

DAFTAR PUSTAKA

- Abdullah, A. H. D., Putri, O. D., Fikriyyah, A. K., Nissa, R. C., & Intadiana, S. (2020). Effect of microcrystalline cellulose on characteristics of cassava starch-based bioplastic. *Polymer-Plastics Technology and Materials*, 59(12), 1250–1258. <https://doi.org/10.1080/25740881.2020.1738465>
- Aini, Q. (2023). PENGAPLIKASIAN PLASTIK BIODEGRADABLE BERPENYERAP OKSIGEN BUTYLATED HYDROXYTOLUENE DENGAN PENGUAT SELULOSA MIKROKRISTALIN PADA BUAH APEL (*Malus domestica* Borkh) FRESH-CUT. In *Skripsi*. Universitas Hasanuddin.
- Ali, A., Zhang, N., & Santos, R. M. (2023). Mineral Characterization Using Scanning Electron Microscopy (SEM): A Review of the Fundamentals, Advancements, and Research Directions. *Applied Sciences (Switzerland)*, 13(23). <https://doi.org/10.3390/app132312600>
- Andrade, M. A., Barbosa, C. H., Mariño-cortegoso, S., Barbosa-pereira, L., Send, R., Buonocore, G. G., Stanzione, M., Coelho, A., Correia, C. B., Saraiva, M., Rodr, A., Quir, D., Vilarinho, F., Khwaldia, K., Silva, A. S., & Ramos, F. (2023). Lemon by-Products Extract: Preparation, Characterization and Beef Meat. *Foods*, 12, 2450.
- Ardyansyah, F., & Yuniwati, M. (2021). PEMBUATAN PLASTIK BIODEGRADABLE DARI PATI UMBI GANYONG MENGGUNAKAN PLASTICIZER GLISERIN DAN KARAGENAN. *Jurnal Inovasi Proses*, 6(1), 20–28.
- Arrigo, R., Malucelli, G., & Mantia, F. P. La. (2021). Effect of the elongational flow on the morphology and properties of polymer systems: A brief review. *Polymers*, 13(20), 1–35. <https://doi.org/10.3390/polym13203529>
- ASTM. (2018). Standard Specification for Labeling of Plastics Designed to be Aerobically Composted in Municipal or Industrial Facilities. *ASTM D6400*.
- ASTM D882-12. (2012). *Standard Test Method for Tensile Properties of Thin Plastic Sheeting* (pp. 1–11). <https://www.astm.org/d0882-12.html>
- Brilianti, K. F., Ridlo, A., & Sedjati, S. (2023). Sifat Mekanik dan Ketebalan Bioplastik dari *Kappaphycus alvarezii* Menggunakan Variasi Konsentrasi Amilum dengan Pemplastis Gliserol. *Journal of Marine Research*, 12(1), 95–102.
- Brunšek, R., Kopitar, D., Schwarz, I., & Paula Marasovi. (2023). Biodegradation Properties of Cellulose Fibers and PLA Biopolymer. *Polymers*, 15.
- Chamas, A., Moon, H., Zheng, J., Qiu, Y., Tabassum, T., Jang, J. H., Abu-Omar, M., Scott, S. L., & Suh, S. (2020). Degradation Rates of

- Plastics in the Environment. *ACS Sustainable Chemistry and Engineering*, 8(9), 3494–3511. <https://doi.org/10.1021/acssuschemeng.9b06635>
- Dachriyanus. (2004). *Analisis Struktur Senyawa Organik secara Spektroskopi*.
- Desramadhani, R., & Kusuma, S. B. W. (2023). The effect of sorbitol concentration on the characteristics of starch-based bioplastics. *Indonesian Journal of Chemical Science*, 12(2), 130–142.
- Dirpan, A., Kamaruddin, I., Syarifuddin, A., Zainal, Rahman, A. N. F., Hafidzah, Latief, R., & Prahesti, K. I. (2019). Characteristics of bacterial cellulose derived from two nitrogen sources: Ammonium sulphate and yeast extract as an indicator of smart packaging on fresh meat. *IOP Conference Series: Earth and Environmental Science*, 355(1). <https://doi.org/10.1088/1755-1315/355/1/012040>
- Fadlelmoula, A., Pinho, D., Carvalho, V. H., Catarino, S. O., & Minas, G. (2022). Fourier Transform Infrared (FTIR) Spectroscopy to Analyse Human Blood over the Last 20 Years: A Review towards Lab-on-a-Chip Devices. *Micromachines*, 13(2). <https://doi.org/10.3390/mi13020187>
- Fitriany, D. S., Annaziha, S., Syamsuddin, H. S. A., & Khumaira, A. (2023). Dhea Sandra Fitriany, Salma Annaziha, Hiskia Sains Assajuly Syamsuddin, Annisa KhuBIO-PACK: BIODEGRADABLE PACKAGING PATI SINGKONG SEBAGAI SOLUSI PENCEMARAN LIMBAH PLASTIK KONVENSIONAL. *Journal of Comprehensive Science*, 2(1), 430–437.
- Grzebieciarz, W., Biswas, D., Roy, S., & Jamróz, E. (2023). Advances in biopolymer-based multi-layer film preparations and food packaging applications. *Food Packaging and Shelf Life*, 35.
- Hariyanto, A. (2023). Analisis Sem (Scanning Electron Microscope) Dan Foto Mikro Pada Material Komposit Serat Tangkai Jagung Dengan Matriks Plastik Polipropilen. *AutoMech : Jurnal Teknik Mesin*, 3(01), 15–22. <https://doi.org/10.24269/jtm.v3i01.6889>
- Hariyanto, A., Yuswanto, & Kuncoro, P. S. (2023). Analisis SEM (Scanning Electrone Microscope) dan Foto Mikro pada Material Komposit Serat Tangkai Jagung dengan Matriks Plastik Polipropilen. *Jurnal Teknik Mesin*, 3(1), 15–22.
- Huang, C. H., Wu, J. S., Huang, C. C., & Lin, L. S. (2003). Adhesion, Permeability, and Mechanical Properties of Multilayered Blown Films Using Maleated Low-Density Polyethylene Blends as Adhesion-Promoting Layers. *Polymer Journal*, 35(12), 978–984. <https://doi.org/10.1295/polymj.35.978>
- Iswarin, S. J., Nuriyah, L., & Sriwilujeng, A. I. (2013). Hubungan Gugus Fungsi Plastik Biodegradabel Metil Akrilat dan Pati Garut Terhadap Sifat Mekaniknya. *Natural*, 2(2), 178–183.
- Jaime, S. B. M., Alves, R. M. V., & Bócoli, P. F. J. (2022). Moisture and

- oxygen barrier properties of glass, PET and HDPE bottles for pharmaceutical products. *Journal of Drug Delivery Science and Technology*, 71(January).
<https://doi.org/10.1016/j.jddst.2022.103330>
- JIS 2-1707. (2003). Plastics - Determination of thickness. *Japanese Industrial Standards Committee (JISC)*.
- JIS K 7113:2019. (2019). Plastics - Determination of tensile properties. *Japanese Industrial Standards Committee (JISC)*.
- Kong, U., Rawi, N. F. M., & Tay, G. S. (2023). The Potential Applications of Reinforced Bioplastics in Various Industries: A Review. *Polymers*, 15(10).
- Liu, Z., Lin, D., Lopez-Sanchez, P., & Yang, X. (2020). Characterizations of Bacterial Cellulose Nano fibers Reinforced Edible Films Based On Konjac Glucomannan. *International Journal of Biological Macromolecules*, 145, 634–645.
- Mairiza, L., Mariana, Ramadhany, M., & Feviyussa, C. A. (2017). The effect of starch-garlic powder ratio on degradation rate of Gadung starch bioplastic. *IOP Conf. Series: Materials Science and Engineering*, 334.
- Mandasari, A., Safitri, M. F., Perangin-angin, E. R., Sunarwati, D., Nasution, Safitri, W. D., & Indriati, H. (2017). KARAKTERISASI UJI KEKUATAN TARIK (TENSILE STRENGTH) FILM PLASTIK BIODEGRADABLE DARI TANDAN KOSONG KELAPA SAWIT DENGAN PENGUAT ZINK OKSIDA DAN GLISEROL. *Jurnal Hasil Penelitian Bidang Fisika*, 5(2), 1–6.
- Mar, C., Andr, C., Manuel, P., Andr, C., Plou, F. J., & Eduardo, P. (2024). Antioxidant Metabolism Pathways in Vitamins , Polyphenols , and Selenium: Parallels and Divergences. *International Journal Molecular Sciences*, 25(2600).
- Martha, R., & Sutoyo, S. (2021). PEMBUATAN DAN KARAKTERISASI PLASTIK BIODEGRADABLE DARI KOMPOSIT HDPE (HIGH DENSITY POLYETHYLENE) DAN PATI UMBI SUWEG (*Amorphophallus campanulatus*). 10(1), 85–95.
- Mohan, S., & Panneerselvam, K. (2022). A short review on mechanical and barrier properties of polylactic acid-based films. *Materials Today: Proceedings*, 56(6), 3241–3246.
- Nandiyanto, A. B. D., Oktiani, R., & Ragadhita, R. (2019). How to read and interpret ftir spectroscopy of organic material. *Indonesian Journal of Science and Technology*, 4(1), 97–118.
<https://doi.org/10.17509/ijost.v4i1.15806>
- Nigam, S., Das, A. K., & Patidar, M. K. (2021). Synthesis, characterization and biodegradation of bioplastic films produced from Parthenium hysterophorus by incorporating a plasticizer (PEG600). *Environmental Challenges*, 5(July), 100280.
<https://doi.org/10.1016/j.envc.2021.100280>

- Nissa, R. C., Fikriyyah, A. K., Pudjiraharti, A. H. D., & Abdullah, S. (2018). Preliminary study of biodegradability of starch-based bioplastics using ASTM G21-70, dip-hanging, and Soil Burial Test methods. *IOP Conf. Series: Earth and Environmental Science*, 277.
- Nurhadi, T., Budiyanoro, C., & Sosiati, H. (2017). IDENTIFIKASI MECHANICAL PROPERTIES DARI BAHAN DAUR ULANG POLYSTYRENE. *JMPM: Jurnal Material Dan Proses Manufaktur*, 1(1), 36–40.
- Nurulhasni, D. (2023). Homemade BIOPLASTICS (Biodegradable Plastic From Cassava Peel Waste) with Analysis of the Effect of Glycerol and Cellulose Ratio on Tensile Strength, Elongation, and Thickness. *JST (Jurnal Sains Dan Teknologi)*, 12(1), 56–64. <https://doi.org/10.23887/jstundiksha.v12i1.51464>
- Platnieks, O., Gaidukovs, S., Barkane, A., Sereda, A., Gaidukova, G., Grase, L., Thakur, V. K., Filipova, I., & Fridrihsone, V. (2020). Bio-Based Poly(butylene succinate)/Microcrystalline Cellulose/Nanofibrillated Cellulose-Based Sustainable Polymer Composites: Thermo-Mechanical and Biodegradation Studies. *Polymers*, 12(1472).
- Putra, E. P. D., Thamrin, E. S., & Saputra, H. (2019). Effect of Dragon Fruit Skin Extract (*Hylocereus costaricensis*) on Bio-plastic Physical and Mechanical Properties of Cassava Starch and Polyvinyl Alcohol. *IOP Conference Series: Earth and Environmental Science*, 258(1). <https://doi.org/10.1088/1755-1315/258/1/012047>
- Resende, R., Silva, A., Marques, C. S., & Arruda, T. R. (2023). *Biodegradation of Polymers : Stages , Measurement , Standards and Prospects*. 371–399.
- Rini, F., Yulneriwarni, & Sukara, E. (2022). Additional Nata de Coco on The Performance of Cassava Starch Based Bioplastic. *Journal of Tropical Biodiversity*, 3(1), 43–51.
- Roberta, A. M. (2020). Oxygen scavenging films and coating of biopolymers for food application. *Biopolymer Membranes and Films*, 535–551. <https://doi.org/https://doi.org/10.1016/b978-0-12-818134-8.00022-5>
- Sakti, D. I., Setyana, B., Tauviqirrahman, M., Jurusan, M., Mesin, T., Teknik, F., Diponegoro, U., Jurusan, D., Mesin, T., Teknik, F., & Diponegoro, U. (2023). Studi Perbandingan Investigasi Modulus Elastisitas Antara Metode Uji Tarik dengan Metode Indentasi Pada Material Styrene BUTADIENE RUBBER 25 (SBR-25). *Jurnal Teknik Mesin S-1*, 11(2), 147–156.
- Salfitra, M., & Putra, A. (2023). EFFECT OF CALCIUM CARBONATE (CaCO₃) ADDITIVES ON THE QUALITY OF CELLULOSE-BASED BIODEGRADABLE PLASTICS BACTERIA-POLYETHYLENE GLYCOL (PEG) OF COCONUT WATER (*Cocos Nucifera*). *Electrolyte*, 2(1), 65–72. <https://journals.insparagonsociety.org>

- Santoso, R. A., & Atma, Y. (2020). Physical Properties of Edible Films from Pangasius catfish Bone Gelatin-Breadfruits Strach with Different Formulations. *Indonesian Food Science and Technology Journal*, 3(2), 42–47. <https://doi.org/10.22437/iftstj.v3i2.9498>
- Sari, W. N., Saebani, S., & Dhanardhono, T. (2018). PENGARUH PEMBERIAN BUTYLATED HYDROXYTOLUENE (2,6-DI-TERT-BUTYL-4-METHYLPHENOL) PER ORAL DOSIS BERTINGKAT TERHADAP GAMBARAN HISTOPATOLOGIS HEPAR TIKUS WISTAR. *Jurnal Kedokteran Diponegoro*, 7(2), 1344–1357.
- Satriawan, & Illing, I. (2017). Uji FTIR Bioplastik dari Limbah Ampas Sagu dengan Penambahan Variasi Konsentrasi Gelatin. *Jurnal Dinamika*, 8(1–13).
- Sujatno, A., Salam, R., Bandriyana, & Dimiyati, A. (2015). Studi Scanning Electron Microscopy (SEM) untuk Karakterisasi Proses Oksidasi Paduan Zirkonium. *Jurnal Forum Nuklir*, 9(2).
- Sulaeman, B. (2018). Modulus Elastisitas Berbagai Jenis Material. *PENA TEKNIK: Jurnal Ilmiah Ilmu-Ilmu Teknik*, 3(2), 127. https://doi.org/10.51557/pt_jiit.v3i2.176
- Utami, M. R., Latifah, & Widiart, N. (2014). SINTESIS PLASTIK BIODEGRADABLE DARI KULIT PISANG DENGAN PENAMBAHAN KITOSAN DAN PLASTICIZER GLISEROL. *Indonesian Journal of Chemical Science*, 3(2).
- Wiradipta, I. D. G. A. (2017). PEMBUATAN PLASTIK BIODEGRADABLE BERBAHAN DASAR SELULOSA DARI TONGKOL JAGUNG. In *Skripsi*. Institut Teknologi Sepuluh Nopember.
- Xu, Y., Liu, X., Jiang, Q., Yu, D., Xu, Y., Wang, B., & Xia, W. (2021). Development and properties of bacterial cellulose, curcumin, and chitosan composite biodegradable films for active packaging materials. *Carbohydrate Polymers*, 260, 117778. <https://doi.org/https://doi.org/10.1016/j.carbpol.2021.117778>
- Yuniarto, K., Lastriyanto, A., & Kurniawan, H. (2020). Permeabilitas Oksigen Kemasan Aktif Polylactic Acid-Butylated Hydroxytoluene Oxygen Permeability Active Packaging Polylactic Acid-Butylated Hydroxytoluene. *Jurnal Teknologi Pertanian*, 21(2), 136–143.
- Yupa, N. P., Sunardi, & Irawati, U. (2021). Synthesis And Characterization Of Alginate Based Bioplastic With The Addition Of Nanocellulose From Sago Frond As Filler. *JUSTEK: JURNAL SAINS DAN TEKNOLOGI*, 4(1), 30–39.
- Zahan, K. A., Azizul, N. M., Mustapha, M., Tong, W. Y., Rahman, M. S. A., & Sahuri, I. S. (2020). Application of bacterial cellulose film as a biodegradable and antimicrobial packaging material. *Materials Today: Proceedings*, 31(xxxx), 83–88. <https://doi.org/10.1016/j.matpr.2020.01.201>
- Zeenat, Elahi, A., Bukhari, D. A., Shamim, S., & Rahman, A. (2021). Plastics degradation by microbes: A sustainable approach. *Journal*

- of King Saud University - Scienc*, 33(6).
- Zenata, R., Lutfi, M., & Masruroh. (2015). Pembuatan dan Karakterisasi Kadar Air dan Gugus Fungsi Plastik Biodegradable Berbahan Dasar Pati Umbi Walur. *Jurnal Bioproses Komoditas Tropis*, 3(2), 47–52.
- Abdullah, A. H. D., Putri, O. D., Fikriyyah, A. K., Nissa, R. C., & Intadiana, S. (2020). Effect of microcrystalline cellulose on characteristics of cassava starch-based bioplastic. *Polymer-Plastics Technology and Materials*, 59(12), 1250–1258. <https://doi.org/10.1080/25740881.2020.1738465>
- Aini, Q. (2023). PENGAPLIKASIAN PLASTIK BIODEGRADABLE BERPENYERAP OKSIGEN BUTYLATED HYDROXYTOLUENE DENGAN PENGUAT SELULOSA MIKROKRISTALIN PADA BUAH APEL (*Malus domestica* Borkh) FRESH-CUT. In *Skripsi*. Universitas Hasanuddin.
- Ali, A., Zhang, N., & Santos, R. M. (2023). Mineral Characterization Using Scanning Electron Microscopy (SEM): A Review of the Fundamentals, Advancements, and Research Directions. *Applied Sciences (Switzerland)*, 13(23). <https://doi.org/10.3390/app132312600>
- Andrade, M. A., Barbosa, C. H., Mariño-cortegoso, S., Barbosa-pereira, L., Send, R., Buonocore, G. G., Stanzione, M., Coelho, A., Correia, C. B., Saraiva, M., Rodr, A., Quir, D., Vilarinho, F., Khwaldia, K., Silva, A. S., & Ramos, F. (2023). Lemon by-Products Extract: Preparation, Characterization and Beef Meat. *Foods*, 12, 2450.
- Ardyansyah, F., & Yuniwati, M. (2021). PEMBUATAN PLASTIK BIODEGRADABLE DARI PATI UMBI GANYONG MENGGUNAKAN PLASTICIZER GLISERIN DAN KARAGENAN. *Jurnal Inovasi Proses*, 6(1), 20–28.
- Arrigo, R., Malucelli, G., & Mantia, F. P. La. (2021). Effect of the elongational flow on the morphology and properties of polymer systems: A brief review. *Polymers*, 13(20), 1–35. <https://doi.org/10.3390/polym13203529>
- ASTM. (2018). Standard Specification for Labeling of Plastics Designed to be Aerobically Composted in Municipal or Industrial Facilities. *ASTM D6400*.
- ASTM D882-12. (2012). *Standard Test Method for Tensile Properties of Thin Plastic Sheeting* (pp. 1–11). <https://www.astm.org/d0882-12.html>
- Brilianti, K. F., Ridlo, A., & Sedjati, S. (2023). Sifat Mekanik dan Ketebalan Bioplastik dari *Kappaphycus alvarezii* Menggunakan Variasi Konsentrasi Amilum dengan Pemplastis Gliserol. *Journal of Marine Research*, 12(1), 95–102.
- Brunšek, R., Kopitar, D., Schwarz, I., & Paula Marasovi. (2023). Biodegradation Properties of Cellulose Fibers and PLA Biopolymer. *Polymers*, 15.

- Chamas, A., Moon, H., Zheng, J., Qiu, Y., Tabassum, T., Jang, J. H., Abu-Omar, M., Scott, S. L., & Suh, S. (2020). Degradation Rates of Plastics in the Environment. *ACS Sustainable Chemistry and Engineering*, 8(9), 3494–3511. <https://doi.org/10.1021/acssuschemeng.9b06635>
- Dachriyanus. (2004). *Analisis Struktur Senyawa Organik secara Spektroskopi*.
- Desramadhani, R., & Kusuma, S. B. W. (2023). The effect of sorbitol concentration on the characteristics of starch-based bioplastics. *Indonesian Journal of Chemical Science*, 12(2), 130–142.
- Dirpan, A., Kamaruddin, I., Syarifuddin, A., Zainal, Rahman, A. N. F., Hafidzah, Latief, R., & Prahesti, K. I. (2019). Characteristics of bacterial cellulose derived from two nitrogen sources: Ammonium sulphate and yeast extract as an indicator of smart packaging on fresh meat. *IOP Conference Series: Earth and Environmental Science*, 355(1). <https://doi.org/10.1088/1755-1315/355/1/012040>
- Fadlelmoula, A., Pinho, D., Carvalho, V. H., Catarino, S. O., & Minas, G. (2022). Fourier Transform Infrared (FTIR) Spectroscopy to Analyse Human Blood over the Last 20 Years: A Review towards Lab-on-a-Chip Devices. *Micromachines*, 13(2). <https://doi.org/10.3390/mi13020187>
- Fitriany, D. S., Annaziha, S., Syamsuddin, H. S. A., & Khumaira, A. (2023). Dhea Sandra Fitriany, Salma Annaziha, Hiskia Sains Assajuly Syamsuddin, Annisa KhuBIO-PACK: BIODEGRADABLE PACKAGING PATI SINGKONG SEBAGAI SOLUSI PENCEMARAN LIMBAH PLASTIK KONVENSIONAL. *Journal of Comprehensive Science*, 2(1), 430–437.
- Grzebieciarz, W., Biswas, D., Roy, S., & Jamróz, E. (2023). Advances in biopolymer-based multi-layer film preparations and food packaging applications. *Food Packaging and Shelf Life*, 35.
- Hariyanto, A. (2023). Analisis Sem (Scanning Electron Microscope) Dan Foto Mikro Pada Material Komposit Serat Tangkai Jagung Dengan Matriks Plastik Polipropilen. *AutoMech : Jurnal Teknik Mesin*, 3(01), 15–22. <https://doi.org/10.24269/jtm.v3i01.6889>
- Hariyanto, A., Yuswanto, & Kuncoro, P. S. (2023). Analisis SEM (Scanning Electrone Microscope) dan Foto Mikro pada Material Komposit Serat Tangkai Jagung dengan Matriks Plastik Polipropilen. *Jurnal Teknik Mesin*, 3(1), 15–22.
- Huang, C. H., Wu, J. S., Huang, C. C., & Lin, L. S. (2003). Adhesion, Permeability, and Mechanical Properties of Multilayered Blown Films Using Maleated Low-Density Polyethylene Blends as Adhesion-Promoting Layers. *Polymer Journal*, 35(12), 978–984. <https://doi.org/10.1295/polymj.35.978>
- Iswarin, S. J., Nuriyah, L., & Sriwilujeng, A. I. (2013). Hubungan Gugus Fungsi Plastik Biodegradabel Metil Akrilat dan Pati Garut Terhadap

- Sifat Mekaniknya. *Natural*, 2(2), 178–183.
- Jaime, S. B. M., Alves, R. M. V., & Bócoli, P. F. J. (2022). Moisture and oxygen barrier properties of glass, PET and HDPE bottles for pharmaceutical products. *Journal of Drug Delivery Science and Technology*, 71(January).
<https://doi.org/10.1016/j.jddst.2022.103330>
- JIS 2-1707. (2003). Plastics - Determination of thickness. *Japanese Industrial Standards Committee (JISC)*.
- JIS K 7113:2019. (2019). Plastics - Determination of tensile properties. *Japanese Industrial Standards Committee (JISC)*.
- Kong, U., Rawi, N. F. M., & Tay, G. S. (2023). The Potential Applications of Reinforced Bioplastics in Various Industries: A Review. *Polymers*, 15(10).
- Liu, Z., Lin, D., Lopez-Sanchez, P., & Yang, X. (2020). Characterizations of Bacterial Cellulose Nano fibers Reinforced Edible Films Based On Konjac Glucomannan. *International Journal of Biological Macromolecules*, 145, 634–645.
- Mairiza, L., Mariana, Ramadhany, M., & Feviyussa, C. A. (2017). The effect of starch-garlic powder ratio on degradation rate of Gadung starch bioplastic. *IOP Conf. Series: Materials Science and Engineering*, 334.
- Mandasari, A., Safitri, M. F., Perangin-angin, E. R., Sunarwati, D., Nasution, Safitri, W. D., & Indriati, H. (2017). KARAKTERISASI UJI KEKUATAN TARIK (TENSILE STRENGTH) FILM PLASTIK BIODEGRADABLE DARI TANDAN KOSONG KELAPA SAWIT DENGAN PENGUAT ZINK OKSIDA DAN GLISEROL. *Jurnal Hasil Penelitian Bindang Fisika*, 5(2), 1–6.
- Mar, C., Andr, C., Manuel, P., Andr, C., Plou, F. J., & Eduardo, P. (2024). Antioxidant Metabolism Pathways in Vitamins , Polyphenols , and Selenium: Parallels and Divergences. *International Journal Molecular Sciences*, 25(2600).
- Martha, R., & Sutoyo, S. (2021). PEMBUATAN DAN KARAKTERISASI PLASTIK BIODEGRADABLE DARI KOMPOSIT HDPE (HIGH DENSITY POLYETHYLENE) DAN PATI UMBI SUWEG (*Amorphophallus campanulatus*). 10(1), 85–95.
- Mohan, S., & Panneerselvam, K. (2022). A short review on mechanical and barrier properties of polylactic acid-based films. *Materials Today: Proceedings*, 56(6), 3241–3246.
- Nandiyanto, A. B. D., Oktiani, R., & Ragadhita, R. (2019). How to read and interpret ftir spectroscopy of organic material. *Indonesian Journal of Science and Technology*, 4(1), 97–118.
<https://doi.org/10.17509/ijost.v4i1.15806>
- Nigam, S., Das, A. K., & Patidar, M. K. (2021). Synthesis, characterization and biodegradation of bioplastic films produced from *Parthenium hysterophorus* by incorporating a plasticizer (PEG600).

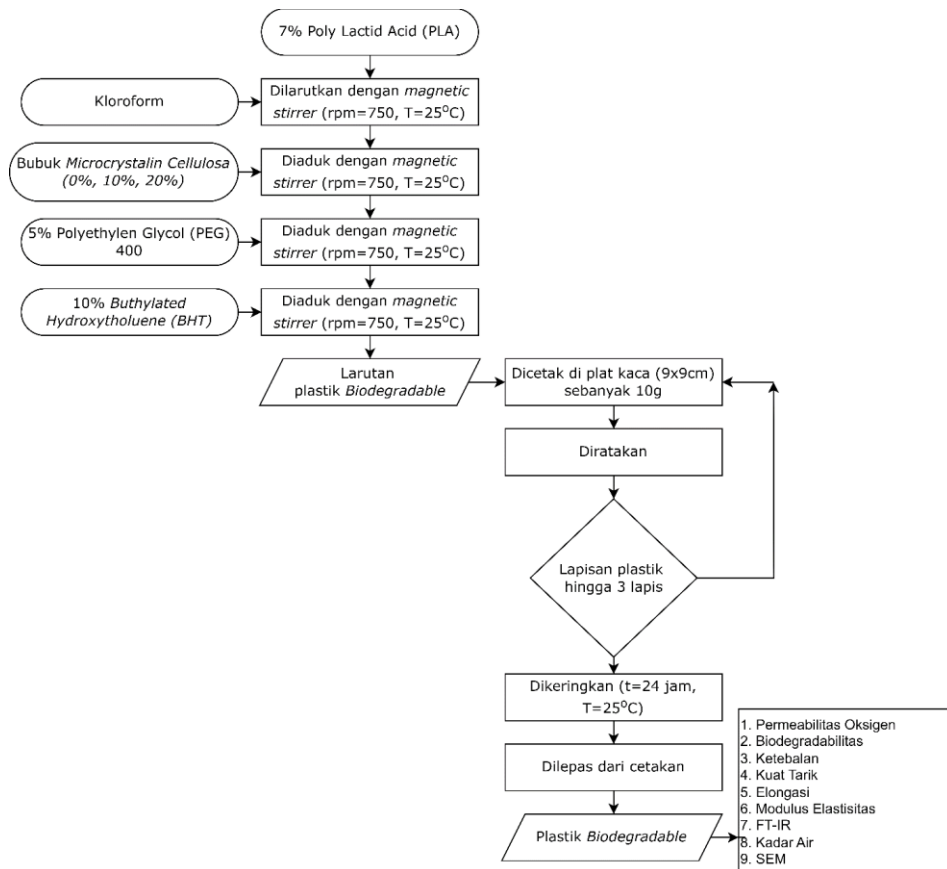
- Environmental Challenges*, 5(July), 100280.
<https://doi.org/10.1016/j.envc.2021.100280>
- Nissa, R. C., Fikriyyah, A. K., Pudjaraharti, A. H. D., & Abdullah, S. (2018). Preliminary study of biodegradability of starch-based bioplastics using ASTM G21-70, dip-hanging, and Soil Burial Test methods. *IOP Conf. Series: Earth and Environmental Science*, 277.
- Nurhadi, T., Budiyanoro, C., & Sosiati, H. (2017). IDENTIFIKASI MECHANICAL PROPERTIES DARI BAHAN DAUR ULANG POLYSTYRENE. *JMPM: Jurnal Material Dan Proses Manufaktur*, 1(1), 36–40.
- Nurulhasni, D. (2023). Homemade BIOPLASTICS (Biodegradable Plastic From Cassava Peel Waste) with Analysis of the Effect of Glycerol and Cellulose Ratio on Tensile Strength, Elongation, and Thickness. *JST (Jurnal Sains Dan Teknologi)*, 12(1), 56–64.
<https://doi.org/10.23887/jstundiksha.v12i1.51464>
- Platnieks, O., Gaidukovs, S., Barkane, A., Sereda, A., Gaidukova, G., Grase, L., Thakur, V. K., Filipova, I., & Fridrihsone, V. (2020). Bio-Based Poly(butylene succinate)/Microcrystalline Cellulose/Nanofibrillated Cellulose-Based Sustainable Polymer Composites: Thermo-Mechanical and Biodegradation Studies. *Polymers*, 12(1472).
- Putra, E. P. D., Thamrin, E. S., & Saputra, H. (2019). Effect of Dragon Fruit Skin Extract (*Hylocereus costaricensis*) on Bio-plastic Physical and Mechanical Properties of Cassava Starch and Polyvinyl Alcohol. *IOP Conference Series: Earth and Environmental Science*, 258(1).
<https://doi.org/10.1088/1755-1315/258/1/012047>
- Resende, R., Silva, A., Marques, C. S., & Arruda, T. R. (2023). *Biodegradation of Polymers : Stages , Measurement , Standards and Prospects*. 371–399.
- Rini, F., Yulneriwarni, & Sukara, E. (2022). Additional Nata de Coco on The Performance of Cassava Starch Based Bioplastic. *Journal of Tropical Biodiversity*, 3(1), 43–51.
- Roberta, A. M. (2020). Oxygen scavenging films and coating of biopolymers for food application. *Biopolymer Membranes and Films*, 535–551. <https://doi.org/https://doi.org/10.1016/b978-0-12-818134-8.00022-5>
- Sakti, D. I., Setyana, B., Tauviqirrahman, M., Jurusan, M., Mesin, T., Teknik, F., Diponegoro, U., Jurusan, D., Mesin, T., Teknik, F., & Diponegoro, U. (2023). Studi Perbandingan Investigasi Modulus Elastisitas Antara Metode Uji Tarik dengan Metode Indentasi Pada Material Styrene BUTADIENE RUBBER 25 (SBR-25). *Jurnal Teknik Mesin S-1*, 11(2), 147–156.
- Salfitra, M., & Putra, A. (2023). EFFECT OF CALCIUM CARBONATE (CaCO₃) ADDITIVES ON THE QUALITY OF CELLULOSE-BASED BIODEGRADABLE PLASTICS BACTERIA-POLYETHYLENE

- GLYCOL (PEG) OF COCONUT WATER (*Cocos Nucifera*). *Electrolyte*, 2(1), 65–72. <https://journals.insparagonsociety.org>
- Santoso, R. A., & Atma, Y. (2020). Physical Properties of Edible Films from *Pangasius catfish* Bone Gelatin-Breadfruits Strach with Different Formulations. *Indonesian Food Science and Technology Journal*, 3(2), 42–47. <https://doi.org/10.22437/ifstj.v3i2.9498>
- Sari, W. N., Saebani, S., & Dhanardhono, T. (2018). PENGARUH PEMBERIAN BUTYLATED HYDROXYTOLUENE (2,6-DI-TERT-BUTYL-4-METHYLPHENOL) PER ORAL DOSIS BERTINGKAT TERHADAP GAMBARAN HISTOPATOLOGIS HEPAR TIKUS WISTAR. *Jurnal Kedokteran Diponegoro*, 7(2), 1344–1357.
- Satriawan, & Illing, I. (2017). Uji FTIR Bioplastik dari Limbah Ampas Sagu dengan Penambahan Variasi Konsentrasi Gelatin. *Jurnal Dinamika*, 8(1–13).
- Sujatno, A., Salam, R., Bandriyana, & Dimyati, A. (2015). Studi Scanning Electron Microscopy (SEM) untuk Karakterisasi Proses Oksidasi Paduan Zirkonium. *Jurnal Forum Nuklir*, 9(2).
- Sulaeman, B. (2018). Modulus Elastisitas Berbagai Jenis Material. *PENA TEKNIK: Jurnal Ilmiah Ilmu-Ilmu Teknik*, 3(2), 127. https://doi.org/10.51557/pt_jiit.v3i2.176
- Utami, M. R., Latifah, & Widiart, N. (2014). SINTESIS PLASTIK BIODEGRADABLE DARI KULIT PISANG DENGAN PENAMBAHAN KITOSAN DAN PLASTICIZER GLISEROL. *Indonesian Journal of Chemical Science*, 3(2).
- Wiradipta, I. D. G. A. (2017). PEMBUATAN PLASTIK BIODEGRADABLE BERBAHAN DASAR SELULOSA DARI TONGKOL JAGUNG. In *Skripsi*. Institut Teknologi Sepuluh Nopember.
- Xu, Y., Liu, X., Jiang, Q., Yu, D., Xu, Y., Wang, B., & Xia, W. (2021). Development and properties of bacterial cellulose, curcumin, and chitosan composite biodegradable films for active packaging materials. *Carbohydrate Polymers*, 260, 117778. <https://doi.org/https://doi.org/10.1016/j.carbpol.2021.117778>
- Yuniarto, K., Lastriyanto, A., & Kurniawan, H. (2020). Permeabilitas Oksigen Kemasan Aktif Polylactic Acid-Butylated Hydroxytoluene Oxygen Permeability Active Packaging Polylactic Acid-Butylated Hydroxytoluene. *Jurnal Teknologi Pertanian*, 21(2), 136–143.
- Yupa, N. P., Sunardi, & Irawati, U. (2021). Synthesis And Characterization Of Alginate Based Bioplastic With The Addition Of Nanocellulose From Sago Frond As Filler. *JUSTEK: JURNAL SAINS DAN TEKNOLOGI*, 4(1), 30–39.
- Zahan, K. A., Azizul, N. M., Mustapha, M., Tong, W. Y., Rahman, M. S. A., & Sahuri, I. S. (2020). Application of bacterial cellulose film as a biodegradable and antimicrobial packaging material. *Materials Today: Proceedings*, 31(xxxx), 83–88. <https://doi.org/10.1016/j.matpr.2020.01.201>

- Zeenat, Elahi, A., Bukhari, D. A., Shamim, S., & Rahman, A. (2021). Plastics degradation by microbes: A sustainable approach. *Journal of King Saud University - Scienc*, 33(6).
- Zenata, R., Lutfi, M., & Masruroh. (2015). Pembuatan dan Karakterisasi Kadar Air dan Gugus Fungsi Plastik Biodegradable Berbahan Dasar Pati Umbi Walur. *Jurnal Bioproses Komoditas Tropis*, 3(2), 47–52.

LAMPIRAN

Lampiran 1. Diagram Alir Pembuatan Plastik Biodegradable Berpenyerap Oksigen



Lampiran 2. Hasil Analisis One-Way ANOVA Tingkat Biodegradabilitas

→ **Oneway****ANOVA**

Kehilangan berat

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1309.661	4	327.415	289.722	.000
Within Groups	11.301	10	1.130		
Total	1320.962	14			

Post Hoc Tests**Homogeneous Subsets****Kehilangan berat**Duncan^a









Interval waktu	N	Subset for alpha = 0.05				
		1	2	3	4	5
H1	3	2.3800				
H2	3		7.2833			
H3	3			13.2333		
H4	3				19.8800	
H5	3					28.8933
Sig.		1.000	1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

Lampiran 3. Dokumentasi Penelitian

- Pembuatan Plastik *biodegradable*

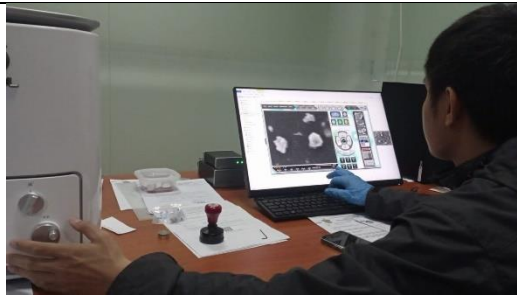
			
Proses pelarutan PLA ke dalam kloroform	Proses penimbangan bubuk MC kedalam larutan	Proses penambahan bubuk MC kedalam larutan	Proses penambahan PEG-400
			
Penambahan BHT kedalam larutan plastik	Larutan dihomogenisasi	Proses pencetakan larutan plastik	Hasil lembaran plastik biodegradable

- Pengujian SEM

			
Peletakan sampel pada blok sampel	Kenampakan sampel	Proses coating untuk meningkatkan sifat konduktor	Proses coating kedua

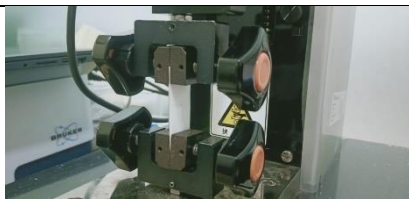


Peletakan sampel pada ruang vakum



Proses pengamatan morfologi permukaan sampel plastik biodegradable

- Pengujian Ketebalan, Kuat Tarik, Elongasi dan Modulus Elastisitas



Proses uji sifat fisik plastik

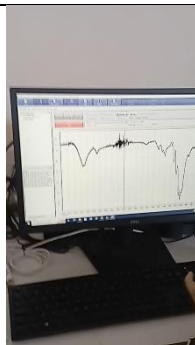


Kenampakan plastik setelah mengalami putus

- Pengujian FTIR



Proses kalibrasi dan peletakan sampel plastik pada sensor



Proses pemindaian sampel



Data sampel uji FTIR

- Pengujian Permeabilitas Oksigen



- Pengujian tingkat biodegradabilitas



- Pengujian Kadar Air



CURRICULUM VITAE

A. Data Pribadi

1. Nama : Abel Yandi Novrain
2. Tempat, tgl. Lahir : Makassar, 20 November 2002
3. Alamat : BSR II, Moncongloe, Maros
4. Kewarganegaraan : Warga Negara Indonesia

B. Riwayat Pendidikan

1. Tamat SD tahun 2014 di SDN Nusa Indah 1
2. Tamat SMP tahun 2017 di SMP Katolik Sanjaya
3. Tamat SMA tahun 2020 di SMAN 3 Banjarbaru

C. Pekerjaan dan Riwayat Pekerjaan

1. Jenis Pekerjaan : Mahasiswa
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3. Pangkat/Jabatan : -