

DAFTAR PUSTAKA

- Abbaszadeh, A., Rajabzadeh, A., Zarei, L., 2019, Effect of Chitosan/Propolis Biodegradable Film on Full Thickness Wound Healing in Rats, *Iran. J. Vet. Surg.*, 14(1): 30.
- Agustin, E. D., Suryono, Akbar, A. F., Murtikasari, M., 2022, Pengaruh pemberian gel propolis 10% dan fototerapi near infrared pada penyembuhan luka pasca kuretase, *MEDALI Journal*, 4(1).
- Al-Shammari, M. M., Shafshak, S. M., Ali, M. S., 2018, Effect of 0,8% Hyaluronic Acid in Conventional Treatment of Moderate to Severe Chronic Periodontitis, *J. Contemp. Dent. Pract.*, 19(5): 527-534.
- Ali, K. M., Saleh, Z. A., Jalal, J. A., 2022, The effect of local propolis irrigation as an adjunct to scaling and root planning on alveolar bone loss in experimental periodontitis in rats (A biochemical and histological study), *Egypt. Dent. J.*, 5(1).
- Alipoor, R., Ayan, M., Hamblin, M. R., Ranjbar, R., Rashki, S., 2022, Hyaluronic Acid-Based Nanomaterials as a New Approach to the Treatment and Prevention of Bacterial Infections, *Front. Bioeng. Biotechnol.*, 10.
- Alkhateeb, W. H., Mashlah, A. M., Hajeer, M. Y., Aljoujou, A. A., 2023, Efficacy of Hyaluronic Acid in Relieving Post-implantation Pain: A Split-Mouth Randomized Controlled Trial, *Cureus*, 15(3): e36575.
- Alshehri, F. A., Alharbi, M. S., 2023, The Effect of Adjunctive Use of Hyaluronic Acid on Prevalence of *Porphyromonas gingivalis* in Subgingival Biofilm in Patients with Chronic Periodontitis: A Systematic Review, *Pharmaceutics*, 15(7), 1883.
- Amalina, R., Ardhani, R., Yusuf, Y., Susilowati, H., 2023, Fabrication and Physicochemical Properties of a Novel Gel-Like Liquid Chitosan-Carbonated Hydroxyapatite from Asian Moon Scallop (*Amusium pleuronectes*) for Periodontal Application, *J. Int. Dent. Medical. Res.*, 16(2).
- Amarasekara, D. S., Kim, S., Rho, J., 2021, Regulation of Osteoblast Differentiation by Cytokine Networks, *Int. J. Mol. Sci.*, 22, 2851.
- Aragon, J., Salerno, S., De Bartolo, L., Irusta, S., Mendoza, G., 2018, Polymeric electrospun scaffolds for bone morphogenetic protein 2 delivery in bone tissue engineering, *J. Col. Inter. Sci.* 531: 126-137.
- Asparuhova, M. B., Chappuis, V., Stahli, A., Buser, D., Sculean, 2020, Role of hyaluronan in regulating self-renewal and osteogenic differentiation of mesenchymal stromal cells and pre-osteoblasts, *Clin. Oral Investig.*, 24: 3923-3937.
- Bai, X., Gao, M., Syed, S., Xu, X., Zhang, X., 2018, Bioactive hydrogels for bone regeneration, *Bioact. Mater.* 3, 401-417.

- Barboza, A. S., Aitken-Saavedra, J. P., Ferreira, M. L., Aranha, A. M. F., and Lund, R. G., 2021, Are propolis extracts potential pharmacological agents in human oral health? – A scoping review and technology prospecting, *J. Ethnopharmacol.*, 271: 113846.
- Beck, G. R., Zerler, B., Moran, E., 2001, Gene Array Analysis of Osteoblast Differentiation, *Cell Growth Differ.*, 12: 61-83.
- Bhati, A., Fageeh, H., Ibraheem, W., Fageeh, H., Chopra, H., Panda, S., 2022, Role of hyaluronic acid in periodontal therapy (Review), *Biomed Rep.*, 17(5): 91.
- Braakhuis, A., 2019, Evidence on the Health Benefits of Supplemental Propolis, *Nutrients*, 11: 2705
- Cai, L., Qin, X., Xu, Z., Song, Y., Jiang, H., Wu, Y., Ruan, H., Chen, J., 2019, Comparison of Cytotoxicity Evaluation of Anticancer Drugs between Real-Time Cell Analysis and CCK-8 Method, *ACS Omega*, 4(7): 12036-12042.
- Chen, J., Lan, Y., He, Y., He, C., Xu, F., Zhang, Y., Zhao, Y., and Liu, Y., 2017, Tc-MDP-induced human osteoblast proliferation, differentiation and expression of osteoprotegrin, *Mol. Med. Rep.*, 16: 1801-1809.
- Chen, L., Fu, C., Zhang, Q., He, C., Zhang, F., Wei, Q., 2020, The role of CD44 in pathological angiogenesis, *FASEB J.*, 34: 13125-13139.
- Chen, M. X., Zhong, Y. j., Dong, Q. Q., Wong, H. M., Wen, Y. F., 2021, Global, regional, and national burden of severe periodontitis, 1990-2019: An analysis of the Global Burden of Disease Study 2019, *J. Clin. Periodontol.*, 48(9): 1165-1188.
- Cho, Y., Kim, K., Lee, Y., Ku, Y., and Seol, Y., 2021, Periodontal Wound Healing and Tissue Regeneration: A Narrative Review, *Pharmaceuticals*, 14:456.
- Daghrery, A., Bottino, M. C., 2022, Advanced biomaterials for periodontal tissue regeneration, *Genesis*, 60:e23501.
- Devitaningtyas, N., Syaify, A., Herawati, D., 2020, Combining 10% propolis with carbonated hydroxyapatite to observe the RANKL expression in a rabbit's alveolar bone, *Dent. J.*, 53(4): 212-216.
- Djais, A. A., Jemmy, Putri, N., Putri, A. R., dan Soekanto, S. A., 2020, Description of *Streptococcus mutans*, *Streptococcus sanguinis*, and *Candida Albicans* biofilms after exposure to propolis dentrifice by using OpenCFU method, *Saudi Dent. J.*, 32: 129-134.
- Duda, G. N., Geissler, S., Checa, S., Tsitsilonis, S., Petersen, A., Schmidt-Bleek, K., 2023, The decisive early phase of bone regeneration, *Nat. Rev. Rheumatol.*, 19: 78-95.
- Elkhenany, H., El-Badri, N., and Dhar, M., 2019, Green propolis extract promotes in vitro proliferation, differentiation, and migration of bone marrow stromal cells, *Biomed. Pharmacother.*, 115: 108861.

- Ekeuku, S. O., Chin, K., 2021, Application of Propolis in Protecting Skeletal and Periodontal Health – A Systematic Review, *Molecules*, 26: 3156.
- Eskandarinia, A., Kefayat, A., Rafienia, M., Agheb, M., Navid, S., Ebrahimpour, K., 2019, Constarch-based wound dressing incorporated with hyaluronic acid and propolis: *in vitro* and *in vivo* studies, *Carbohydr. Polym.*, 216: 25-35.
- Eskandarinia, A., Kefayat, A., Gharakhloo, M., Agheb, M., Khodabakhshi, D., Khorshidi, M., Sheikmoradi, V., Rafienia, M., Salehi, H., 2020, A propolis enriched polyurethane-hyaluronic acid nanofibrous wound dressing with remarkable antibacterial and wound healing activities, *Int. J. Bio. Macromol.*, 149: 467-476.
- Fraire-Reyes, I. A., Gaitan-Fonseca, C., Cepeda-Arguelles, O., Esparza-Villalpando, V., Aguilera-Galaviz, L., and Bermudez-Jimenez, C., 2021, Use and Effectiveness of Propolis on Chronic Periodontitis: a Systematic Review, *Int. J. Dental Sc.*, 24-1 (January-April): 32-43.
- Fraser, D., Caton, J., Benoit, D. S. W., 2022, Periodontal Wound Healing and Regeneration: Insights for Engineering New Therapeutic Approaches, *Front. Dent. Med.*, 3: 815810.
- Florencio-Silva, R., Sasso, G. R. S., Sasso-Cerri, Simoes, M. J., and Cerri, P. S., 2015, Biology of Bone Tissue: Structure, Function, and Factors that Influence Bone Cells, *BioMed Res. Int.*, 421746.
- Gaharwar, A. K., Singh, I., Khademhosseini, A., 2020, Engineered biomaterials for in situ tissue regeneration, *Nat. Rev. Mater.*, 5: 686-705.
- Giardullo, L., Altomare, A., Rotondo, C., Corrado, A., Cantatore, F. P., 2021, Osteoblast Dysfunction in Non-Hereditary Sclerosing Bone Diseases, *Int. J. Mol. Sci.*, 22, 7980.
- Gocmen, G., Gonul, O., Oktay, N. S., Yarat, A., Goker, K., 2015, The antioxidant and anti-inflammatory efficiency of hyaluronic acid after third molar extraction, *J. Craniomaxillofac. Surg.*, 43, 1033-1037.
- Goldman, J. A., Poss, K. D., 2020, Gene regulatory programmes of tissue regeneration, *Nat. Rev. Genet.*, 21: 511-525.
- Hajishengallis, G., Chavakis, T., Lambris, J. D., 2020, Current understanding of periodontal disease pathogenesis and targets for host-modulation therapy, *Periodontol. 2000*, 84(1): 14-34.
- Han, S. H., Kim, B. G., Yoon, J. A., Chong, Y., Ahn, J., 2014, Synthesis of Flavonoid O-Pentosides by *Escherichia coli* through Engineering of Nucleotide Sugar Pathways and Glycosyltransferase, *Appl. Environ. Microbiol.*, 80, 2754-2762.
- Handayani, B., Brahmana, A., 2018, Jumlah Osteoblas pada Daerah Tarikan dengan Pemberian Ekstrak Propolis Sebagai Pencegahan Relaps Ortodonti, *DENTA*, 12(1): 28-33.

- How, K. N., Yap, W. H., Lim, C. L. H., Goh, B. H., Lai, Z. W., 2020, Hyaluronic Acid-Mediated Drug Delivery System Targeting for Inflammatory Skin Diseases: A Mini Review, *Front. Pharmacol.*, 11: 1105.
- Hwang, P. W., dan Horton, J. A., 2018, Variable osteogenic performance of MC3T3-E1 subclones impacts their utility as models of osteoblast biology, *Sci. Rep.*, 9: 8299.
- Hu, B., Yu, B., Tang, D., Li, S., Wu, Y., 2016, Daidzein promotes osteoblast proliferation and differentiation in OCT1 cells through stimulating the activation of BMP-2/Smads pathway, *Gen. Mol. Res.*, 15(2).
- Jann, J., 2020, Influence of the TGF- β Superfamily on Osteoclasts/Osteoblasts Balance in Physiological and Pathological Bone Conditions, *Int. J. Mol. Sci.*, 21, 7597.
- Kim, J., Lin, C., Stavre, Z., Greenblatt, M. B., and Shim, J., 2020, Osteoblast-Osteoclast Communication and Bone Homeostasis, *Cells*, 9:2073.
- Komori, T., 2019, Regulation of Proliferation, Differentiation and Functions of Osteoblasts by Runx2, *Int. J. Mol. Sci.*, 20, 1694.
- Kononen, E., Gursoy, M., Gursoy, U. K., 2019, Periodontitis: A Multifaceted Disease of Tooth-Supporting Tissues, *J. Clin. Med.*, 8: 1135.
- Kresnoadi, U., Lunardhi, L. C., Agustono, B., 2020, Propolis extract and bovine bone graft combination in the expression of VEGF and FGF2 on the preservation of post extraction socket, *J. Indian Prosthodont. Soc.*, 20(4).
- Kumar, M., Prakash, S., Radha, Lorenzo, J. M., Chandran, D., Dhumal, S., Dey, A., Senapathy, M., Rais, N., Singh, S., Kalkreuter, P., Damale, R. D., Natta, S., Vishvanathan, M., Sathyaseelan, S. K., Rajalingam, S., Viswanathan, S., Murugesan, Y., Muthukumar, M., Javaraman, A., Kalirajan, M., Selim, S. Amarowicz, R., Mekhemar, M., 2022, Apitherapy and Periodontal Disease: Insights into In Vitro, In Vivo and Clinical Studies, *Antioxidants*, 11: 823.
- Kumar, A., Sunkara, M. S. V. V., Pantareddy, I., Sudhakar, S., 2015, Comparison of Plaque Inhibiting Efficacies of Aloe Vera and Propolis Tooth Gels: A Randomized PCR Study, *J. Clin. Diagn. Res.*, 9(9): ZC01-ZC03.
- Kusumawati, I., Suryono, Syaify, A., 2021, The enhance of type 1 collagen after 10% propolis-carbonated hydroxyapatite application in periodontitis-induced rabbits, *Dent. J.*, 54(1): 16-20.
- Kwon, T., Lamster, I. B., Levin, L., 2021, Current concepts in the management of periodontitis, *Int. Dent. J.*, 71(6): 462-476.
- Lasserre, J. F., Brex, M. C., Toma, S., 2018, Oral Microbes, Biofilms and Their Role in Periodontal and Peri-Implant Diseases, *Materials*, 11, 1802.
- Lastianny, S. P., Sukmawati, A. N., Soesilowati, Al S. K., 2022, Immunohistochemistry assay of osteocalcin on bone healing with CHA-10% propolis, *J. Dentomaxillofac. Sci.*, 7(2): 97-101.

- Lee, H., Byun, S., Cho, S., Yang, B., 2019, Past, Present, and Future of Regeneration Therapy in Oral and Periodontal Tissue: A Review, *Appl. Sci.*, 9, 1046.
- Li, X., Xu., P., Cheng, Y., Zhang, W., Zheng, B., Wang, Q., 2020, Nano-pearl powder/chitosan-hyaluronic acid porous composite scaffold and preliminary study of its osteogenesis mechanism, *Mater. Sci. Eng.*, C 111, 110749.
- Lim, Y. K., Yoo, S. Y., Jang, Y. Y., Lee, B. C., Lee, D. S., Kook, J. K., 2020, Anti-inflammatory and in vitro bone formation effects of *Garcinia mangostana* L. and propolis extracts., *Food Sci. Biotechnol.*, 29(4): 539-48.
- Lisbona-Gonzalez, M. J., Munoz-Soto, E., Reyes-Botella, C., Olmedo-Gaya, M. V., Diaz-Castro, J., Moreno-Fernandez, J., 2021, Study of the Antimicrobial Effect of an Ethanolic Extract of Propolis in Periodontal Disease, *Appl. Sci.*, 11, 7463.
- Lopez-Valverde, N., Pardal-Pelaez, B., Lopez-Valverde, A., Flores-Fraile, J., Herrero-Hernandez, S., Macedo-de-Sousa, B., Herrero-Payo, J., Ramirez, J. M., 2021, Effectiveness of Propolis in the Treatment of Periodontal Disease: Updated Systemic Review with Meta-Analysis, *Antioxidants*, 10: 269.
- Luan, J., Li, R., Xu, W., Sun, H., Li, Q., Wang, D., Dong, S., Ding, J., 2022, Functional biomaterials for comprehensive periodontitis therapy, *Acta Pharm. Sin. B.*, 13(6): 2310-2333.
- Mamajiwala, A. S., Sethi, K. S., Raut, C. P., Karde, P. A., Mamajiwala, B. S., 2021, Clinical and radiographic evaluation of 0,8% hyaluronic acid as an adjunct to open flap debridement in the treatment of periodontal intrabony defects: randomized controlled clinical trial, *Clin. Oral Investig.*, 25: 5257-5271.
- Marinho, A., Nunes, C., Reis, S., 2021, Hyaluronic Acid: A Key Ingredient in the Therapy of Inflammation, *Biomolecules*, 11, 1518.
- Mecenas, A. S., Malafaia, C. R. A., Sangenito, L. S., Simas, D. L. R., Machado, T. B., Amaral, A. C. F., dos Santos, A. L. S., Freire, D. M. G., Leal, I. C. R., 2018, Rutin derivatives obtained by transesterification reactions catalyzed by Novozym 435: Antioxidant properties and absence of toxicity in mammalian cells, *PLoS ONE*, 13(9): e0203159.
- Meimandi-Parizi, A., Oryan, A., Sayahi, E., Bigham-Sadegh, A., 2018, Propolis extract a new reinforcement material in improving bone healing: An in vivo study, *Int. J. Surg.*, 56-94-101.
- Mitsui, Y., Gotoh, M., Nakama, K., Yamada, T., Higuchi, F., Nagata, K., 2008, Hyaluronic Acid Inhibits mRNA Expression of Proinflammatory Cytokines and Cyclooxygenase-2/Prostaglandin E2 Production via CD44 in Interleukin-1-Stimulated Subacromial Synovial Fibroblasts from Patients with Rotator Cuff Disease, *J. Orthop. Res.*, 26(7): 1032-7.
- Muzio, L. L., Santarelli, A., Orsini, G., Meme, L., Mattioli-Belmonte, M., De Florio, I., Gatto, R., Gallusi, G., Nocini, P. F., Bertossi, D., Emanuelli, M.,

- Putignano, A., Bambini, F., 2013, MG63 AND MC3T3-E1 OSTEOBLASTIC CELL LINES RESPONSE TO RALOXIFENE, *Eur. J. Inflamm.* 11(3): 797-804.
- Newman, M. G., Takei, H., Klokkevold, P. R., Carranza, F. A., 2018, *Newman and Carranza's Clinical Periodontology, 13th Ed.*, Elsevier, Inc., Philadelphia.
- Pan, J., Deng, J., Yu, L., Wang, Y., Zhang, W., Han, X., Camargo, P. H. C., Wang, J., Liu, Y., 2020, Investigating the repair of alveolar bone defects by gelatin methacrylate hydrogels-encapsulated human periodontal ligament stem cells, *J. Mater. Sci. Mater. Med.*, 31:3.
- Park, J., 2013, Combined effects of simvastatin and fibroblast growth factor-2 on the proliferation and differentiation of preosteoblasts, *Biomed. Rep.*, 1: 812-814.
- Przybylek, I., Karpinski, T. M., 2019, Antibacterial Properties of Propolis, *Molecules*, 24, 2047.
- Qiao, X., Nie, Y., Ma, Y., Chen, Y., Cheng, R., Yin, W., Hu, Y., Xu, W., and Xu, L., 2017, Irisin promotes osteoblast proliferation and differentiation via activating the MAP kinase signaling pathways, *Sci. Rep.* 6: 18732.
- Ramanauskaite, E., Machiulskiene, V., 2020, Antiseptics as adjuncts to scaling and root planing in the treatment of periodontitis: a systematic literature review, *BMC Oral Health*, 20: 143.
- Romano, C. L., Vecchi, E. D., Bortolin, M., Morelli, I., Drago, L., 2017, Hyaluronic Acid and Its Composites as Local Antimicrobial/Antiadhensive Barrier, *J. Bone Jt. Infect.*; 2(1): 63-72.
- Rutkovskiy, A., Stenslokken, K., Vaage, I., 2016, Osteoblast Differentiation at a Glance, *Med. Sci. Monit. Basic Res.*, 22: 95-106.
- Sanz, M., Herrera, D., Kebschull, M., Chapple, I., Jepsen, S., Berglundh, T., Sculean, A., Tonetti, M. S., 2020, Treatment of stage I-III periodontitis – The EFP S3 level clinical practice guideline, *J. Clin. Periodontol.*, 47: 4-60.
- Sharma, A. R., Lee, Y., Bat-Ulzii, A., Chatterjee, S., Bhattacharya, M., Chakraborty, C., Lee, S., 2023, Bioactivity, Molecular Mechanism, and Targeted Delivery of Flavonoids for Bone Loss, *Nutrients*, 15, 919.
- Siaili, M., Chatzopoulou, D., Gillam, D. G., 2018, An overview of periodontal regenerative procedures for the general dental practitioner, *Saudi Dent. J.*, 30(1): 26-37.
- Sugimoto, K., Miyata, Y., Nakayama, T., Saito, S., Suzuki, R., Hayakawa, F., Nishiwaki, S., Mizuno, H., Takeshita, K., Kato, H., Ueda, R., Takami, A., Naoe, T., 2016, Fibroblast Growth Factor-2 facilitates the growth and chemoresistance of leukemia cells in the bone marrow by modulating osteoblast functions, *Sci. Rep.*, 6: 30079.

- Suratri, M. A. L., Jovina, T. A., Andayasari, L., Edwin, V. A., Ayu, G. A. K., 2020, Pengaruh Hipertensi Terhadap Kejadian Penyakit Jaringan Periodontal (Periodontitis) pada Masyarakat Indonesia (Data Riskesdas 2018), *Bul. Penelit. Kesehat.*, 48(4): 227- 234.
- Suryono, Hasmy, N. S., Pertiwi, T. L., Benyamin, B., Ismail, A. A. K., 2017, Propolis 10% -Gel as a Topical Drug Candidate on Gingivitis, *Int. J. Med. Pharm.*, 5(1): 12-17.
- Suryono, Kusumawati, I., Devitaningtyas, N., Sukmawati, A. N., Wijayanti, P., 2020, Characteristic Assay of Incorporation of Carbonated Hydroxyapatite-Propolis as an Alternative for Alveolar Bone Loss Therapy on Periodontitis: An *In Vitro* Study, *J. Int. Oral Health*, 12: 463-9.
- Suryono, Wijayanti, P., Lastianny, S. P., 2023, The Effect of Carbonated Hidroxyapatite-10% Propolis Application on Open Flap Debridement Towards Transforming Growth Factor B1 Expression, *Mal. J. Med. Health Sci.*, 19(SUPP4): 45-51.
- Szwed-Georgiou, A., Plocinski, P. Kupikowska-Stobba, B., Urbaniak, M. M., Rusek-Wala, P., Szustakiewicz, K., et al., 2023, Bioactive Materials for Bone Regeneration: Biomolecules and Delivery Systems, Vol. 9, *ACS Biomater. Sci. Eng.*, 5222-54.
- Tang, M., Wang, G., Li, J., Wang, Y., Peng, C., Chang, X., et al., 2023, Flavonoid extract from propolis alleviates periodontitis by boosting periodontium regeneration and inflammation resolution via regulationg TLR/MyD88/NF-kB and RANK/NF-kB pathway., *J. Ethnopharmacol.*, 117324.
- Tsuchida, S., Nakayama, T., 2023, Recent Clinical Treatment and Basic Research on the Alveolar Bone, *Biomedicines*, 11, 843.
- Ward, E., 2022, A Review of Tissue Engineering for Periodontal Tissue Regeneration, *J. Vet. Dent.*, 39(1).
- Yasin, A., Ren, Y., Li, J., Sheng, Y., Cao, C., Zhang, K., 2022, Advances in Hyaluronic Acid for Biomedical Applications, *Front. Bioeng. Biotechnol.*, 10: 910290.
- Wang, Z., 2021, Regulation of Cell Cycle Progression by Growth Factor-Induced Cell Signaling, *Cells*, 10, 3327.
- Wu, J., Fong, Y., Tsai, H., Chen, Y., Tsuzuki, M., Tang, C., 2008, Naringin-induced bone morphogenetic protein-2 expression via PI3K, Akt, c-Fos/c-Jun and AP-1 pathway in osteoblasts, *Eur. J. Pharmacol.*, 588: 333-341.
- Yazid, F., Ng, W. C., Luchman, N. A., Ariffin, S. H. Z., Wahab, R. M. A., 2022, Higher Concentration of Ascorbic Acid as a Sole Induction Factor for Osteogenesis on MC3T3-E1 Cell Model, *Sains Malays.*, 51(5): 1449-1464.
- Zhai, P., Peng, X., Li, B., Liu, Y., Sun, H., Li, X., 2020, The application of hyaluronic acid in bone regeneration, *Int. J. Biol. Macromol.*, 151: 1224-1239.

- Zhao, N., Wang, X., Qin, L., Guo, Z., Li, D., 2015, Effect of molecular weight and concentration of hyaluronan on cell proliferation and osteogenic differentiation in vitro, *Biochem. Biophys. Res. Comm.*, 465, 569-574.
- Zheng, Z., Patel, M., Patel, R., 2022, Hyaluronic acid-based materials for bone regeneration: A review, Reactive and Functional, *Polymers*, 171: 105151.
- Zulhendri, F., Lesmana, R., Tandean, S., Christoper, A., Chandrasekaran, K., Irsyam, I., Suwantika, A. A., Abdulah, R., Wathoni, N., 2022, Recent Update on the Anti-Inflammatory Activities of Propolis, *Molecules*, 27, 8473.
- Zulkiflee, N., Taha, H., Usman, A., 2022, Propolis: Its Role and Efficacy in Human Health and Diseases, *Molecules*, 27: 6120.