DAFTAR PUSTAKA

Agrawal, K., Singh, G., Puri, D., dan Prakash, S., 2011, Synthesis and Characterization of Hydroxyapatite Powder by Sol-Gel Method for Biomedical Application, *J. Minerals. Mater. Charac. Eng.*, *10*(08), 727–734.

Ahmad, I., 2017, Pemanfaatan Limbah Cangkang Kerang Darah (Anadara granosa) sebagai Bahan Abrasif dalam Pasta Gigi, *J. Galung Tropika*, 6(1), 49-59.

Akbari, M., Zebarjad, S., Nategh, B., dan Roubani, A., 2013, Effect of Nanosilica on Setting Time and Physical Properties of Mineral Trioxide Aggregate, *J. Endod. (JOE)*, 39, 1448-1451.

Alimohammadi, E., Sheibani, S., dan Ataie, A., 2018, Preparation of nano-structured strontium carbonate from Dasht-e kavir celestite ore via mechanochemical method, *J. Ultrafine Grained Nanostruct*. Mater., *51*(2), 147–152.

Alqedairi, A., Muñoz-Viveros, C. A., Pantera, E. A., Campillo-Funollet, M., Alfawaz, H., Abou Neel, E. A., dan Abuhaimed, T. S.,2017, Superfast Set, Strong dan Less Degradable Mineral Trioxide Aggregate Cement. *Int. J. Dentist*.

Amir, H. dan Bambang, G., 2017, Uji Microtetrazolium (MTT) Ekstrak Metanol Daun *Phaleria macrocarpa (Scheff.)* boerl terhadap Sel Kanker Payudara MCF, *Alotrop*, 1, 27-32.

Apsana, G., Pp, G., Devanna, N., dan Yuvasravana, R., 2018, Biomimetic Synthesis and Antibacterial Properties of Strontium Oxide Nanoparticles Using Ocimum Sanctum Leaf Extract, *Asian J. Pharm. Clin. Res.*,11(3), 384-389.

Arandi, N., and Thabet, M., 2021, Review Article Minimal Intervention in Dentistry : A Literature Review on Biodentine as a Bioactive Pulp Capping Material. *BioMed Res. Int*., 3, 1-13.

Asgari-Fard, Z., Sabet, M., dan Salavati-Niasari, M., 2016, Synthesis and characterization of strontium carbonate nanostructures via simple hydrothermal method. *High Temp. Mater. Process.*, *35*(2), 215–220.

Asgary, S., Parirokh, M., Eghbal, M. J., dan Brink, F., 2005, Chemical differences between white and gray mineral trioxide aggregate. *J. Endod.*, *31*(2), 101–103.

Bakhit, A., Kawashima, N., Hashimoto, K., Noda, S., Nara, K., Kuramoto, M., Tazawa, K., dan Okiji, T., 2018, Strontium ranelate promotes odonto-/osteogenic differentiation/mineralization of dental papillae cells in vitro and mineralized tissue formation of the dental pulp in vivo. *Sci. Rep.*, *8*(1), 1–10.

Bakri, R, Utari, T, dan Sari, I.P., 2008, Kaolin sebagai Sumber SiO_2 untuk Pembuatan Katalis Ni/SiO_2: Karakterisasi, Uji Katalis pada Dehidrogenasi Benzena menjadi Sikloheksana, *J Sains*, 12(1), 37-43.

Bancovic, I., Miladinovic, M., Stamencovic, O., and Veljkovic, V., 2017, Application pf nano CaO-based catalysts in Biodiesel Synthesis, *Renewable and Sustainable Energy Rev.*, 72 (746-760).

Barros, C. M. B., de Oliveira, S. V., Marques, J. B., Viana, K. M. de S., dan Costa, A. C. F. de M., 2012, Analysis of the hydroxyapatite incorporate MTA dental application. *Mater. Sci. Forum.*, *727–728*, 1381–1386.

Basha, S., Chandra, K.S., dan Sarkar, D., 2020, Salient features of SrO doping in Al_2O_3 5wt% ZrO_2 reaction sintered composite ceramics, *J. Alloys Compd.*, 829.

Basso, A. M., Nicola, B. P., Bernardo-Gusmão, K., dan Pergher, S., 2020, Tunable effect of the calcination of the silanol groups of KIT-6 and SBA-15 mesoporous materials. *Appl. Sci.*,*10*(3), 1–16.

Basu, S. dan Basu, B., 2019, Doped biphasic calcium phosphate : synthesis and structure, *J. Asian Ceram. Soc.*, 00, 1–19.

Berzins, D., 2014, *Chemical Properties of WMTA*, John Wiley and Sons, Inc.: USA.

Behzadian, R., dan Shahrajabian, H., 2019, Experimental Study of the Effect of Nano-silica on the Mechanical Properties of Concrete/PET Composites. *KSCE J. Civil Eng.*, *23*(8), 3660–3668. https://doi.org/10.1007/s12205-019-2440-9.

Bikharudin, A., Sutarno, Kamiya, Y., Nuryono., 2021, Effect of Thermal Treatment on Physico-Chemical Properties of White Mineral Trioxide Aggregate Synthesized from Limestone Precipitate Calcium Carbonate, *KEM*. 884, 290–297.

Bortoluzzi, E. A., Broon, N. J., Bramante, C. M., Garcia, R. B., de Moraes, I. G., dan Bernardineli, N., 2006, Sealing Ability of MTA and Radiopaque Portland Cement With or Without Calcium Chloride for Root-End Filling. *J. Endod.*, *32*(9), 897–900. https://doi.org/10.1016/j.joen.2006.04.006

Camilleri, J., 2008, The chemical composition of mineral trioxide aggregate. *J. Conserv. Dent.*, *11*(4), 141. https://doi.org/10.4103/0972-0707.48834

Carlson, E. T., dan Wells, L. S., 1953, Hydrothermal preparation of some strontium silicates. *J. Res. National Bureau of Standards*, *51*(2), 73.

Cervino, G., Laino, L., Amico, C.D., Russo, D., Nucci, L., Amoroso, G., Gorassini, F., Tepedino, M., Terranova, A., Gambino, D., Mastroieni, R., Didem, M., dan Luca, T., 2020, Mineral Trioxide Aggregate Applications in Endodontics : A Review,. *Eur. J. Dent.*, 1-9.

Chen, S., Shi, L., Luo, J., dan Engqvist, H., 2018, A Novel Fast-setting Mineral

Trioxide Aggregate: Its Formulation, Chemical-physical Properties and Cytocompability, *ACS Appl. Mater. Interfaces*, 1-25.

Chiang, T., Wei, C.-K., dan Ding, S.-J., 2014, Effects of Bismuth Oxide on Physicochemical Properties and Osteogenic Activity of Dicalcium Silicate Cements. *J. Med. Biological Eng.*, *34*(1), 30–35.

Chiu, Y., Shie, M., Lin, Y., Lee, A.K., dan Chen, Y., 2019, E ff ect of Strontium Substitution on the Physicochemical Properties and Bone Regeneration Potential of 3D Printed Calcium Silicate Scaffolds,. *Int. J. Mol. Sci.*, 20, 1-20.

Collier, N., 2016,Transition and decomposition temperatures of cement phases - a collection of thermal analysis data, Ceramics-Silikaty. 338–343. https://doi.org/10.13168/cs.2016.0050.

Chopra, K., Bhatt, P., Kumar, S., Tilokani, A.D., Student, P., Student, P., Student, P., Student, P., Lecturer, S., dan Surgery, M., 2021, Mineral trioxide aggregate (MTA) - A review, *Int. J. Dent. Sci*., 3, 4–7.

Coomaraswamy KS, Lumley PJ, dan Hofmann MP, 2007, Effect of bismuth oxide radioopacifier content on the material properties of an endodontic Portland cement-based (MTA- like) system. *J. Endod.*, 33, 295–8.

Cox, S. C., 2015., 2014, Synthesis Method of Hydroxyapatite Author : Sophie Cox. *Ceram.*, 1–7.

Damamaschke dan Gerth, 2005, Chemical and physical material characterization of white proroot MTA, and two portland cements, *Dent. Mater*. 21(8), 731-738.

Dewi, F., Asrianti, D., dan Margono, A., 2017, Microleakage Evaluation of Modified Mineral Trioxide Aggregate Effect Toward Marginal Adaptation on Cervical Dentin Perforation, *Int. J. Appl. Pharm.*, 9(2), 10-13.

Dsouza, T. S., Hegde, M. N., Radhakrishna, V., Dsouza, N., dan Kumari, S., 2019, In Vitro Cytotoxic Evaluation of Mineral Trioxide Aggregate with Silver and Titanium Dioxide Nanoparticles. *World J. Dent.*, *10*(6), 432–434.

Duerte, M., Marciano, M., Vivan, R., Filho, M., Tanomaru, J., Camilleri, J., 2018, Tricalcium Silicate-based Cements: Properties and Modifications, *Braz. Oral Res*, 32, 111-118.

Ehret, C., Sagardoy, T., Siadous, R., Bareille, R., Rey, S., dan Pechev, S., 2017, Strontium-doped hydroxyapatite polysaccharide materials effect on ectopic bone formation. *PLoS ONE*, *12*(9), 1–21.

Emtiazi, G., Shapoorabadi, F. A., dan Mirbagheri, M., 2019, Chemical and Biological Synthesis of Hydroxy Apatite: Advantage and Application. *Int. J.Microbiology Current Res.*, *1*(1), 20–22.

Endorgan, N., dan Eken, H., 2017, Precipitated Calcium Carbonate Production,

Synthesis and properties, *Physicochem. Probl. Miner. Process*, 53(1), 57-68.

Farmosa, L., Mallia, B., dan Camilleri, J, 2013, Mineral Trioxide Aggregate with Anti-washout Gel-Properties and Microstructure, *Dent. Mater*, 29, 294-306.

Fa'izzah, M., Widjijono, W., Kamiya, Y., dan Nuryono, N., 2020, Synthesis and characterization of white mineral trioxide aggregate using precipitated calcium carbonate extracted from limestone. *Key Eng. Mater.*, 330–335.

Fernandes, I. J., Calheiro, D., Sánchez, F. A. L., Camacho, A. L. D., De Campos Rocha, T. L. A., Moraes, C. A. M., dan De Sousa, V. C., 2017, Characterization of silica produced from rice husk ash: Comparison of purification and processing methods. *Mater. Res.*, *20*, 519–525.

Fredholm, Y. C., Karpukhina, N., Brauer, D. S., Jones, J. R., Law, R. V., dan Hill, R. G., 2012, Influence of strontium for calcium substitution in bioactive glasses on degradation, ion release and apatite formation, *J. R. Soc. Interface*, *9*(70), 880–889. https://doi.org/10.1098/rsif.2011.0387

Galindo, T. G. P., Chai, Y., dan Tagaya, M., 2019, Hydroxyapatite nanoparticle coating on polymer for constructing effective biointeractive interfaces. *J. J. Nanomater.*, https://doi.org/10.1155/2019/6495239

Gandolfi, M. G., Iezzi, G., Piattelli, A., Prati, C., dan Scarano, A., 2017, Osteoinductive potential and bone-bonding ability of ProRoot MTA, MTA Plus and Biodentine in rabbit intramedullary model: Microchemical characterization and histological analysis. *Dent. Mater.*, *33*(5), 221–238.

Garbo, C., Locs, J., D'este, M., Demazeau, G., Mocanu, A., Roman, C., Horovitz, O., dan Tomoaia-Cotisel, M., 2020, Advanced Mg, Zn, Sr, Si multi-substituted hydroxyapatites for bone regeneration. *Int. J. Nanomed.*, *15*, 1037–1058.

Geng, Z., Cheng, Y., Ma, L., Li, Z., Cui, Z., Zhu, S., Liang, Y., Liu, Y., Bao, H., Li, X., dan Yang, X., 2018, Nanosized strontium substituted hydroxyapatite prepared from egg shell for enhanced biological properties. *J. Biomater. Appl.*, *32*(7), 896–905.

Ghadafi, M., Santosa, S. J., Kamiya, Y., dan Nuryono, N., 2020, Free Na and less fe compositions of SiO2 extracted from rice husk ash as the silica source for synthesis of white mineral trioxide aggregate. *Key Eng. Mater.*, 311–317.

Ghasemi, N., Rahimi, S., Shahi, S., Milani, A., Rezaei, Y., dan Nobakht, M., 2016, Compressive Strengh of Mineral Trioxide Aggregate with Propylene Glycol, *IEJ*, 11(4), 325-328.

Ghazvini, S.A., Tabrizi, M.A., Kobarfard, F., Baghban, A.A., dan Asgary, S., 2009, Ion Release and pH of a New Endodontic Cement, MTA and Portland Cement, *Iran. Endod. J.*, 4, 74–8.

Ginanjar, R. R., Mulyadi, A. H., Biologi, F., dan Soedirman, U. J., 2014, Ekstraksi Silika Dari Abu Sekam Padi Menggunakan Pelarut NaOH, *Prosiding Seminar Nasional Hasil-hasil Penelitian dan Pengabdian UMP 2014*, *3*, 306–312.

Grazziotin-Soares, R., Nekoofar, M. H., Davies, T. E., Bafail, A., Alhaddar, E., Habler, R., Busato, A. L. S., dan Dummer, P. M. H., 2014, Effect of bismuth oxide on white mineral trioxide aggregate: Chemical characterization and physical properties. *Int. Endod. J.l*, *47*(6), 520–533.

Guerreiro-Tanomaru, J. M., Vázquez-García, F. A., Bosso-Martelo, R., Bernardi, M. I. B., Faria, G., dan Tanomaru Filho, M., 2016, Effect of addition of nano-hydroxyapatite on physico-chemical and antibiofilm properties of calcium silicate cements. *J. Appl. Oral Sci.*, *24*(3), 204–210.

Ha, W. N., Nicholson, T., Kahler, B., dan Walsh, L. J., 2017, Mineral trioxide aggregate-A review of properties and testing methodologies. *Mater. J.*, *10*(11), 1–18. https://doi.org/10.3390/ma10111261

Habte, L., Shiferaw, N., Mulatu, D., Thenepalli, T., Chilakala, R., dan Ahn, J., 2019, Synthesis of Nano-Calcium Oxide from Waste Eggshell by Sol-Gel Method, *Sustainability*, 11 (3196), 1-10.

Hamid, H., Abo-Almaged, H., dan Radwan, M., 2017, Synthesis, Characterization, and Antimicrobial Activity of Nano-crystalline Tricalcium Silicate Bio-cement, *J Appl. Pharm. Sci.*, 7(10), 001-008.

Hanafy, A. K., Shinaishin, S. F., Eldeen, G. N., dan Aly, R. M., 2018, Nano hydroxyapatite and mineral trioxide aggregate efficiently promote odontogenic differentiation of dental pulp stem cells. *Macedonian J. Med. Sci.*, *6*(9), 1727–1731. https://doi.org/10.3889/oamjms.2018.368

Handayani, L dan Syahputra, F., 2017, Isolasi dan Karakterisasi Nanokalsium dari Cangkang Tiram, *JPHPI*, 20 (3), 515-523.

Harrison, C.J., Hatton, P. V, Gentile, P., dan Miller, C.A., 2021, Nanoscale Strontium-Substituted Hydroxyapatite Pastes and Gels for Bone Tissue Regeneration,. *Nanomater. J.*, 11, 1-19.

Haruheansapong, S., Pulngern, T., dan Chucheepsakul, S., 2017, Effect of Nanosilica Particle Size on The Water Permeability, Abrasion Resistance, Drying Shrinkage, and Repair Work Properties of Cement Mortar Containing Nano-SiO_2, *Adv. Mater. Sci. Eng.*, 1-11.

Hernandez-Delgadillo, R., Del Angel-Mosqueda, C., Solís-Soto, J. M., Munguia-Moreno, S., Pineda-Aguilar, N., Sánchez-Nájera, R. I., Chellam, S., dan Cabral-Romero, C., 2017, Antimicrobial and antibiofilm activities of MTA supplemented with bismuth lipophilic nanoparticles. *Dent. Mat. J.*, *36*(4), 503–510. https://doi.org/10.4012/dmj.2016-259

Hosseinzade, M., Soflou, R. K., Valian, A., dan Nojehdehian, H., 2016, Physicochemical properties of MTA, CEM, hydroxyapatite and nano hydroxyapatite-chitosan dental cements. *Biomed. Res. (India)*, *27*(2), 442–448.

Ibrahim, M., Labaki, M., Giraudon, J. M., dan Lamonier, J. F., 2020, Hydroxyapatite, a multifunctional material for air, water and soil pollution control: A review. *J. Hazard. Mater. 383*.

Iwaida, T., Nagasaki, S., dan Tanaka, S, 2001, Sorption Behavior of Strontium onto C-SH (Calcium-Silicate Hidrated Phase), *Surface Sci. Catal.*, 901-905.

Ji, D., Wu, H., Hsieh, S., Teng, N., Chen, C., Ke, E., Lin, Y., Lee, S., dan Yang, J. 2011, Effect of a Novel Hydration Accelerant on the Biological and Mechanical Properties of White Mineral Trioxide Aggregate, *JOE*, 37(6), 851-855.

Kahlenberg, V., Prosser, L., Salzmann, M., dan Hejny, C, 2022, On the Incorporation of Strontium into the Crystal Structure of Bredigite: Structural Effects and Phase Transition, *Mineral. Petrol.*, 116, 151-167.

Kakani, A. K., Veeramachaneni, C., Majeti, C., Tummala, M., dan Khiyani, L., 2015, A review on perforation repair materials. *J.Clinic. Diagn. Res.*, *9*(9), ZE09-ZE13.

Karabulut, B., Dönmez., N., Göret, C., Ataş, C., dan Kuzu, U., 2020, Health, Reactions of Subcutaneous Connective Tissue to Mineral Trioxide Aggregate, Biodentine®, and a Newly Developed BioACTIVE Base/Liner, *Scanning*, 1-10.

Karypidou, A., Trikas, E., Dimosiari, G., Koulaouzidou, E., dan Economides, N., 2018, Cytotoxicity and metal content of tricalcium silicate-based endodontic cements, *Int. J. Dent. Oral Health, 4*(2), 20–26.

Khoiruddin., M., Yelmida., dan Zultiniar, 2015, Sintesis dan Karakterisasi Hidroksiapatit (Hap) dari Kulit Kerang Darah (Anadara granosa) dengan Proses Hidrotermal, *JOM FTEKNIK*, 2(2), 1-8.

Kim, H.J., Jang, J.H., dan Kim, S.Y., 2021, Investigation of characteristics as endodontic sealer of novel experimental elastin - like polypeptide - based mineral trioxide aggregate, *Sci. Rep.*, 1–8.

Kirboga, S., and Oner, M., 2013, Effect of the Experimental Parameters on Calcium Carbonate Precipitation, *Chem. Eng. Trans.*, 32, 1974-9791.

Kogan, P., He, J., Glickman, G., dan Watanabe, I., 2006, The Effects of Various Additives on Setting Properties of MTA, *JOE*, 32(6), 569-572.

Kurdowski, W 2014, cement and concrete chemistry, Netherlands: Springer Netherlands.

Ladesma, A. F., Santana, F. B., Bucio, L., Arenas-Alatorre, J., Faraji, M., dan Wintergerst, A., 2017, Bioactive materials improve some physical properties of a MTA-like cement. *Mater. Sci. Eng. C*, *71*, 150–155.

Laksono, A. P., Lutfia, Y., dan Siswati, N. D., 2020, Precipitated Calcium Carbonate ($CaCO_3$) dari Cangkang Kerang Darah Dengan Metode Double Decomposition Precipitated Calcium Carbonate ($CaCO_3$) From Blood Clam Shells With Double Decomposition Method. *Seminar Nasional Teknik Kimia Soebardjo Brotohardjono* XVI, 5–10.

Laskus, A. dan Kolmas, J., 2017, Ionic Substitutions in Non-Apatitic Calcium Phosphates, *Int. J. Mol. Sci*., 18, 1–22.

Lee, B., Lin, H., Chan, J., Wang, W., Hung, P., Tsai, Y., dan Lee, Y., 2018a, A Novel Sol-Gel-Derived Calcium Silicate Cement with Short Setting Time for Application in Endodontic Repair Of Perforations, *Nanomed. J*, 13, 261-271.

Lee, H., J. Liao, M. Lee, B. Liu, W. Fuu, K. Sivashanmugan, dan Y. Juang., 2018b, Strontium oxide deposited onto a load-bearable and porous titanium matrix as dynamic and high-surface-contact-area catalysis for transesterification, *J. Nanomater.*, 8(12), 1-14.

Li, Q. dan Coleman, N.J., 2019, Impact of Bi_2O_3 dan ZrO_2 Radiopacifiers on The Early Hydration and C-S–H Gel Structure of White Portland Cement, *Dent. Mater. J.*, 10, 1–15.

Li, Q dan Coleman, N, 2015, The Hydration of ProRoot MTA, *Dent. Mater. J.*, 34(4), 458-465.

Macwan, C., dan Deshpande, A., 2014, Mineral trioxide aggregate (MTA) in dentistry: A review of literature. *J. Oral Res. Review*, *6*(2), 71-74.

Maisyarah, A. O., dan Shofiyani, A., 2019, Sintesis CaO dari Cangkang Kerang Ale-ale, *Meretrix*, *8*(1), 37–40.

Malhotra, N., Agarwal, A., dan Mala, K., 2013, Mineral Trioxide Aggregate: A Review of Physical Properties, *Compend. Contin. Educ. Dent.*, 34(2), 25-32.

Mammen, J., Shetty, K., dan Jayasheelan, N., 2018, Nano-white MTA: A Review, *Int. J. Adv. Res.*, 6(2), 1564-1571.

Mansha, M., Javed, S. H., Kazmi, M., and Feroze, N., 2011, Study of Rice Husk Ash as Potential Source of Acid Resistance Calcium Silicate, *Adv. Chem. Eng. Sci.*, *01*(03), 147–153.

Marciano, M. A., Costa, R. M., Camilleri, J., Mondelli, R. F. L., Guimarães, B. M., dan Duarte, M. A. H., 2014, Assessment of color stability of white mineral trioxide aggregate angelus and bismuth oxide in contact with tooth structure. *J. Endod.*, *40*(8). https://doi.org/10.1016/j.joen.2014.01.044

Mark, A.M., 2018, What is dental erosion? *J. American Dent. Assoc.*, 149, 564.

Meducin, F., Bresson, B., Lequeux, N., Noirfontaine,M., dan Zanni, H., 2007, Calcium Silicate Hidrate Investigated by Solid-stateHigh Resolution H and Si Nuclear Magnetic Resonance, *Cem. Concrete Res.*, 37, 631-638.

Montesi, M., Panseri, S., Dapporto, M., Tampieri, A., dan Sprio, S., 2017, Sr-substituted bone cements direct mesenchymal stem cells, osteoblasts and osteoclasts fate, *Plos one*, 1–13.

Mossaddegh, E., dan Hassankhani, A., 2014, Preparation and Characterization of Nano-CaO Based on Eggshell Waste: Novel and Green Catalytic Approach to Highly Efficient Synthesis of Pyrano [4,3-b] pyrans, *Chinese J. Catalysis*, 35, 351-356.

Nishad, K., Manoj, K., dan Unnikrishnan, G., 2019, Synthesis of Strontium Orthosilicate (Sr_2SiO_4) by Sol-Gel Method, for The Use in Endodontic Cements to Enhance Bioactivity and Radio-Contrast, *Mater. Res. Express*, 1-23.

No, Y., Nguyen, T., Lu, Z., Mirkhalaf, M., Fei, F., Foley, M., dan Zreiqat, H., 2021, Development of a bioactive and radiopaque bismuth doped baghdadite ceramic for bone tissue engineering, *Bone*, 153, 1-8.

Octavianty, D., Amri, A., Zultiniar, Yelmida., 2015, Sintesa Precipitated Calcium Carbonate (KALSIUM KARBONAT) dari Kulit Kerang Darah (Andara granosa) dengan Variasi Konsentrasi Asam dan Rasio CaO/HNO_3, *JOM FTEKNIK*, 2(2), 1-7.

Ozdemir, F., Evans, I., dan Bretcanu, O., 2017, Calcium Phospate Cements for Medical Applications, *J. Biomater. Appl*., 91-122.

Palente, I., Suryanto, E., dan Momuat, L, 2021, Karakterisasi Serat Pangan dan Aktivitas Antioksidan dari Tepung Kulit Kakao, *Chem. Prog*., 14(1), 70-80.

Patel BH, Chaudhari SB, dan Patel PN., 2014, Nano silica loaded cotton fabric, Characterization and Mechanical testing. *Res. J. Eng. Sci.* 3(4), 2278-9472.

Patil, S., Hoshing, U., dan Rachalwar, D., 2017, Solubility of 5 Different Root Canal Sealers in Water and Artificial Saliva, *Int. J. Current Res.*, 9, 61490–61493.

Pelepenko, L. E., Marciano, M. A., Sorrentino, F., Bombarda, G., Bessa, T., Antunes, M., Martin, R. A., Boanini, E., Cooper, P. R., dan Shelton, R. M. (2022). Can strontium replace calcium in bioactive materials for dental applications?, *J. Biomed. Mater. Res*., 1–21.

Phuttawong, R., Chantaramee, N., Pookmanee, P., dan Puntharod, R., 2015, Synthesis and Characterization of Calcium Silicate from Rice Husk Ash and Shell of Snail *Pomacea canaliculata* by Solid State Reaction. *Advanc. Mater. Res.*, *1103*, 1–7.

Prakash, V. dan Venkatesh, A., 2021, Mineral Trioxide Aggregate (MTA)–an overview, *Eur. J. Mol. Clin. Med.*, 7(3), 2115-2120.

Prasad, K., dan Naik, C. T., 2017, Mineral Trioxide Aggregate in Endodontics. *Int J. Appl. Dent. Sci. Manipulation*, *3*(1), 71–75.

Prema, D., Gnanavel, S., Anuraj, S., dan Gopalakrishnan, C., 2018, Synthesis and Characterization of Different Chemical Combination of Hydroxyapatite for Biomedical Application. *Mater. Today: Proc.*, *5*(2), 8868–8874.

Radwan, M. M., Abd El-Hamid, H. K., dan Nagi, S. M., 2016, Synthesis, properties and hydration characteristics of novel nano-size mineral trioxide and tetracalcium phosphate for dental applications. *Orient. J. Chem.*, *32*(5), 2459–2472.

Raya, I., Mayasari, E., Yahya, A., Syahrul, M., dan Latunra, A. I., 2015, Synthesis and Characterizations of Calcium Hydroxyapatite Derived from Crabs Shells (Portunus pelagicus) and Its Potency in Safeguard against to Dental Demineralizations. *Int. J. Biomater.*, https://doi.org/10.1155/2015/469176

Ressler, A., Cvetnić, M., Antunović, M., Marijanović, I., Ivanković, M., dan Ivanković, H., 2020, Strontium substituted biomimetic calcium phosphate system derived from cuttlefish bone. *J. Biomed. Mater. Res.*, *108*(4), 1697–1709.

Reza, M., 2017, Effect of Colloidal nano-silica on Setting time, Radiopacity and Physical Properties of a Nano Cement Based Compound for Endodontic Applications, *17th Int. Conf. Exhibition on Nanomed. Nanotech. in Health care*, 8(1), 1-5.

Rezende, M. R. D, Danrade, G. F., Cipreste, M. F., Mirdana, M. C., Gomes, D. A., de Barros Correia Menezes, M., dan de Sousa, E. M. B., 2019, 89Sr-doped hydroxyapatite nanoparticles as a potential therapeutic agent for bone tumors. *Int. J. Appl. Ceram. Tech.*, *16*(5), 1904–1919.

Rosalia, R., Asmi, D., dan Ginting, E, 2016, Preparasi dan Karakterisasi Keramik Silika (SiO_2) Sekam Padi dengan Suhu Kalsinasi 800 ºC- 1000 ºC, *J. Teori dan Aplikasi Fisika*, 4(1), 101-106.

Saberi, E., Farhadmollashahi, N., Ghotbi, F., Karkeabadi, H., dan Havaei, R. 2016. Cytotoxic effects of mineral trioxide aggregate, calcium enriched mixture cement, Biodentine and octacalcium pohosphate on human gingival fibroblasts. *J. Dent. Res. Dent. Clin. Dent. Prospects (JODDD).*, *10*(2), 1–6.

Saeed, G. K., Essa, A. F., dan Said, S., 2020, Preparation and characterization of hydroxyapatite powder and study of hydroxyapatite - Alumina Composite. *J. Phys. Conf. Ser*, *1591*(1).

Saghiri, M.A., Orangi, J., Asatourian, A., Gutmann, J.L., Garcia-Godoy, F., Lotfi,

M., dan Sheibani, N., 2017, Calcium silicate-based cements and functional impacts of various constituents, *Dent. Mater. J.*, 36, 8–18.

Saghiri, M. A., Asgar, K., Lotfi, M., dan Garcia-Godoy, F., 2012 Nanomodification of mineral trioxide aggregate for enhanced physiochemical properties. *Int. Endod. J.*, *45*(11), 979–988.

Saghiri, M. Lotfi, M. D. Joupari, M. Aeinehchi, dan A. M. Saghiri, 2010, Effects of storage temperature on surface hardness, microstructure, and phase formation of white mineral trioxide aggregate, *J. Endod.*, 36(8), 1414–1418.

Saleh, N., Ibrahim, R., dan Salman, A., 2015, Characterization of Nano-silica Prepared from Local Silica Sand and Its Application in Cement Mortar Using Optimization Technique, *Adv. Powder Tech.*, 26, 1123-1133.

Saraya,I M. E.-S., dan Rokbaa, H., 2017, Formation and Stabilization of Vaterite Calcium Carbonate by Using Natural Polysaccharide. *Adv. Nanopart.*, *06*(04), 158–182.

Sarkar, N., Caicedo, R., Ritwik, P., Moiseyeva, R., dan Kawashima, I., 2005, Physicochemical basis of the biologic properties of MTA. *J. Endod*, 31, 97-100.

Satyarth, S., Alkhamis, A.M., Almunahi, H.F., Omar, M., Alsuhaymi, A., Vadde, H.B., dan S, N.S., 2021, Comparative Evaluation of Mineral Trioxide Aggregate Pulpotomy and Laser-Assisted Mineral Trioxide Aggregate Pulpotomy : An Original Research Article, *J. Microsc. Ultrastruct*, 9(1), 7–11.

Sawhney, S. dan Vivekananda, P.A.R., 2015, Comparative Evaluation of The Calcium Release from Mineral Trioxide Aggregate and Its Mixture with Glass Ionomer Cement in Different Proportions and Time, *Saudi Dent. J.*, 27, 215–219.

Shekhar, S., Jaiswal, S., Nikhil, V., Gupta, S., Mishra, P., dan Raj, S., 2019, Comparative pH and Calcium Ion Release in Newer Calcium Silicate-based Root Canal Sealers, *J. Endod.*, 31, 29–33

Shelke, V. R., Bhagade, S. S., dan Mandavgane, S. A., 2010, Mesoporous Silica from Rice Husk Ash. *Chem. React. Eng. Catal.*, *5*(2), 63–67.

Smallman, R.E dan Bishop, R.J., 2000, *Mod Phys Metall Mater Eng*, Hill International Book Company: NewYork.

Sprio, S., Dapporto, M., Preti, L., Mazzoni, E., Iaquinta, M.R., Martini, F., Tognon, M., Pugno, N.M., Restivo, E., Visai, L., dan Tampieri, A., 2020, Enhancement of the Biological and Mechanical Performances of Sintered Hydroxyapatite by Multiple Ions Doping, *Front. Mater. Sci.*, 7, 1–18.

Srinivasan, V., Waterhouse, P., dan Whitworth, J., 2009, Mineral trioxide aggregate

in paediatric dentistry. *Int. J. Paediatric Dent.*, *19*(1), 34–47.

Suka, I. G., Simanjuntak, W., Sembiring, S., dan Trisnawati, E., 2004, Karakteristik silika sekam padi dari provinsi lampung yang diperoleh dengan metode ekstraksi. *J. MIPA*, *37*(1), 47–52.

Swarup, S., Rao, A., Boaz, K., Srikant, N., dan Shenoy, R., 2014, Pulpal response to nano hydroxyapatite, mineral trioxide aggregate and calcium hydroxide when used as a direct pulp capping agent: An in vivo study. *J. Clinic. Pediatric Dent.*, *38*(3), 201–206.

Syukri, I., Hindryawati, N., dan Subagyono, R, 2017, Sintesis Silika dari Abu Sekam Padi Termodifikasi 2-Merkaptobenzotiazol untuk Adsorbsi Ion Logam Cd^{2+} and Cr^{6+}, *J. Atomic*, 2(2), 221-226

Tabiyar, K. dan Logani, A., 2021, The Apical Extent of Mineral Trioxide Aggregate Apical Barrier Does not Influence the Treatment Outcome in a Nonvital Immature Permanent Anterior Tooth : A Split-Mouth Clinical Study, *Eur. Endod. J.*, 6, 44–49.

Talabani, R. M., Garib, B. T., dan Masaeli, R., 2020, Bioactivity and Physicochemical Properties of Three Calcium Silicate-Based Cements: An in Vitro Study. *BioMed Res. Int.*, 1-10.

Tanomaru-Filho, M., Morales, V., da Silva, G. F., Bosso, R., Reis, J. M. S. N., Duarte, M. A. H., dan Guerreiro-Tanomaru, J. M., 2012, Compressive Strength and Setting Time of MTA and Portland Cement Associated with Different Radiopacifying Agents. *ISRN Dent.*, 1-4.

Tavares, D., Resende, C., Quitan, M. P., De Oliveira Castro, L., Granjeiro, J. M., dan De Almeida Soares, G., 2011, Incorporation of strontium up to 5 mol. (%) to hydroxyapatite did not affect its cytocompatibility. *Mater. Res. 14*(4), 456–460.

Tawil, P. Z., Duggan, D. J., dan Galicia, J., 2015, Mineral trioxide aggregate (MTA): its history, composition, and clinical applications. *Compendium of Continuing Education in Dentistry (Jamesburg, N.J. : 1995)*, *36*(4).

Todkar, B. S., Deorukhkar, O. A., dan Deshmukh, S. M., 2016, Extraction of Silica from Rice Husk. *Int. J. Eng. Res. Development*, *12*(3), 2278–67.

Tomita, S., Haga, K., Hosokawa, Y., Yamada, K., Igarishi, G., dan Maruyama, I, 2021, Modeling of the Adsorption Behavior of Cs and Sr on Calcium Silicate Hydrates, *J. Adv. Concr. Technol.*,19, 1061-1074.

Torabinejad, M., Moazzami, S. M., Moaddel, H., Hawkins, J., Gustefson, C., Faras, H., Wright, K., dan Shabahang, S., 2017, Effect of MTA particle size on periapical healing. *Int. Endod. J.*, *50*, 3–8.

Torshabi, M., Amid, R., dan Kadkhodazadeh, M. 2016, Conservative Dentistry. *J.*

Conserv. Dent. 19(6), 522–526.

Trivana, L., Sugiarti, S., dan Rohaeti, E., 2015, Sintesis Dan Karakterisasi Natrium Silikat (Na_2SiO_3). *J. Sains dan Teknologi Lingkungan*, *7*(2), 66–75.

Ummah, S., Prasetyo, A., dan Barroroh, H, 2010, Kajian Penambahan Abu Sekam Padi dari Berbagai Suhu Pengabuan terhadap Plastisitas Kaolin, *Alchemy*, 1(2), 70-74.

Voicu, G., Didilescu, A. C., Stoian, A. B., Dumitriu, C., Greabu, M., dan Danrei, M., 2019, Mineralogical and microstructural characteristics of two dental pulp capping materials. *Mater. J*, *12*(11), 1–13.

Voicu, G., Badanoiu, A., Ghitulica, C., dan Endronescu,E, 2012, Sol-Gel of White Mineral Tioxide Aggregate with Potential Use as Biocement, *J. Nanomater. Biostruct.*, 7(4), 1639-1646.

Wahyuningsih, K., Jumeri, dan Wagiman, 2019, Optimalization of Production Process of Nano-Calcium Oxide from Pinctada maxima Shell by Using Taguchi Method, *Indones. J. Chem*, 19 (2), 356-367.

Wahyuningsih, K dan Perdani, L., 2020, Aktivitas Antimikroba Partikel Nano CaO dari Kulit Kerang Mutiara, *J. Kimia dan Kemasan*, 42 (1), 14-19.

Wang, J., L. Zhang, X. Sun, X. Chen, K. Xie, M. Lin, G. Yang, S. Xu, W. Xia, dan Z. Gou., 2014a, Preparation and in vitro evaluation of strontium-doped calcium silicate/gypsum bioactive bone cement, *Biomed. Mater.*, 9(4), 1-13.

Wang, W. H., Wang, C. Y., Shyu, Y. C., Liu, C. M., Lin, F. H., dan Lin, C., 2010, Compositional characteristics and hydration behavior of mineral trioxide aggregates. *J. Dent. Sci.*, *5*(2), 53–59.

Wang, Y., Wong, C., Wen, C., dan Li, Y., 2014b, Ti – SrO metal matrix composites for bone implant, *J. Mater. Chem. Mater. Biol. Med.*, 2, 5854–5861.

Yamamoto, S., Han, L., Noiri, Y., dan Okiji, T., 2017, Evaluation of The Ca Ion Release, pH and Surface Apatite Formation of a Prototype Tricalcium Silicate Cement, *Int. Endod. J.*, 50, 73–82.

Zeid, A S. T., dan Edrees, H. Y., 2022, Hydration Characterization of Two Generations of MTA-Based Root Canal Sealers. *Appl. Sci. (Switzerland)*, *12*(7).

Zeid, T., Alamoudi, N., Khafagi, M., dan Neel, E., 2017, Chemistry and Bioactivity of NeoMTA Plus™ versus MTA Angelus® Root Repair Materials Endodontic, *J. Spect.*, 9, 1-9.

Zhu, H., Guo, D., Sun, L., Li, H., Hanaor, D. A. H., Schmidt, F., dan Xu, K., 2018, Nanostructural insights into the dissolution behavior of Sr-doped hydroxyapatite. *J. Europ. Ceram. Society*, *38*(16), 5554–5562.