

## DAFTAR PUSTAKA

- Abdel, R., Abdel, F., El, F., and Hamed, T.A., 2021, Effect of Chitosan Nanoparticles on Quorum Sensing-Controlled Virulence Factors and Expression of Lasi and Rhli Genes Among *Pseudomonas aeruginosa* Clinical Isolates, *AIMS Microbiology*, 7(4), 415–430.
- Abusrewil, S., Brown, J.L., Delaney, C., Butcher, M.C., Tiba, M., Scott, J.A., Ramage, G., and Mclean, W., 2021, Chitosan Enhances the Anti-Biofilm Activity of Biodentine Against an Interkingdom Biofilm Model, *Antibiotics*, 10(11), 1317.
- Agnihotri, S. A., Mallikarjuna, N. N., and Aminabhavi, T. M., 2004, Recent Advances On Chitosan-Based Micro-And Nanoparticles In Drug Delivery. *JCR.*, 100(1), 5-28.
- Agwuh, K.N., and Macgowan, A., 2006, Pharmacokinetics and Pharmacodynamics of the Tetracyclines Including Glycylcyclines, *J. Antimicrob. Chemother.*, 58(2), 256–265.
- Akhavan, H., Mohebbi, P., Firouzi, A., and Noroozi, M., 2016, X-Ray Diffraction Analysis of ProRoot Mineral Trioxide Aggregate Hydrated at Different pH Values, *Iranian Endod. J.*, 11(2), 111.
- Altan, H., and Tosun, G., 2016, The Setting Mechanism of Mineral Trioxide Aggregate, *JIUFD.*, 50(1), 65.
- Andrade, Â.L., Militani, I.A., Almeida, K.J. De, Belchior, J.C., Reis, S.C., Costa, R.M.F., and Domingues, R.Z., 2018, Theoretical and Experimental Studies of the Controlled Release of Tetracycline Incorporated into Bioactive Glasses, *AAPS PharmSciTech.*, 19, 1287-1296.
- Archana, D., Dutta, J., and Dutta, P.K., 2013, International Journal of Biological Macromolecules Evaluation of Chitosan Nano Dressing for Wound Healing: Characterization, In Vitro and In Vivo Studies, *Int. J. Biol. Macromol.*, 57, 193–203.
- Armini, N. K., Susanti, D. N. A., and Pertiwi, N. K. F. R., 2022, Uji Daya Hambat Ekstrak Cacing Tanah (*Lumbricus rubellus*) dengan Tambahan Kitosan Cangkang Udang Terhadap Bakteri *Streptococcus mutans*, *Bali Dental Journal*, 6(2), 68-73.
- Bachtiar, Z.A., 2016, Perawatan Saluran Akar Pada Gigi Permanen Anak dengan Bahan Gutta Percha, *Jurnal PDGI*, 65, 60–67.
- Ballal, N. V., Kundabala, M., Bhat, K. S., Acharya, S., Ballal, M., Kumar, R., and Prakash, P. Y., 2009, Susceptibility of *Candida albicans* and *Enterococcus faecalis* to Chitosan, Chlorhexidine Gluconate and Their Combination in Vitro. *Aust. Endod. J.*, 35(1), 29-33.

- Brunauer, S., Emmett, P. H., and Teller, E., 1938, Adsorption of Gases in Multimolecular Layers, *JACS.*, 60(2), 309-319.
- Bolhari, B., Meraji, N., Se, M.R., and Pedram, P., 2020, Bioactive Materials Evaluation of the Properties of Mineral Trioxide Aggregate Mixed with Zinc Oxide Exposed to Different Environmental Conditions, *Bioact. Mater.*, 5(3), 516–521.
- Camilleri, J., 2007, Hydration Mechanisms of Mineral Trioxide Aggregate. *Int. Endod. J.*, 40(6), 462-470.
- Chang, S.W., 2020, Chemical Composition and Porosity Characteristics of Various Calcium Silicate-Based Endodontic Cements, *Bioinorg Chem Appl Journal*, 2018(1), 1–7.
- Chiang, T.Y. and Ding, S.J., 2010, Comparative Physicochemical and 56 Biocompatible Properties of Radiopaque Dicalcium Silicate Cement and Mineral Trioxide Aggregate, *J. Endod.*, 36, 1683–1687.
- Choi, J., Kim, J., Sang, K., and Gyu, T., 2008, Synthesis of Mesoporous TiO<sub>2</sub>/γ-Al<sub>2</sub>O<sub>3</sub> Composite Granules with Different Sol Composition and Calcination Temperature, *Powder Technol.*, 181(1), 83–88.
- Cychosz, K.A. and Thommes, M., 2018, Progress in the Physisorption Characterization of Nanoporous Gas Storage Materials, *Engineering*, 4, 559–566.
- Das, R.K., Kasoju, N., and Bora, U., 2010, Encapsulation of Curcumin In Alginate-Chitosan-Pluronic Composite Nanoparticles For Delivery To Cancer Cells, Nanomedicine Nanotechnology, *Biol. Med.*, 6, 153–160.
- Dewangga, V.S. and Nirwana, A.P., 2019, Uji Daya Hambat Ekstrak Etanol Daun Srikaya (*Annona Squamosa L.*) Terhadap Pertumbuhan *Staphylococcus Aureus* Secara In Vitro, *JKKH.*, 50–56.
- Dhanasegaran, K., Djearamane, S., Liang, S.X.T., Wong, L.S., and Kasivelu, G., 2021, Antibacterial Properties of Zinc Oxide Nanoparticles on *Pseudomonas aeruginosa* (ATCC 27853), *Sci. Iran.*, 28(6), 3806–3815.
- Dianat, O., Naseri, M., and Tabatabaei, S.F., 2017, Evaluation of Properties of Mineral Trioxide Aggregate with Methyl Cellulose as Liquid, *J. Dent.*, 14(1), 7–12.
- Díaz, M. R., and Vivas-Mejia, P. E., 2013, Nanoparticles as Drug Delivery Systems in Cancer Medicine: Emphasis on Rnai-Containing Nanoliposomes, *Pharmaceuticals*, 6(11), 1361-1380.
- Dosunmu, E., Chaudhari, A.A., Singh, S.R., and Dennis, V.A., 2015, Silver-Coated Carbon Nanotubes Downregulate the Expression of *Pseudomonas aeruginosa* Virulence Genes: A Potential Mechanism For Their Antimicrobial Effect, *Int. J Nanomedicine.*, 5025-5034.

- Elgadir, M.A., Uddin, S., Ferdosh, S., Adam, A., Jalal, A., Chowdhury, K., and Islam, Z., 2014, Impact of Chitosan Composites and Chitosan Nanoparticle Composites on Various Drug Delivery Systems: A Review, *JFDA.*, 23(4), 619-629.
- Eltohamy, M., Kundu, B., Moon, J., Lee, H., and Kim, H., 2018, Anti-bacterial Zinc-Doped Calcium Silicate Cements: Bone Filler, *Ceram. Int.*, 44(11), 13031–13038.
- Estrela, C., Silva, R.S., and Pécora, J.D., 2018, Antimicrobial and Chemical Study of MTA, Portland Cement, Calcium Hydroxide Paste, Sealapex and Dycal, *Braz Dent. J.*, 11(1), 3–9.
- Farrugia, C., Baca, P., Camilleri, J., and Moliz, M.T.A., 2017, Antimicrobial Activity of ProRoot MTA in Contact with Blood, *Sci. Rep.*, 1–10.
- Farrugia, C. and Camilleri, J., 2014, Antimicrobial Properties of Conventional Restorative Filling Materials and Advances in Antimicrobial Properties of Composite Resins and Glass Ionomer Cements: A Literature Review, *Dent. Mater.*, 31, E89–E99.
- Febriza, M. A., and Adrian, Q. J., 2021, Penerapan AR dalam Media Pembelajaran Klasifikasi Bakteri, *BIOEDUIN*, 11(1), 10-18.
- Flores-ledesma, A., Santana, F.B., Bucio, L., Arenas-alatorre, J.A., Faraji, M., and Wintergerst, A.M., 2017, Bioactive Materials Improve Some Physical Properties of a MTA-Like Cement, *Mater. Sci. Eng. C*, 71, 150–155.
- Fouda, M. M., Abdel-Halim, E. S., and Al-Deyab, S. S., 2013, Antibacterial Modification of Cotton Using Nanotechnology, *Carbohydr. Polym.*, 92(2), 943-954.
- Galal, M., Zaki, D.Y., Rabie, M.I., El-shereif, S.M., and Hamdy, T.M., 2020, Solubility, pH Change, and Calcium Ion Release of Low Solubility Endodontic Mineral Trioxide Aggregate, *Bull Natl Res Cent.*, 44, 1–5.
- Giraud, T., Jeanneau, C., Rombouts, C., Bakhtiar, H., Laurent, P., and About, I., 2018, Pulp Capping Materials Modulate the Balance Between Inflammation and Regeneration, *Dent. Mater.*, 35, 24–35.
- Guerra, W., Silva-Caldeira, P. P., Terenzi, H., and Pereira-Maia, E. C., 2016, Impact of Metal Coordination on The Antibiotic and Non-Antibiotic Activities of Tetracycline-Based Drugs, *Coord. Chem. Rev.*, 327, 188-199.
- Gürel, M., Demiryürek, E.Ö., Özyürek, T., and Gülhan, T., 2016, Antimicrobial Activities of Different Bioceramic Root Canal Sealers on Various Bacterial Species, *Int. J. Appl. Dent. Sci.*, 2(3), 19–22.

- Haapasalo, H.K., Sirén, E.K., Waltimo, T.M.T., Ørstavik, D., and Haapasalo, M.P.P., 2000, Inactivation of Local Root Canal Medicaments by Dentine: An In Vitro Study, *Int. Endod. J.*, 33, 126–131
- Hairani, Z., Ratnah, S., and Pakadang, S.R., 2023, Isolasi, Identifikasi, dan Uji Aktivitas Antibakteri Fungi Endofit Daun Alpukat (*Persea americana mill*) Terhadap *Pseudomonas aeruginosa* dan *Staphylococcus aureus*, *JMPI.*, 9(2), 543–551.
- Hapsari, T. D., and Puspitasari, I. M., 2018, Potensi Kitosan Dalam Sistem Penghantaran Obat Tertarget Pada Organ Paru Hati Ginjal Dan Kolon, *Farmaka*, 16(2), 54-63.
- Hartanto, D., Purbaningtias, T.E., Fansuri, H., and Prasetyoko, D., 2008, Karakterisasi Struktur Pori dan Morfologi ZSM-2 Mesopori yang Disintesis dengan Variasi Waktu Aging Pore Structure and Morphology Characterizations of Mesoporous ZSM-5 Synthesized at Various Aging Time, *JID.*, 12(1), 80–90.
- Hench, L.L., 2006, The story of Bioglass®, *J. Mater. Sci. Mater. Med.*, 17, 967–978.
- Hidayati, S., Kunafah, S., and Mahirawatie, I., 2021, Pengetahuan Tentang Karies Gigi Pada Siswa Kelas V SDN Pakal 1 Surabaya Tahun 2020, *Indones. J. Heal. Med.*, 1, 2774–5244.
- Hu, D., Ren, Q., Li, Z., and Zhang, L., 2020, Chitosan-Based Biomimetically Mineralized Composite Materials in Human Hard Tissue Repair, *Molecules*, 1–20.
- Husen, L.M.S., Hardiansah, Y., Asmawariza, L.H., Yulandasari, V., Apriani, B.F., Mastuti, A., Wiguna, R.I., Sari, B.L.P.M., Ayuwardini, C., and Azhari, R., 2022, Penyuluhan Kesehatan melalui Program GERTAGIMU sebagai Upaya Menangani Masalah Gigi dan Mulut pada Anak, *J. Abdimas Kesehat.*, 4, 500.
- Ihsan, S. and Akib, N.I. Studi Penggunaan Antibiotik Non Resep Komunitas Kota Kendari, *Media Farmasi*, 13(1), 272–284.
- Jaman, A., Ulin, M., Aba, N., and Asri, O., 2023, Jurnal Kimia Sains dan Aplikasi Synthesis of White Mineral Trioxide Aggregate ( WMTA ) Using Silica from Rice Husk and Calcium Carbonate from Limestone, *J. Kim. Sains Apl.*, 26(2), 64–69.
- Javidi, M., Zarei, M., Naghavi, N., Mortazavi, M., and Nejat, A. H., 2014, Zinc Oxide Nano-Particles As Sealer in Endodontics and Its Sealing Ability. *Contem. Clin. Den.*, 5(1), 20-24.
- Jones, D.S., Woolfson, A.D., Djokic, J., and Coulter, W.A., 1996, Development and Mechanical Characterization of Bioadhesive Semi-Solid, Polymeric Systems Containing Tetracycline for the Treatment of Periodontal Diseases, *Pharm. Res.*, 13, 1734–1738.

- Jones, R.N., Wilson, M.L., Weinstein, M.P., Stilwell, M.G., and Mendes, R.E., 2013, Contemporary Potencies of Minocycline and Tetracycline HCL Tested Against Gram-Positive Pathogens : SENTRY Program Results Using CLSI and EUCAST Breakpoint Criteria, *Diagn. Microbiol. Infect. Dis.*, 75, 402–405.
- Kadali, N. S., Alla, R. K., AV, R., MC, S. S., Mantena, S. R., and RV, R., 2021, An Overview of Composition, Properties, and Applications of Biodentine. *IJDM.*, 3(4), 120-126.
- Kartinawanti, A.T., and Khoiruzza Asy'ari, A., 2021, Penyakit Pulpa dan Perawatan Saluran Akar Satu Kali Kunjungan: Literature Review, *JIKG.*, 4, 64–72.
- Khanal, S., Adhikari, U., Rijal, N.P., Bhattarai, S.R., Sankar, J., and Bhattarai, N., 2016, pH-Responsive PLGA Nanoparticle for Controlled Payload Delivery of Diclofenac Sodium, *J. Funct. Biomater.*, 7(3), 21.
- Kim, R.J., Kim, M., Lee, K., Lee, D., and Shin, J., 2015, Archives of Oral Biology An in Vitro Evaluation of the Antibacterial Properties Oo Three Mineral Trioxide Aggregate (MTA) Against Five Oral Bacteria, *Arch. Oral Biol.*, 60, 1497–1502.
- Kishen, A., Shi, Z., and Shrestha, A., 2008, An Investigation on the Antibacterial and Antibiofilm Efficacy of Cationic Nanoparticulates for Root Canal, *JOEN.*, 34, 1515–1520.
- Kong, M., Guang, X., Xing, K., and Jin, H., 2010, International Journal of Food Microbiology Antimicrobial Properties of Chitosan and Mode of Action: A State of the Art Review, *Int. J. Food Microbiol.*, 144, 51–63.
- Korsmqr, R.W., Gurny, R., Doelker, E., Buri, P., and Peppas, N.A., 1983, Mechanisms of Solute Release from Porous Hydrophilic Polymers, *Int. J. Pharm.*, 15(1), 25–35.
- Kumari, S., Mittal, A., Dadu, S., Dhaundiyal, A., Abraham, A., and Yendrembam, B., 2018, Comparative Evaluation of Physical and Chemical Properties of Calcium Silicate-Based Root-End Filling Materials (Mineral Trioxide Aggregate and Biodentine): An in vitro Study, *Indian J. Dent. Res.*, 10(4), 197–202.
- Li, J., Cheng, G., Huang, S., and Lian, P., 2021, Cement and Concrete Research Effect of ZnO on the Whiteness of White Portland Cement Clinker, *Cem. Concr. Res.*, 143, 106372.
- Li, W., Bilal, M., Kumar, A., Sher, F., Ashraf, S.S., Franco, M., Heloisa, J., Américo, P., and Hafiz, P., 2023, Broadening the Scope of Biocatalysis Engineering by Tailoring Enzyme Microenvironment : A Review, *Catalysis Letters*, 153, 1227–1239.

- Li, X. and Scrivener, K.L., 2022, Cement and Concrete Research Impact of ZnO on C<sub>3</sub>S Hydration and C-S-H Morphology at Early Ages, *Cem. Concr. Res.*, 154, 106734.
- Liu, J., Jin, H., Gu, C., and Yang, Y., 2019, Effects of Zinc Oxide Nanoparticles on Early-Age Hydration and The Mechanical Properties of Cement Paste, *Constr. Build. Mater.*, 217, 352–362.
- Lynch, R.J.M., 2011, Zinc in the Mouth , Its Interactions with Dental Enamel and Possible Effects on Caries: A Review of the Literature, *Int. Dent. J.*, 61, 46–54.
- Maharani, D. K., dan Lailiyah, N., 2022, Pengaruh Penambahan SiO<sub>2</sub> dan TiO<sub>2</sub> terhadap Sifat Hidrofobik Komposit Kitosan-ZnO Pada Kain, *Unesa J. Chem.*, 11(1), 77-87.
- Marciano, M. A., Camilleri, J., Costa, R. M., Matsumoto, M. A., Guimaraes, B. M., and Duarte, M. A. H., 2017, Zinc Oxide Inhibits Dental Discoloration Caused by White Mineral Trioxide Aggregate Angelus, *J. Endod.*, 43(6), 1001-1007.
- Mardy, D. C., Sudjari, S., and Rahayu, S. I., 2015, Perbandingan Efektivitas Kitosan (2-Acetamido-2-Deoxy-D-Glucopyranose) dan Nanokitosan Terhadap Pertumbuhan Bakteri *Enterococcus faecalis* Secara in Vitro, *Majalah Kesehatan*, 2(4), 229-240.
- Mariyam, M., Sunarintyas, S., and Nuryono, N., 2023, Improving Mechanical, Biological, and Adhesive Properties of Synthesized Mineral Trioxide Aggregate by Adding Chitosan, *Inorg. Chem. Commun.*, 149, 110446.
- Mariyam, M., Sunarintyas, S., Yuliatun, L., Irnawati, D., and Dwi, A., 2024, Case Studies in Chemical and Environmental Engineering Physicochemical and Antibacterial Properties of ZnO/Chitosan-Modified Mineral Trioxide Aggregate Composites, *Case Stud. Chem. Environ. Eng.*, 9, 100749.
- Mirzaeei, S., Moghadam, F., Asare-addo, K., and Nokhodchi, A., 2022, Journal of Drug Delivery Science and Technology Design of a Nanofibrous Guided Tissue Regeneration Carrier as A Potential Drug Delivery System For Tetracycline Hydrochloride in the Management of Periodontitis, *J. Drug Deliv. Sci. Technol.*, 75, 103722.
- Mohamed, M., Sabah, A., Ibrahim, M., Hassan, A., and Mohamad, N., 2018, Review Article: A Systematic Review on Antibacterial Activity of Zinc Against *Streptococcus mutans*, *Saudi Dent. J.*, 30, 283–291.
- Mohammadi, Z. and Dummer, P.M.H., 2011, Properties and Applications of Calcium Hydroxide in Endodontics and Dental Traumatology, *Int. Endod. J.*, 44(8), 697–730.



- Mohammadi, Z., Giardino, L., Palazzi, F., and Shalavi, S., 2012(a), Antibacterial Activity of A New Mineral Trioxide Aggregate-Based Root Canal Sealer, *Int. Dent. J.*, 62, 70–73.
- Mohammadi, Z., and Shalavi, S., 2011, Effect of Hydroxyapatite and Bovine Serum Albumin on The Antibacterial Activity of MTA, *Iranian Endod. J.*, 6(4), 136.
- Mohammadi, Z., Shalavi, S., and Yazdizadeh, M., 2012(b), Antimicrobial Activity of Calcium Hydroxide In Endodontics: A Review, *Chonnam Med J.*, 48(3), 133-140.
- Mohanasrinivasan, V., Mishra, M., Paliwal, J. S., Singh, S. K., Selvarajan, E., Suganthi, V., and Subathra Devi, C., 2014, Studies on Heavy Metal Removal Efficiency and Antibacterial Activity of Chitosan Prepared from Shrimp Shell Waste, *3 Biotech*, 4, 167-175.
- Morales-Melgares, A., Casar, Z., Moutzouri, P., Venkatesh, A., Cordova, M., Kunhi Mohamed, A., Scrivener, K.L., Bowen, P., and Emsley, L., 2022, Atomic-Level Structure of Zinc-Modified Cementitious Calcium Silicate Hydrate, *J. Am. Chem. Soc.*, 144, 22915–22924.
- Mubarak, Z., Chismirina, S., and Daulay, H. H., 2016, Aktivitas Antibakteri Ekstrak Propolis Alami dari Sarang Lebah Terhadap Pertumbuhan *Enterococcus faecalis*, *JDS.*, 1(2), 175-186.
- Muslim, I., Safrihatini, W., and Aini, W., 2017, Pengaruh Katalis pada Proses Pembentukan Partikel Nano Silika Sebagai Material Hidrofobik, *JKPK.*, 2(3), 152-157.
- Nadia, L. M. H., Effendy, W. N. A., Rieuwpassa, F. J., Imra, I., Nurhikma, N., and Cahyono, E., 2021, Aktivitas Antibakteri Kitosan dari Tulang Rawan Cumi-Cumi (*Loligo Sp.*) Terhadap Bakteri *Staphylococcus aureus* dan *Escherichia coli*, *Jurnal Fishtech*, 10(2), 95-101.
- Nagal, A. and Singla, R.K., 2022, Nanoparticles in Different Delivery Systems: A Brief Review, *Organ*, 1, 4.
- Nazari, A. and Riahi, S., 2011, The Effects of ZnO<sub>2</sub> Nanoparticles on Strength Assessments and Water Permeability of Concrete in Different Curing Media, *Mater. Res.*, 14, 178–188.
- Novitasari, R., and Siswanto, A. S., 2015, Uji Antibakteri Nano Semen Gigi Zinc Oxide Eugenol. *Airlangga Med J.*
- Nurakhmawati, I., 2017, Sintesis dan Karakterisasi Scaffold Kitosan-Tetrasiklin Yang Diiradiasi Gamma Sebagai Pengganti Jaringan Tulang Gigi, *Tesis*, Fakultas Sains dan Teknologi Universitas Islam Negeri Syarif Hidayatullah, Jakarta.

- Noviyandri, P. R., and Nasution, A. I., 2017, Pengaruh Ekstrak Buah Timun Suri (*Cucumis sativus L.*) sebagai Antibakteri Alami dalam Menghambat Pertumbuhan *Enterococcus faecalis*, *J. Can. Dent.*, 2(3), 111-116.
- Ozlek, E., Rath, P.P., Kishen, A., and Neelakantan, P., 2020, A Chitosan-Based Irrigant Improves the Dislocation Resistance of A Mineral Trioxide Aggregate-Resin Hybrid Root Canal Sealer, *Clin. Oral Investig.*, 24, 151–156.
- Padmavathy, N. and Vijayaraghavan, R., 2008, Enhanced Bioactivity of ZnO Nanoparticles — an Antimicrobial Study, *STAM.*, 6996.
- Pasquet, J., Chevalier, Y., Pelletier, J., Couval, E., Bouvier, D., and Bolzinger, M., 2014, Colloids and Surfaces A : Physicochemical and Engineering Aspects The Contribution of Zinc Ions to the Antimicrobial Activity of Zinc Oxide, *Colloids Surfaces A Physicochem. Eng. Asp.*, 457, 263–274.
- Pawestri, W., Satria, G.D., Hakimah, N., and Yudhabuntara, D., 2019, Deteksi Kejadian Residu Tetrasiklin pada Daging Ikan Nila di Kota Yogyakarta dengan Kromatografi Cair Kinerja Tinggi ( KCKT ), *JSV.*, 37(2), 185–192.
- Pereira, J.F.B., Vicente, F., Santos-ebinuma, V.C., Araújo, J.M., Pessoa, A., Freire, M.G., and Coutinho, J.A.P., 2013, Extraction of Tetracycline from Fermentation Broth Using Aqueous Two-Phase Systems Composed ff Polyethylene Glycol and Cholinium-Based Salts, *Process Biochem.*, 48, 716–722.
- Permanadewi, I., Kumoro, A. C., Wardhani, D. H., and Aryanti, N., 2019, Modelling of Controlled Drug Release in Gastrointestinal Tract Simulation, *J. Phys. Conf. Ser.*, 1295(1).
- Persadmehr, A., Torneck, C.D., Fred, C., Cvitkovitch, D.G., Pinto, V., Talior, I., Kazembe, M., and Kishen, A., 2014, Bioactive Chitosan Nanoparticles and Photodynamic Therapy Inhibit Collagen Degradation In Vitro, *J. Endod.*, 40, 703–709.
- Prasetya, Y. A., Nisyak, K., and Hisbiyah, A., 2021, Aktivitas Antibakteri dan Antibiofilm Nanokomposit Seng Oksida-Perak (Zno-Ag) dengan Minyak Cengkeh Terhadap *Pseudomonas aeruginosa*, *JBBI.*, 8(12).
- Prastyo, T., RW, E. W., Nofrizal, N., Ikono, R., Sukarto, A., Siswanto, S., and Rochman, N. T., 2018, Pengaruh Nanopartikel ZnO Terhadap Strukturmikro Semen Gigi Seng Fosfat, *JUSAMI.*, 13(4), 27-30.
- Pratiwi, R. H., 2017, Mekanisme Pertahanan Bakteri Patogen Terhadap Antibiotik, *Jurnal pro-life*, 4(3), 418-429.
- Pushpa, S., Maheshwari, C., Maheshwari, G., Sridevi, N., Duggal, P., and Ahuja, P., 2018, Effect of pH on Solubility of White Mineral Trioxide Aggregate and Biodentine: An in vitro study, *Tabriz Univ. Med. Sci.*, 12, 201–207.



- Pushpalatha, C., Dhareshwar, V., Sowmya, S. V, and Augustine, D., 2022, Modified Mineral Trioxide Aggregate—A Versatile Dental Material: An Insight on Applications and Newer Advancements, *Front. Bioeng. Biotechnol.*, 10, 1–15.
- Puspasari, S. and Amir, H., 2020, Uji Sitotoksik dan Aktivitas Antibakteri Ekstrak Daun Pandan Laut (*Pandanus Odorifer*) Terhadap Bakteri *Staphylococcus aureus*, *Alotrop*, 4, 42–50.
- Putri, M. A., Herawati, D., and Kurniaty, N., 2015, Pengembangan Metode Analisis Antibiotik Tetrasiklin Dalam Hati Ayam Menggunakan Kromatografi Cair Kinerja Tinggi (KCKT). *Prosiding Farmasi*, 79-85.
- Raganata, T.C. and Aritonang, H., 2019, Sintesis Fotokatalis Nanopartikel ZnO Untuk Mendegradasi Zat Warna Methylene Blue, *Chemistry Progress*, 12, 54–58.
- Rajasekharan, S., Vercruysse, C., Martens, L., and Verbeeck, R., 2018, Effect of Exposed Surface Area, Volume and Environmental pH on the Calcium Ion Release of Three Commercially Available Tricalcium Silicate Based Dental Cements, *Materials*, 11(1), 123.
- Ren, X., Zhang, W., and Ye, J., 2017, Cement and Concrete Research FTIR study on the Polymorphic Structure of Tricalcium Silicate, *Cem. Concr. Res.*, 99, 129–136.
- Ribeiro, M.P., Morgado, P.I., Miguel, S.P., Coutinho, P., and Correia, I.J., 2013, Dextran-Based Hydrogel Containing Chitosan Microparticles Loaded with Growth Factors to be Used in Wound Healing, *Mater. Sci. Eng. C.*, 33, 2958–2966.
- Rida, M.A. and Harb, F., 2014, Synthesis and Characterization of Amorphous Silica Nanoparticles from Aqueous Silicates Using Cationic Surfactants, *JMMM.*, 24, 37–42.
- Sabir, S., Anjum, A. A., Ijaz, T., Ali, M. A., and Nawaz, M., 2014(a), Isolation and Antibiotic Susceptibility of *E. Coli* From Urinary Tract Infections In A Tertiary Care Hospital, *Pak. J. Med. Sci.*, 30(2), 389.
- Sabir, S., Arshad, M., and Chaudhari, S.K., 2014(b), Zinc Oxide Nanoparticles for Revolutionizing Agriculture: Synthesis and Applications, *Sci. World. J.*, 2014(1).
- Saelim, K., Kaewsuwan, S., Tani, A., and Maneerat, S., 2015, Physical, Biochemical and Genetic Characterization of Enterocin CE5-1 Produced by *Enterococcus faecium* CE5-1 Isolated from Thai Indigenous Chicken Intestinal Tract, *SJST.*, 37, 299–307.
- Samiei, M., Aghazadeh, M., Lotfi, M., Shakoei, S., Aghazadeh, Z., Mahdi, S., and Pakdel, V., 2013, Antimicrobial Efficacy of Mineral Trioxide Aggregate with and without Silver Nanoparticles, *Iranian Endod. J.*, 8(4), 166–170.

- Saraya, M.E.I., Hassan, H., and Rokbaa, A.E., 2017, Formation and Stabilization of Vaterite Calcium Carbonate by Using Natural Polysaccharide, *ANP.*, 6(2), 158–182.
- Sari, A. N., and Untara, T. E., 2014, Root Canal Retreatment Menggunakan Kombinasi Kalsium Hidroksida dan Chlorhexidine sebagai Medikamen Intra Kanal Insisivus Sentral Kiri Maksila, *Majalah Kedokteran Gigi Indonesia*, 21(2), 165-170.
- Sarkar, N.K., Caicedo, R., Ritwik, P., Moiseyeva, R., and Kawashima, I., 2005, Physicochemical Basis of the Biologic Properties of Mineral Trioxide Aggregate, *J. Endod.*, 31(2), 97–100.
- Sembiring, P., Sianipar, M., Sitio, S. S. P., Damanik, Y. S., and Sembiring, E., 2023, Edukasi Penggunaan Antibiotik Pada Siswa/Siswi SMA Negeri 1 STM Hilir, Jln. Pendidikan Dusun I Talun Kenas, Kec. Sinembah Tanjung Muda Hilir, Kab. Deli Serdang, Sumatera Utara, *JPMPH.*, 3(3), 29-31.
- Sharmin, S., Rahaman, M., Sarkar, C., Atolani, O., Torequl, M., and Stephen, O., 2021, Heliyon Nanoparticles as Antimicrobial and Antiviral Agents: A Literature-Based Perspective Study, *HLY.*, 7.
- Shashank, S., Jaiswal, S., Nikhil, V., Gupta, S., Mishra, P., and Raj, S., 2019, Comparative pH and Calcium Ion Release in Newer Calcium Silicate-Based Root Canal Sealers, *Endodontology*, 31(1), 29-33.
- Siepmann, J. and Siepmann, F., 2013, Mathematical Modeling of Drug Dissolution, *Int. J. Pharm.*, 453, 12–24.
- Singh, M., Shivalingam, C., Blessy, S., Sekaran, S., and Sasanka, K., 2023, Zinc and Silver-Infused Calcium Silicate Cement: Unveiling Physicochemical Properties and In Vitro Biocompatibility, *Cureus*, 15(11).
- Sivashankari, S. and Shanmughavel, P., 2006, Functional Annotation of Hypothetical Proteins—A Review, *Bioinformation*, 1(8), 335.
- Sobierajska, P., Nowak, N., Rewak-soroczynska, J., Targonska, S., and Lewi, A., 2022, Biomaterials Advances Investigation of Topography Effect on Antibacterial Properties and Biocompatibility of Nanohydroxyapatites Activated with Zinc and Copper Ions: In Vitro Study Of Colloids, Hydrogel Scaffolds and Pellets, *Biomaterial Advances*, 134.
- Stuart, C.H., Schwartz, S.A., Beeson, T.J., and Owatz, C.B., 2006, *Enterococcus faecalis*: Its Role in Root Canal Treatment Failure and Current Concepts in Retreatment, *J. Endod.*, 32, 93–98.
- Subhi, H., Husein, A., Mohamad, D., and Nurul, A., 2020, Physicochemical, Mechanical and Cytotoxicity Evaluation of Chitosan-Based Accelerated Portland Cement, *Integr. Med. Res.*, 9, 11574–11586.

- Suherman, S., Latif, M., and Dewi, S. T. R., 2018, Potensi Kitosan Kulit Udang *Vannemei* (*Litopenaeus Vannamei*) Sebagai Antibakteri Terhadap *Staphylococcus epidermidis*, *Pseudomonas aeruginosa*, *Propionibacterium agnes*, dan *Escherichia coli* dengan Metode Difusi Cakram Kertas, *Media Farmasi*, 14(1), 132-143.
- Suparno, N. R., Putri, C. S., and Camalin, C. M. S., 2021, Pasta Gigi Ekstrak Etanol Daun Sirih, Biji Pinang, Gambir Terhadap Hambatan Bakteri *Pseudomonas aeruginosa*, *JIKG.*, 3(2).
- Suprianto, S., 2017, Analisis Kinetika Pelepasan Teofilin dari Granul Matriks Kitosan, *JIM.*, 2(1), 70-80.
- Tanomaru, J. M. G., Storto, I., Da Silva, G. F., Bosso, R., Costa, B. C., Bernardi, M. I. B., and Tanomaru-Filho, M., 2014, Radiopacity, pH and Antimicrobial Activity of Portland Cement Associated with Micro-And Nanoparticles of Zirconium Oxide and Niobium Oxide, *Dent. Mater. J.*, 33(4), 466-470.
- Thermodynamics, J.C., Zhao, Y., and Wang, Y., 2013, Measurement and Correlation of Solubility of Tetracycline Hydrochloride in Six Organic Solvents, *J. Chem. Thermodyn.*, 57, 9–13.
- Thosar, N. R., Chandak, M., Bhat, M., and Basak, S., 2018, Evaluation of Antimicrobial Activity of Two Endodontic Sealers: Zinc Oxide With Thyme Oil and Zinc Oxide Eugenol Against Root Canal Microorganisms—An In Vitro Study, *Int. J. Clin. Pediatr. Dent.*, 11(2), 79.
- Tommaseo, C.E. and Kersten, M., 2002, Aqueous Solubility Diagrams for Cementitious Waste Stabilization Systems. 3. Mechanism of Zinc Immobilization by Calcium Silicate Hydrate, *Environ. Sci. Technol.*, 36(13), 2919–2925.
- Torabinejad, M., Hong, C.U., McDonald, F., and Ford, T.R.P., 1995, Physical and Chemical Properties of a New Root-End Filling Material, *J. Endod.*, 21(7), 349–353.
- Trisunaryanti, W., and Emmanuel, I., 2009, Preparation, Characterization, Activity, Deactivation, and Regeneration Tests of CoO-MoO/ZnO and CoO-MoO/ZnO-Activated Zeolite Catalysts for the Hydrogen Production From Fusel Oil, *Indones. Chem. J.*, 9(3), 361-367.
- Tsisis, I., Elbahary, S., Venezia, N.B., and Rosen, E., 2018, Bacterial Colonization in the Apical Part of Extracted Human Teeth Following Root-End Resection And Filling: A Confocal Laser Scanning Microscopy Study, *Clin. Oral Investig.*, 22, 267–274.
- Unal, G.C., Maden, M., and Isidan, T., 2019, Repair of Furcal Iatrogenic Perforation with Mineral Trioxide Aggregate: Two Years Follow-up of Two Cases, *Eur. J. Dent.*, 4, 475–481.

- Voicu, G., G., Bădănoiu, A. I., Ghițulică, C. D., and Andronescu, E., 2012, Sol-Gel Synthesis of White Mineral Trioxide Aggregate With Potential Use As Biocement, *Digest J. Nanomater. Biostruct.*, 7(4), 1639-1646
- Vu, B.K., Snisarenko, O., Lee, H.S., and Shin, E.W., 2010, Adsorption of Tetracycline on La-Impregnated MCM-41 Materials, *Environ. Technol.*, 31(3) 233-241.
- Waani, J.E., Elisabeth, L., Teknik, F., and Sam, U., 2017, Substitusi Material Pozolan Terhadap Semen pada Kinerja Campuran Semen, *JTS.*, 24, 237–246.
- Wang, N.A.N., Ji, Y., Zhu, Y., Wu, X., Mei, L.I., Zhang, H., Deng, J., and Wang, S., 2020(a), Antibacterial Effect of Chitosan and Its Derivative on *Enterococcus faecalis* Associated with Endodontic Infection, *Exp. Ther. Med.*, 3805–3813.
- Wang, P., Qiao, G., Zhang, Y., Hou, D., Zhang, J., Wang, M., Wang, X., and Hu, X., 2020(b), Molecular Dynamics Simulation Study on Interfacial Shear Strength Between Calcium-Silicate-Hydrate and Polymer Fibers, *Constr. Build. Mater.*, 257, 119557.
- Wang, W., Wang, C., Shyu, Y., Liu, C., Lin, F., and Lin, C., 2010, Compositional Characteristics and Hydration Behavior of Mineral Trioxide Aggregates, *J. Dent. Sci.*, 5, 53–59.
- Wang, X., 2017, Effects of Nanoparticles on The Properties of Cement-Based Materials, *Thesis*, Civil Engineering Iowa State University, Iowa.
- Widyasanti, A. and Hajar, S., 2015, Aktivitas Antibakteri Ekstrak Teh Putih Terhadap Bakteri Gram Positif dan Negatif, *Jurnal Penelitian Teh dan Kina*, 18(1), 55–60.
- Wu, Y., and Fassihi, R., 2005, Stability of Metronidazole, Tetracycline HCl and Famotidine Alone and In Combination, *Int. J. Pharm.*, 290(1-2), 1-13.
- Yamin, I. F., and Natsir, N., 2014, Bakteri Dominan di Dalam Saluran Akar Gigi Nekrosis, *Dentofasial*, 13(2), 113-116.
- Yao, T., Zhang, H., Feng, C., and He, Y., 2023, Continuous Enrichment and Trace Analysis of Tetracyclines in Bovine Milk Using Dual-Functionalized Aqueous Biphasic System Combined With High-Performance Liquid Chromatography, *J. Dairy Sci.*, 106, 5916–5929.
- Yoo, K. H., Kim, Y. I., and Yoon, S.Y., 2021, Physicochemical and Biological Properties of Mg-Doped Calcium Silicate Endodontic Cement, *Materials*, 1–17.
- Yuliatun, L., 2024, Invitro Activity of Mineral Trioxide Aggregate Modification from Rice Hull Ash Silica and Calcium Oxide from Clamshells, *BST.*, 12(2), 70-74.s

- Yuliatun, L., Kunarti, E.S., Widjijono, W., and Nuryono, N., 2022, 1651 Enhancing Compressive Strength and Dentin Interaction of Mineral Trioxide Aggregate by Adding SrO and Hydroxyapatite, *Indones. J. Chem.*, 22, 1651–1662.
- Yulistina, Y., Yasin, S. A., Arsad, A., Dirman, R., and Rahmah, R., 2023, Hubungan Tingkat Pengetahuan Pasien dengan Minat Perawatan Saluran Akar Gigi di Poli Gigi RS Daerah Beriman Balikpapan 2023, *J. Pharm. Res.*, 4(2), 297-302.
- Yuvaraja, G., Pathak, J.L., Weijiang, Z., Yaping, Z., and Jiao, X., 2017, International Journal of Biological Macromolecules Antibacterial and Wound Healing Properties of Chitosan/Poly (Vinyl Alcohol)/Zinc Oxide Beads (CS/PVA/ZnO ), *Int. J. Biol. Macromol.*, 103, 234–241.
- Zadsirjan, S., Dehkordi, N.P., Heidari, S., Naja, F., Zargar, N., Feli, M., and Salimnezhad, S., 2024, Synthesis of a Calcium Silicate Cement Containing a Calcinated Strontium Silicate Phase, *Int. J. Dent.*, 2024.
- Zakaria, N., Hamzah, H., Salih, I.L., Balakrishnan, V., and Razak, K., 2023, A Review of Detection Methods for Vancomycin-Resistant Enterococci (VRE) Genes: From Conventional Approaches to Potentially Electrochemical DNA Biosensors, *Biosensors*, 13, 294.
- Zaugg, L.K., Lenherr, P., Zaugg, J.B., Weiger, R., and Krastl, G., 2016, Influence of The Bleaching Interval on The Luminosity of Long-Term Discolored Enamel-Dentin Discs, *Clin. Oral Investig.*, 451–458.
- Zusandy, A.K., Sommeng, K.F., Musa, I.M., and Amir, S.P., 2021, Bakteri Penyebab Infeksi Nosokomial di Ruang Rawat Inap, *Fakumi Medical Journal: Jurnal Mahasiswa Kedokteran*, 1, 97–103.