

DAFTAR PUSTAKA

- Abid Hussain, 2009. "Dielectric Properties and Microwave Assisted Separation of Eggshell and Membrane." Tesis, Department of Bioresource Engineering, Faculty of Agricultural and Environmental Sciences, McGill University, 5-14.
- Afrizal, A. (2016) 'Analisa Struktur Mikro Material Substitusi Hidroksipatit Cangkang Kerang Darah dan Resin Akrilik Bahan Pembuat Gigi untuk Aplikasi Gigi Tiruan', Jurnal Surya Teknika, 2(04), pp. 1–9. doi: 10.37859/jst.v2i04.17.
- Amu, O.O., A.B. Fajobi and B.O. Oke, 2005. Effect of eggshell powder on the stabilization potential of lime on an expansive clay soil. Res. J. Agric and Biol. Sci., 1: 80-84.
- Amu, O.O. and B. A. Salami, 2010. Effect of common salt on some engineering properties of eggshell stabilized lateritic soil. ARPN J. Eng. Appl. Sci., 5: 64-73.
- Anusavice, K.J., 1992. Degradability of dental ceramics. Advances in dental research, 6(1), pp.82-89.
- Artikel, M. (2013) 'Jurnal Gigi Karies', 1(2321), pp. 136–143.
- Asopa, V. et al. (2015) 'A comparative evaluation of properties of zirconia reinforced high impact acrylic resin with that of high impact acrylic resin', Saudi Journal for Dental Research, 6(2), pp. 146–151. doi: 10.1016/j.sjdr.2015.02.003.
- Babu, P. J. et al. (2015) 'Dental Ceramics: Part I – An Overview of Composition, Structure and Properties', American Journal of Materials Engineering and Technology, 3(1), pp. 13–18. doi: 10.12691/materials-3-1-3.
- Bajraktarova-Valjakova, E. et al. (2018) 'Contemporary dental ceramic materials, a review: Chemical composition, physical and mechanical properties, indications for use', Open Access Macedonian Journal of Medical Sciences, 6(9), pp. 1742–1755. doi: 10.3889/oamjms.2018.378.
- Buasri, A. et al. (2013) 'Application of eggshell wastes as a heterogeneous catalyst for biodiesel production', Sustainable Energy, 1(2), pp. 7–13. doi: 10.12691/rse-1-2-1.

- Dasar, P., Gigi, G. and Metil, P. (2020) 'D saya J R', 2, pp. 46–53.
- El-Shahate Ismaiel Saraya, M. and Hassan Abdel Latif Rokbaa, H. (2016) 'Preparation of Vaterite Calcium Carbonate in the Form of Spherical Nano-size Particles with the Aid of Polycarboxylate Superplasticizer as a Capping Agent', American Journal of Nanomaterials, 4(2), pp. 44–51. doi: 10.12691/ajn-4-2-3.
- Eliaz, N. and Metoki, N. (2017) 'Calcium phosphate bioceramics: A review of their history, structure, properties, coating technologies and biomedical applications', Materials, 10(4). doi: 10.3390/ma10040334.
- Gadi, M. M. et al. (2017) 'Peningkatan bahan dasar gigi tiruan PMMA : review penambahan fiber , filler , dan nanofiller', pp. 3801–3812.
- Ge, H. et al. (2010) 'From crabshell to chitosan-hydroxyapatite composite material via a biomorphic mineralization synthesis method', Journal of Materials Science: Materials in Medicine, 21(6), pp. 1781–1787. doi: 10.1007/s10856-010-4045-1.
- Gunawan, J. et al. (2017) 'Perbandingan porselen kedokteran gigi swasintesis berbahan baku pasir felspar Pangaribuan dan Sukabumi', Majalah Kedokteran Gigi Indonesia, 3(3), p. 49. doi: 10.22146/majkedgiind.22936.
- Halik, M. et al. (2015) 'Sintesis Dan Karakterisasi Hidroksiapatit dari Nanopartikel Kalsium Oksida (CaO) Cangkang Telur Untuk Aplikasi Dental Implan', Prosiding Pertemuan Ilmiah XXIX HFI Jateng & DIY, 25 April 2015, (3), pp. 124–127.
- Ho, W. F. et al. (2013) 'Calcium phosphate bioceramics synthesized from eggshell powders through a solid state reaction', Ceramics International, 39(6), pp. 6467–6473. doi: 10.1016/j.ceramint.2013.01.076.
- John, J., Gangadhar, S. A. and Shah, I. (2001) 'Flexural strength of heat-polymerized polymethyl methacrylate denture resin reinforced with glass, aramid, or nylon fibers', Journal of Prosthetic Dentistry, 86(4), pp. 424–427. doi: 10.1067/mpd.2001.118564.
- Kamalanathan, P. et al. (2014) 'Synthesis and sintering of hydroxyapatite derived from eggshells as a calcium precursor', Ceramics International, 40(PB), pp. 16349–16359. doi: 10.1016/j.ceramint.2014.07.074.
- Kusrini, E. et al. (2012) 'Preparation of Hydroxyapatite from Bovine Bone by Combination Methods of Ultrasonic and Spray Drying', International

- Conference on Chemical, Bio-Chemical and Environmental Sciences (ICBEE'2012), (April 2016), pp. 47–51.
- Mahreni et al. (2012) 'Pembuatan Hidroksi Apatit Dari Kulit Telur', Prosiding Seminar Nasional Teknik Kimia, 1(1), p. 1.
- Malau, Nya Daniaty and Adinugraha, F. (2020) 'Penentuan Suhu Kalsinasi Optimum CaO dari Cangkang Telur Bebek dan Cangkang Telur Burung Puyuh', 4(2), pp. 193–202.
- Malau, N. D. and Adinugraha, F. (2020) 'Synthesis of hydroxyapatite based duck egg shells using precipitation method', Journal of Physics: Conference Series, 1563(1). doi: 10.1088/1742-6596/1563/1/012020.
- Mohd Pu'ad, N. A. S. et al. (2019) 'Synthesis method of hydroxyapatite: A review', Materials Today: Proceedings, 29(November 2018), pp. 233–239. doi: 10.1016/j.matpr.2020.05.536.
- Narva, K. K., Lassila, L. V. and Vallittu, P. K. (2005) 'The static strength and modulus of fiber reinforced denture base polymer', Dental Materials, 21(5), pp. 421–428. doi: 10.1016/j.dental.2004.07.007.
- Oliveira, D. A., Benelli, P. and Amante, E. R. (2013) 'A literature review on adding value to solid residues: Egg shells', Journal of Cleaner Production, 46, pp. 42–47. doi: 10.1016/j.jclepro.2012.09.045.
- Ozawa, M. and Suzuki, S. (2002) 'Microstructural development of natural hydroxyapatite originated from fish-bone waste through heat treatment', Journal of the American Ceramic Society, 85(5), pp. 1315–1317. doi: 10.1111/j.1151-2916.2002.tb00268.x.
- Ozyegin, L. S. et al. (2004) 'Plasma-sprayed bovine hydroxyapatite coatings', Materials Letters, 58(21), pp. 2605–2609. doi: 10.1016/j.matlet.2004.03.033.
- Quina, M. J., Soares, M. A. R. and Quinta-Ferreira, R. (2017) 'Applications of industrial eggshell as a valuable anthropogenic resource', Resources, Conservation and Recycling, 123, pp. 176–186. doi: 10.1016/j.resconrec.2016.09.027.
- Ramos, V., Runyan, D. A. and Christensen, L. C. (1996) 'The effect of plasma-treated polyethylene fiber on the fracture strength of polymethyl methacrylate', Journal of Prosthetic Dentistry, 76(1), pp. 94–96. doi: 10.1016/S0022-3913(96)90348-0.
- Rauf, N., Suryani, S. and Saputra, S. (2013) 'Pengaruh komposisi bahan terhadap kekerasan gigi tiruan berbasis keramik', pp. 65–67.

Santander, S. A. et al. (2010) 'Ceramics for dental restorations - an introduction', Dyna, pp. 26–36.

Sari, M. and Yusuf, Y. (2018) 'Synthesis and characterization of hydroxyapatite based on green mussel shells (*perna viridis*) with the variation of stirring time using the precipitation method', IOP Conference Series: Materials Science and Engineering, 432(1). doi: 10.1088/1757-899X/432/1/012046

Schaafsma, Z., J.J. van Doormal, F.A. Muskiet, G.J. Hofstede, I. Pakan and E. van der Veer, 2002. Positive effects of a chicken eggshell powder-enriched vitamin-mineral supplement on femoral neck bone mineral density in healthy late post-menopausal Dutch women. Br. J. Nutr., 87: 267-275.

Sha Irwan. 2008. Penyediaan Serbuk Hidroksiapatit Melalui Teknik Pemendalan. Universiti Teknikal Malaka.

Sivakumar, M. et al. (1996) 'Development of hydroxyapatite derived from Indian coral', Biomaterials, 17(17), pp. 1709–1714. doi: 10.1016/0142-9612(96)87651-4.

Sinarwati dkk, 2015, Pemtiruandan Pengujian Sifat Mekanik Gigi Buatandalam Larutan Teh Hitam, Fakultas MIPA Universitas Hasanuddin, Makassar.

Srinivasan, N. and G, D. (2017) 'Polyamide as a denture base material- a review', International Journal of Current Advanced Research, 6(4), pp. 3272–3274. doi: 10.24327/ijcar.2017.3274.0244.

Stipho, H. D. (1998) 'Repair of acrylic resin denture base reinforced with glass fiber.', The Journal of prosthetic dentistry, 80(5), pp. 546–550. doi: 10.1016/S0022-3913(98)70030-7.

Tangboriboon, N. et al. (2012) 'Preparation and properties of calcium oxide from eggshells via calcination', Materials Science- Poland, 30(4), pp. 313–322. doi: 10.2478/s13536-012-0055-7.

Tangboriboon, N., Changkhamchom, S. and Sirivat, A. (2020) 'Effect of embedding eggshells to form calcium feldspar as flux in porcelain via slip casting process for bio-dental and medical applications', Materials Technology, 35(8), pp. 452–462. doi: 10.1080/10667857.2019.1699262.

Taufiq Rochim & Sri Hardjoko Wirjomartono. 2005. Spesifikasi, Metrologi & Kontrol Kualitas Geometrik, Industrial Metrologi Laboratory, Mechanical & Production Engineering (MPE), Mesin, FTI-ITB.

- Tangboriboon, N., Changkhamchom, S. and Sirivat, A. (2020) 'Effect of embedding eggshells to form calcium feldspar as flux in porcelain via slip casting process for bio-dental and medical applications', *Materials Technology*. Taylor & Francis, 35(8), pp. 452–462. doi: 10.1080/10667857.2019.1699262.
- T.F. Shen dan W.L. Chen, "The Role of Magnesium and Calcium in Eggshell Formation in Tsaiya Ducks and Leghorn Hens," Department of Animal Science, National Taiwan University, Taiwan, 2002: hal 290-296.
- Tham, W. L., Chow, W. S. and Mohd Ishak, Z. A. (2010) 'Flexural and morphological properties of Poly(Methyl Methacrylate)/ hydroxyapatite composites: Effects of planetary ball mill grinding time', *Journal of Reinforced Plastics and Composites*, 29(13), pp. 2065–2075. doi: 10.1177/0731684409344899.
- Vallittu, P. K. and Lappalainen, R. (1994) 'I : The effect of fiber concentration D *', (June).
- VirginiaTech, 2008."The Egg," Virginia State University, Publication 388-801, P-12.
- Wangidjaja, I. 2014. Anatomi Gigi Edisi 2. Jakarta:EGL
- Wu, S. et al. (2018) 'Synthesis of hydroxyapatite from eggshell powders through ball milling and heat treatment', *Integrative Medicine Research*, 4(1), pp. 85–90. doi: 10.1016/j.jascer.2015.12.002.
- Wu, S. C. et al. (2011) 'Hydroxyapatite synthesized from oyster shell powders by ball milling and heat treatment', *Materials Characterization*, 62(12), pp. 1180–1187. doi: 10.1016/j.matchar.2011.09.009.
- (2014) 'Comprehensive Review of Preparation Methodologies of Nano Hydroxyapatite', *Journal of Environmental Nanotechnology*, 3(1), pp. 101–121. doi: 10.13074/jent.2013.12.132058.
- Wu, S.-C., Hsu, H.-C., Hsu, S.-K., Chang, Y.-C. & Ho, W.-F. 2016. Synthesis of hydroxyapatite from eggshell powders through ball milling and kalsinasi. *Journal of Asian Ceramic Societies*, 4, 85-90
- Wu, S.C., Hsu, H.C., Hsu, S.K., Chang, Y.C. and Ho, W.F., 2015. Effects of kalsinasi on the synthesis of hydroxyapatite from eggshell powders. *Ceramics International*, 41(9), pp.10718-10724

Wulandari, W. Murningsih, dan H. I. Wahyuni.2012 Deposisi Kalsium Dan Phosphor Pada Cangkang Telur Ayam Arab Dengan Pemberian Berbagai Level *Azolla Microphylla*, p 507 – 520

Zuriah Sitorus, Awan Mafirah, Yosephin Romania dan Syahrul,(2014). Sifat Mekanik Gigi BuatanAkrilik dengan Penguat Serat Delas, Indonesian Journal of Applied Physics (2014) Vol.4 No.2 hal 183, ISSN 2089 - 0133.

Lampiran 1. Dokumentasi Penelitian



Gambar 1. Membersihkan cangkang telur



Gambar 2. Menghaluskan cangkang telur



Gambar 3. Menghaluskan cangkang telur itik



Gambar 4. Mengayak cangkang telur itik



Gambar 5. Kalsinasi Cangkang Telur Itik



Gambar 6. Kalsinasi Cangkang Telur Itik



Gambar 7. Proses menimbang cangkang telur itik



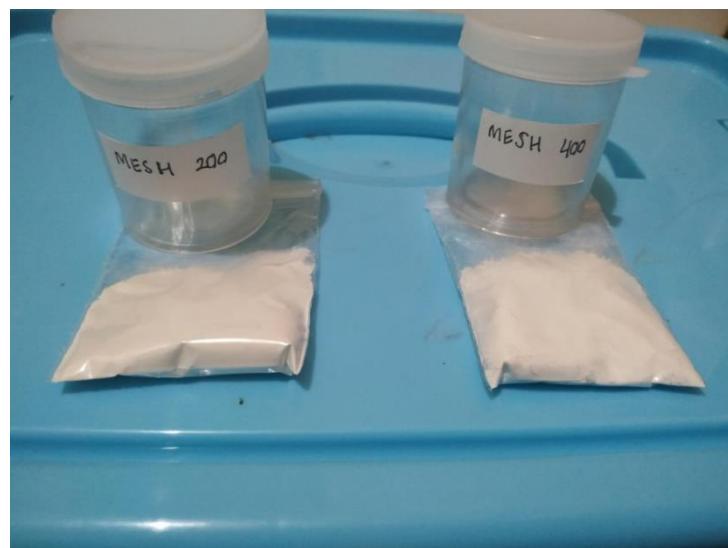
Gambar 8. Proses kalsinasi sampel



Gambar 9. Serbuk cangkang Telur Itik sesudah dikalsinasi mesh 400



Gambar 10. Serbuk cangkang Telur Itik sesudah dikalsinasi mesh 400



Gambar 11. Serbuk Cangkang Telur Itik Tidak mendapat Perlakuan Kalsinasi



Gambar 12. Serbuk Cangkang Telur Itik Mendapat Perlakuan Kalsinasi Mesh 400



Gambar 13. Serbuk Cangkang Telur Itik Mendapat Perlakuan Kalsinasi Mesh 200



Gambar 14. Gambar Bahan Gigi Tiruan (Resin Akrilik) dan Liquid Akrilik



Gambar 15. Wadah Pencampur Bahan Aplikasi Gigi Tiruan



Gambar 16. Spatula sebagai Pengaduk



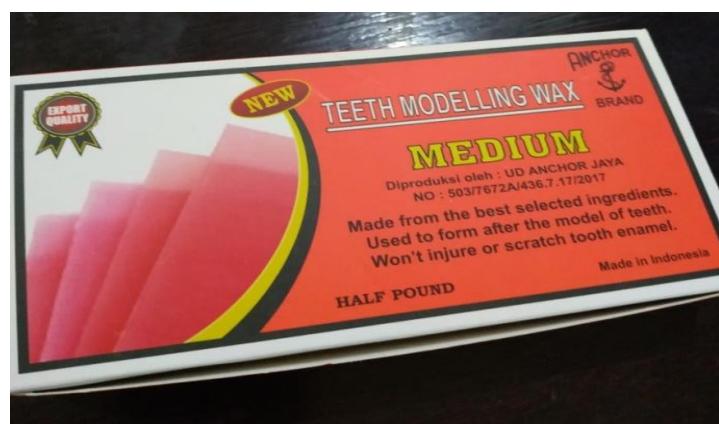
Gambar 17 . Spoit alat ukur liquid akrilik



Gambar 18. Gypsum Sebagai Bahan Pembuat Cetakan



Gambar 19. Tempat Cetakan Sampel



Gambar 20 . Lilin Sebagai Bahan Membuat Sampel



Gambar 21 . Alat uji tekan



Gambar 22. Persiapan pembuatan aplikasi gigi tiuan



Gambar 23. Preparasi Membuat Sampel



Gambar 24 . Sampel Aplikasi Gigi Tiruan Sudah Tercetak



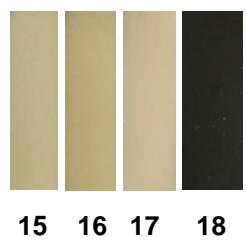
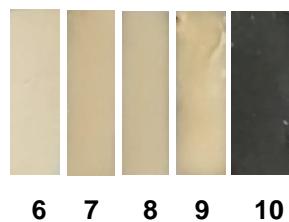
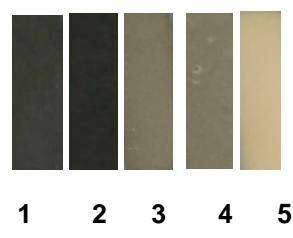
Gambar 25. Proses Sampel dikeluarkan Dari Cetakan

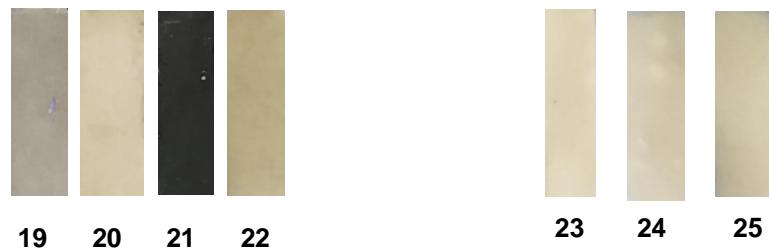


Gambar 26. Sampel Sebelum Proses Polishing

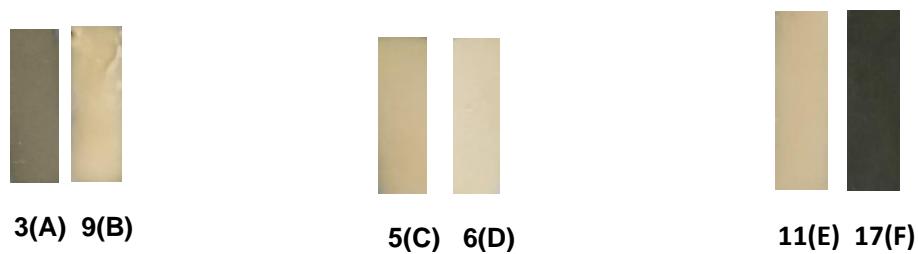


Gambar 27. Sampel Aplikasi Gigi Tiruan Yang Sudah Diuji Mekanik





Gambar 28. Sampel Aplikasi Gigi Tiruan Sesudah Polishing



Gambar 29. Sampel Aplikasi Gigi Tiruan Akrilik



Gambar 30. Model Gigi Tiruan Akrilik

Tabel 1. Tabel Uji Mekanik, Uji Tekan (Mpa), SNI 03-1974-1990.

| NO | BAHAN | UJI MEKANIK |
|----|--------------------------------------|------------------|
| | | UJI TEKAN (Mpa) |
| | | SNI 03-1974-1990 |
| | Berat Total (C+A) = 2 gr | |
| 1 | Mesh 400, 850C, (10% C + 90% A) | 998,040 |
| 2 | Mesh 400, 850C, (20% C + 80% A) | 748,955 |
| 3 | Mesh 400,850C, (40% C + 60% A) | 977,655 |
| 4 | Mesh 400, 900C, (10% C + 90% A) | 1036,263 |
| 5 | Mesh 400, 900C, (20% C + 80% A) | 966,188 |
| 6 | Mesh 400,900C, (40% C + 60% A) | 1032,016 |
| 7 | Mesh 400, 950C, (10% C + 90% A) | 1034,140 |
| 8 | Mesh 400, 950C, (20% C + 80% A) | 1020,762 |
| 9 | Mesh 400,950C, (40% C + 60% A) | 868,932 |
| 10 | Mesh 400,tdk di bkr, (10% C + 90%A) | 855,554 |
| 11 | Mesh 400,tdk di bkr, (20% C + 80%A) | 892,291 |
| 12 | Mesh 400,tdk di bkr, (40% C + 60% A) | 998,040 |
| 13 | Akrilik 100% | 1001,013 |
| 14 | Mesh 200, 850C, (10% C + 90% A) | 949,476 |
| 15 | Mesh 200, 850C, (20% C + 80% A) | 1084,891 |
| 16 | Mesh 200,850C, (40% C + 60% A) | 916,074 |
| 17 | Mesh 200, 900C, (10% C + 90% A) | 999,952 |
| 18 | Mesh 200, 900C, (20% C + 80% A) | 810,536 |
| 19 | Mesh 200,900C, (40% C + 60% A) | 987,911 |
| 20 | Mesh 200, 950C, (10% C + 90% A) | 980,840 |
| 21 | Mesh 200, 950C, (20% C + 80% A) | 697,991 |
| 22 | Mesh 200, 950C, (40% C + 60% A) | 958,543 |
| 23 | Mesh 200,tdk di bkr, (10% C + 90%A) | 819,880 |
| 24 | Mesh 200,tdk di bkr, (20% C + 80%A) | 1014,604 |
| 25 | Mesh 200,tdk di bkr, (40% C + 60% A) | 872,117 |