antara Penggunaan Kitosan Gel 1% dan 2%. 2012;

69. Mahmudati N. Kajian Biologi Molekuler peran Estrogen/ Fitoestrogen pada Metabolisme Tulang Usia Menopause. Semin Nas VIII Pendidik Biol [Internet]. 2011;421–30. Available from: http://jurnal.fkip.uns.ac.id/index.php/prosbio/article/download/748/4161.

70. Berezovska O, Yildirim G, Budell W, Yagerman S et all. Osteocalcin Affects Bone Mineral and Mechanical Properties in female Mice. Bone. 2019; 128(115031): 6-9.

71. Komori Toshihisa. Functions of Osteocalcin in Bone, Pancreas, Testis, and

Muscle. Int J Mol Sci. 2020; 21(7513): 4-5.

72. Brun V, Guillaume C, Mechiche Alami S, Josse J, Jing J, Draux F, et al. Chitosan/hydroxyapatite hybrid scaffold for bone tissue engineering. Biomed Mater Eng.2014;24(1):63-73

73. Pryor LS, Gage E, Langevin C-J, Herrera F, Breithaupt AD, Gordon CR, et al. Review of Bone Substitutes. Craniomaxillofac Trauma Reconstr. 2009;2(3–4):151–60.

74. Vidyahayati, I.L., Dewi, A.H, et.al. Pengaruh Subtitusi Tulang dengan Hidroksiapatit Terhadap Remodeling Tulang. 2016:2(5):53-59.

75. Gani A, Yulianty R, Supiaty S, Rusdy M, Dwipa Asri G, Eka Satya D, et al. Effectiveness of Combination of Chitosan Gel and Hydroxyapatite from Crabs Shells (Portunus Pelagicus) waste ad Bonegraft on Periodontal Network Regeneration through IL-1 and BMP-2 Analysis. Int J Biomater.2022.

76. Viera AE, Rapeke CE, Barros S De, et al. Intramembranous Bone Healing Process Subsequent to Tooth Ekstraction In Mice: Histomorphometric and Molecular Characterization. 2015 :1-22

77. Thein-Han WW, Misra RDK. Biomimetic chitosan-nanohydroxyapatite composite scaffolds for bone tissue engineering. Acta Biometer. 2009.

78. Lutfianto MB, SU Rahardjo, Rahajoe Poerwati S. Ekspresi mRNA Osteokalsin pasca pemebrian bahan cangkok tulang carbonate-hydroxyapatite pada soket pasca pencabutan gigi dengan analisis qPCR (Studi eksperimental pada manusia). UGM. 2017.

79. Thahir H, Alfrida P, Rahayu Feblina A, Annisa A, Etriyani N, et al. fektivitas gel virgin coconut oil (VCO) terhadapa jumlah makrofag pada rattus norvegicus. Unhas. 2022.

80. Chandha MH, Mappangara S, Achmad H, Oktawati S, Raoda S, Ramadhan J, et al. Pinctada Maxima Pearl Shells as a Promising Bone Graft Material in the World of Dentistry. 2022;10(D):109–15.

81. Adam M, Achmad H, Nasir M, Putri SW, Azizah A, Satya DE. Stimulation of Osteoblast and Osteocalcin in the Bone Regeneration By Giving Bonegraft Golden Sea Cucumber. J Int Dent Med Res. 2022;15(1):140–7.

82. Oktawati Sri, Irawaty Djais A, Dwipa Asri G. Effectiveness of bone graft containing pearl shells (pinctada maxima) on bone regeneration through osteoprotegerin expression analysis (OPG). Tesis. Universitas Hasanuddin. 2022.

83. Wahyuningtyas E, et.al. Application of a promising bone graft substitute in bone tissue regeneration: characterization, biocompatibility, and in vivo animal study. Biomed research international. 2019: 1-4.

LAMPIRAN

1. Etik Penelitian

KEMENTERIAN RISET, TEKNOLOGI DAN PENDIDIKAN TINGGI
UNIVERSITAS HASANUDDIN
FAKULTAS KEDOKTERAN GIGI
RUMAH SAKIT GIGI DAN MULUT
KOMITE ETIK PENELITIAN KESEHATAN
Sekretariat : Lantai 2, Gedung Lama RSGM Unhas
Jl.Kandea No. 5 Makassar
Contact Person: drg. Muhammad Ikbal, Sp.Pros/Nur Ardah AR TELP. 081342973011/08114919991

RSGMP

REKOMENDASI PERSETUJUAN ETIK
Nomor: 0071/PL.09/KEPK FKG-RSGM UNHAS/2023

Tanggal: 16 Mei 2023

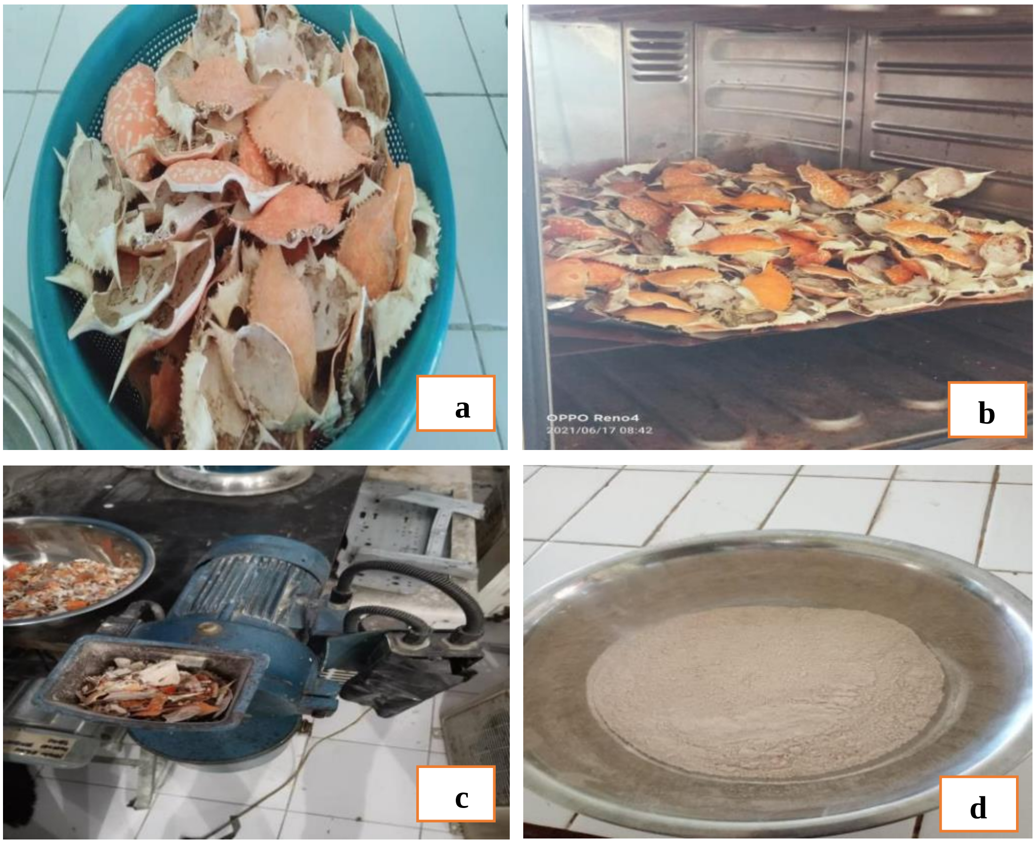
Dengan ini menyatakan bahwa protokol dan dokumen yang berhubungan dengan protokol berikut ini telah mendapatkan persetujuan etik:

No. Protokol	UH 17120812	No Protokol Sponsor	
Peneliti Utama	drg. Aisyah Bella Azzanjani	Sponsor	Pribadi
Judul Peneliti	Ekspresi *Osteokalsin* pada *Socket Preservation* setelah Pemberian Serbuk Kitosan dan Hidroksiapatit dari Limbah Cangkang Kepiting Rajungan *(Portunus Pelagicus)* sebagai *Bonegraft* terhadap Regenerasi Jaringan Periodontal.		
No. Versi Protokol	1	Tanggal Versi	03 Mei 2023
No. Versi Protokol		Tanggal Versi	
Tempat Penelitian	1. Laboratorium Biokimia TPHP Politani Poltek Pangkep 2. Laboratorium Lembaga Penelitian dan Pengembangan Science Fak.MIPA UNHAS 3. Laboratorium Terpadu Kimia, Fak.MIPA UNHAS 4. Laboratorium Biofarmaka dan Farmakologi dan Toksikologi Fakultas Farmasi UNHAS 5. Laboratorium PA RSP Universitas Hasanuddin 6. Laboratorium Biokimia-Biomolekuler Fakultas Kedokteran Universitas Brawijaya		
Dokumen Lain			
Jenis Review	[ ] Exempted [x] Expedited [ ] Fullboard	Masa Berlaku 16 Mei 2023-16 Mei 2024	Frekuensi Review Lanjutan
Ketua Komisi Etik Penelitian	Nama: Dr. drg. Marhamah, M.Kes	Tanda Tangan	Tanggal
Sekretaris Komisi Etik Penelitian	Nama: drg. Muhammad Ikbal, Sp.Pros	Tanda Tangan	Tanggal

Kewajiban peneliti utama:

- Menyerahkan Amandemen 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.

2. Dokumentasi Pelaksanaan Penelitian



Gambar 10: Proses pembuatan serbuk cangkang kepiting rajungan. a; bahan baku limbah cangkang kepiting rajungan (Portunus pelagicus) dibersihkan. b; Cangkang kepiting rajungan dikeringkan dalam oven, c; Cangkang kepiting yang telah kering kemudian digrinder hingga halus, d; Bubuk cangkang kepiting yang telah di grinder kemudian diayak hingga ukuran 100MeSH

Gambar 11: Proses pembuatan gel kitosan dari cangkang kepiting rajungan. a; bubuk cangkang kepiting rajungan ditimbang sebanyak 500gram. b; proses demineralisasi menambahkan HCl 1,5 M dengan perbandingan 1:15 (b/v) antara sampel dengan pelarut. Campuran dipanaskan pada suhu 70–120^{o} C selama 4 jam sambil dilakukan pengadukan kemudian disaring. c; padatan dikeringkan pada oven dengan temperatur 70^{o}C selama 24 jam sehingga diperoleh serbuk. d; proses deproteinase menambahkan larutan NaOH 3,5% dengan perbandingan 1:10 (b/v), e; proses deasetilase, f; pembuatan gel kitosan dicampur dengan larutan asam asetat dalam air suling. g; gel kitosan.

Gambar 12: Proses pembuatan Hidroksiapatit cangkang kepiting rajungan. a; serbuk cangkang kepiting ditimbang sebanyak 8 g dan disimpan dalam wadah tanur.b; dikalsinasi dengan suhu 1000 ^{o}C selama 5 jam. c; mereaksikan prekursor kalsium dan prekursor fosfat. d; ditambahkan NaOH 2 M hingga pH 10. e; suspensi didiamkan pada suhu kamar selama 24 jam untuk menumbuhkan kristal hidroksiapatit. f; hidroksiapatit yang terbentuk kemudian diayak hingga halus.

Gambar 13. Prosedur perlakuan pada hewan coba. a; alat dan bahan yang akan digunakan, b; marmut ditimbang berata badannya sebelum perlakukan, c; marmut di anastesi dengan menggunakan ketamin intramuscular, d; pembukaan perlekatan gusi pada gigi marmut, e; gigi marmut dicabut menggunakan tang cabut, f; gigi marmut yang sudah dicabut, g; Pengaplikasian bahan uji ke soket gigi marmut, h; penjahitan pada soket gigi marmut. i; marmut di kembalikan ke kendang.

Gambar 14. Prosedur sacrified pada hewan coba di hari ke 7, 14, dan 21. a; marmut dimasukkan kedalam toples yang telah diberi eter. b; dilakukan pembedahan pada rahang marmut, c; Pengambilan specimen dengan alat bedah minor. d; daerah tulang rahang bawah pada marmut, e; Tulang rahang bawah dimasukkan dalam wadah. f; tulang rahang bawah dimasukkan kedalam larutan formalin buffer 10% untuk selanjutnya di bawa ke laboratorium patologi anatomi untuk pembuatan slide refarat. g; persiapan slide preparat sudah dikerjakan pada laboratorium patologi anatomi, h; slide preparat yang siap dikirim ke laboratorium Biokimia-Biomolekuler Univ.Brawijaya untuk dilakukan pemeriksaan imunohistokimia.

3. Lampiran Output SPSS.24

Descriptives

	Kelompok			Statistic	Std. Error
OSTEOCALSIN	Serbuk Kitosan	Mean		7.89	.696
		95% Confidence Interval for Mean	Lower Bound	6.28	
			Upper Bound	9.49	
		5% Trimmed Mean		7.93	
		Median		8.00	
		Variance		4.361	
		Std. Deviation		2.088	
		Minimum		4	
		Maximum		11	
		Range		7	
		Interquartile Range		3	
		Skewness		-.447	.717
		Kurtosis		.458	1.400
	Gel Kitosan + Hidroksiapatit	Mean		9.89	.790
		95% Confidence Interval for Mean	Lower Bound	8.07	
			Upper Bound	11.71	
		5% Trimmed Mean		9.93	
		Median		10.00	
		Variance		5.611	
		Std. Deviation		2.369	
		Minimum		6	
		Maximum		13	
		Range		7	
		Interquartile Range		4	
		Skewness		-.411	.717
		Kurtosis		-.874	1.400
	Batan	Mean		7.22	.741
		95% Confidence Interval for Mean	Lower Bound	5.51	
			Upper Bound	8.93	
		5% Trimmed Mean		7.19	
		Median		7.00	
		Variance		4.944	
		Std. Deviation		2.224	
		Minimum		4	
		Maximum		11	
		Range		7	
		Interquartile Range		4	
		Skewness		.256	.717
		Kurtosis		-.620	1.400
	Placebo	Mean		3.56	.475
		95% Confidence Interval for Mean	Lower Bound	2.46	
			Upper Bound	4.65	
		5% Trimmed Mean		3.51	
		Median		3.00	
		Variance		2.028	
		Std. Deviation		1.424	
		Minimum		2	
		Maximum		6	
		Range		4	
		Interquartile Range		3	
		Skewness		.691	.717
		Kurtosis		-.891	1.400

Tests of Normality

	Kelompok	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
OSTEOCALSIN	Serbuk Kitosan	.188	9	.200*	.969	9	.885
	Gel Kitosan + Hidroksiapatit	.147	9	.200*	.949	9	.679
	Batan	.153	9	.200*	.973	9	.916
	Placebo	.318	9	.009	.855	9	.084

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

a. Lilliefors Significance Correction

HARI KE-7

Group Statistics

	Kelompok	N	Mean	Std. Deviation	Std. Error Mean
OSTEOCALSIN	Serbuk Kitosan	3	6.33	2.082	1.202
	Placebo	3	2.33	.577	.333

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
OSTEOCALSIN	Equal variances assumed	5.000	.089	3.207	4	.033	4.000	1.247	.537	7.463
	Equal variances not assumed			3.207	2.306	.070	4.000	1.247	-.739	8.739

Group Statistics

	Kelompok	N	Mean	Std. Deviation	Std. Error Mean
OSTEOCALSIN	Gel Kitosan + Hidroksiapatit	3	7.33	1.528	.882
	Placebo	3	2.33	.577	.333

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
OSTEOCALSIN	Equal variances assumed	2.571	.184	5.303	4	.006	5.000	.943	2.382	7.618
	Equal variances not assumed			5.303	2.560	.019	5.000	.943	1.686	8.314

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
OSTEOCALSIN	Equal variances assumed	2.286	.205	1.000	4	.374	1.333	1.333	-2.369	5.035
	Equal variances not assumed			1.000	2.876	.394	1.333	1.333	-3.015	5.682

Group Statistics

	Kelompok	N	Mean	Std. Deviation	Std. Error Mean
OSTEOCALSIN	Gel Kitosan + Hidroksiapatit	3	7.33	1.528	.882
	Batan	3	5.00	1.000	.577

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
OSTEOCALSIN	Equal variances assumed	.727	.442	2.214	4	.091	2.333	1.054	-.593	5.260
	Equal variances not assumed			2.214	3.448	.102	2.333	1.054	-.788	5.454

HARI KE-14

Group Statistics

	Kelompok	N	Mean	Std. Deviation	Std. Error Mean
OSTEOCALSIN	Serbuk Kitosan	3	8.00	2.000	1.155
	Placebo	3	3.67	1.155	.667

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
OSTEOCALSIN	Equal variances assumed	.400	.561	3.250	4	.031	4.333	1.333	.631	8.035
	Equal variances not assumed			3.250	3.200	.043	4.333	1.333	.236	8.430

Group Statistics

	Kelompok	N	Mean	Std. Deviation	Std. Error Mean
OSTEOCALSIN	Gel Kitosan + Hidroksiapatit	3	10.67	1.528	.882
	Placebo	3	3.67	1.155	.667

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
OSTEOCALSIN	Equal variances assumed	.235	.653	6.332	4	.003	7.000	1.106	3.931	10.069
	Equal variances not assumed			6.332	3.723	.004	7.000	1.106	3.838	10.162

Group Statistics

	Kelompok	N	Mean	Std. Deviation	Std. Error Mean
OSTEOCALSIN	Serbuk Kitosan	3	8.00	2.000	1.155
	Batan	3	7.67	1.528	.882

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
OSTEOCALSIN	Equal variances assumed	.082	.789	.229	4	.830	.333	1.453	-3.701	4.367
	Equal variances not assumed			.229	3.741	.831	.333	1.453	-3.813	4.480

Group Statistics

	Kelompok	N	Mean	Std. Deviation	Std. Error Mean
OSTEOCALSIN	Gel Kitosan + Hidroksiapatit	3	10.67	1.528	.882
	Batan	3	7.67	1.528	.882

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
OSTEOCALSIN	Equal variances assumed	.000	1.000	2.405	4	.074	3.000	1.247	-.463	6.463
	Equal variances not assumed			2.405	4.000	.074	3.000	1.247	-.463	6.463

HARI KE-21

Group Statistics

	Kelompok	N	Mean	Std. Deviation	Std. Error Mean
OSTEOCALSIN	Serbuk Kitosan	3	9.33	1.528	.882
	Placebo	3	4.67	1.528	.882

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
OSTEOCALSIN	Equal variances assumed	.000	1.000	3.742	4	.020	4.667	1.247	1.204	8.130
	Equal variances not assumed			3.742	4.000	.020	4.667	1.247	1.204	8.130

Group Statistics

	Kelompok	N	Mean	Std. Deviation	Std. Error Mean
OSTEOCALSIN	Gel Kitosan + Hidroksiapatit	3	11.67	1.528	.882
	Placebo	3	4.67	1.528	.882

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
OSTEOCALSIN	Equal variances assumed	.000	1.000	5.612	4	.005	7.000	1.247	3.537	10.463
	Equal variances not assumed			5.612	4.000	.005	7.000	1.247	3.537	10.463

Group Statistics

	Kelompok	N	Mean	Std. Deviation	Std. Error Mean
OSTEOCALSIN	Serbuk Kitosan	3	9.33	1.528	.882
	Batan	3	9.00	2.000	1.155

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
OSTEOCALSIN	Equal variances assumed	.082	.789	.229	4	.830	.333	1.453	-3.701	4.367
	Equal variances not assumed			.229	3.741	.831	.333	1.453	-3.813	4.480

Group Statistics

	Kelompok	N	Mean	Std. Deviation	Std. Error Mean
OSTEOCALSIN	Gel Kitosan + Hidroksiapatit	3	11.67	1.528	.882
	Batan	3	9.00	2.000	1.155

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
OSTEOCALSIN	Equal variances assumed	.082	.789	1.835	4	.140	2.667	1.453	-1.367	6.701
	Equal variances not assumed			1.835	3.741	.145	2.667	1.453	-1.480	6.813

LEMBAR PERBAIKAN UJIAN SEMINAR HASIL TESIS PPDGS PERIODONSIA

NAMA : Aisyah Bella Azzanjani

NIM : J035202001

TANGGAL SEMINAR : 25 Oktober 2023

JUDUL : Efektivitas Sediaan Serbuk dan Gel dari Cangkang Kepiting Rajungan (Portunus Pelagicus) Sebagai Bonegraft Terhadap Kadar Osteocalsin Pada Socket Preservation

No	Nama Penguji/ Pembimbing	Koreksi Tesis	Paraf
1.	Prof. Dr. drg. Hasanuddin Thahir, M.S., Sp.Perio(K)	Untuk referensi masukkan sebanyak-banyaknya penelitian yang telah dilakukan oleh para dosen-dosen unhas yang berkaitan dengan penelitian tesis saat ini dan referensi osteocalsin ditambahkan. **Jawaban:** Pada referensi tesis telah ditambahkan sesuai arahan dari dosen penguji dan terlampir pada daftar pustaka dan tinjauan pustaka.	
2.	Drg. Surijana Mappangara, M.Kes., Sp.Perio(K)	Penjelasan tentang cangkang kepiting rajungan lebih diperdalam mengenai kandungan dari cangkang kepiting rajungan. **Jawaban:** Penjelasan mengenai kandungan cangkang kepiting rajungan telah ditambahkan pada tinjauan pustaka dan hasil pembahasan.	
3.	Dr. drg. Asdar Gani M.Kes	Perbaiki bentuk tabel agar pembaca dapat lebih jelas dalam membaca tabel. **Jawaban:** tabel sudah diperbaiki dan telah terlampir pada bab hasil.	

4.	Prof. Dr. drg. Sri Oktawati Sp.Perio(K)	- Pada definisi operasional di tinjau ulang dalam penggunaan kata kerja. - Panah dalam kerangka teori dihilangkan - Rapikan penyusunan penulisan - Masukkan mengenai uji kandungan kedalam pembahasan dan kesimpulan **Jawaban :** definisi operasional, kerangka teori, penyusunan penulisan dan mengenai uji kandungan sudah diperbaiki, ditambahkan dan terlampir dalam tesis.	