

DAFTAR PUSTAKA

- Ab'ror, R. W., Chamisijatin, L., Waluyo, L., Hindun, I., dan Setyawan, D. 2020. Pengaruh gliserol terhadap sifat mekanik bioplastik pati kulit pisang raja (*Musa paradisiaca* L.). In *Prosiding Seminar Nasional Pendidikan Biologi*.
- Abdullah, A. H. D., Fikriyyah, A. K., and Dewantoro, R. 2019. Fabrication and characterization of starch based bioplastics with palm oil addition. *Jurnal Sains Materi Indonesia*, 20(3), 126–131. <https://doi.org/10.17146/jsmi.2019.20.3.4846>.
- Agulhon, Pierre, Velina Markova, Mike Robitzer, Françoise Quignard, and Tzonka Mineva. 2012. "Structure of Alginate Gels: Interaction of Diuronate Units with Divalent Cations from Density Functional Calculations." *Biomacromolecules* 13(6):1899–1907
- Akawijuka, O., Gepreel, M. A.-H., Abdel-Mawgood, A., Yamamoto, M., Saito, Y., and Hassanin, A. H. 2022. Overview of Banana Cellulosic Fibers: Agro-Biomass Potential, Fiber Extraction, Properties, and Sustainable Applications. *Biomass Conversion and Biorefinery*, 1–17. <https://doi.org/10.1007/s13399-022-02819-0>
- Alabi, O. A., Ologbonjaye, K. I., Awosolu, O., and Alalade, O. E. 2019. Public and Environmental Health Effects of Plastic Wastes Disposal: A Review. *J Toxicol Risk Assess*, 5, 021.
- Alam, M. K. 2021. A comprehensive review of sweet potato (*Ipomoea batatas* [L.] Lam): Revisiting the associated health benefits. In , 115. *Trends in food science and technology* (pp. 512–529). Elsevier Ltd.. <https://doi.org/10.1016/j.tifs.2021.07.001>
- Alam, M. K., Sams, S., Rana, Z. H., Akhtaruzzaman, M., and Islam, S. N. 2020. Minerals, vitamin C, and effect of thermal processing on carotenoids composition in nine varieties orange-fleshed sweet potato (*Ipomoea batatas* L.). *Journal of Food Composition and Analysis*, 92. <https://doi.org/10.1016/j.jfca.2020.103582>
- Amagloh, F. C., Kaaya, A. N., Yada, B., Chelangat, D. M., Katungisa, A., Amagloh, F. K., and Tumuhimbise, G. A. 2022. Bioactive compounds and antioxidant activities in peeled and unpeeled sweetpotato roots of different varieties and clones in Uganda. *Future Foods*, 6. <https://doi.org/10.1016/j.fufo.2022.100183>
- Aminah, N. S., Isma, C., dan Kristanti, A. N. 2019. Skopoletin Suatu Senyawa Fenilpropanoid Dari Ekstrak Etil Asetat Umbi Ubi Jalar (*Ipomoea batatas* L.). *J. Kim. Ris*, 3(2).
- Anastacio, A, and Carvalho, I. S. Phenolics extraction from sweet potato peels: Key factors screening through a Placket Burman design.2013. *Industrial Crops and Products*, v.43, n.1, p.99-105, 2013. Available from: doi: 10.1016/j.indcrop.2012.07.011.

- Aranda Garcia, F.J., Gonzalez Nunez, R., Jasso Gastinel, C.F., and Mendizabal, E. 2015. Water absorption and thermomechanical characterization of extruded starch/ poly (lactic acid)/agave bagasse fiber bioplastic composites. *Int. J. Polym. Sci.* 2015, 343294
- Aripin, S., Saing, B., dan Kustiyah, E. 2017. Studi pembuatan bahan alternatif plastik *biodegradable* dari pati ubi jalar dengan plasticizer gliserol dengan metode melt intercalation. *Jurnal Teknik Mesin (JTM)*, 6(2), 79-84.
- Ariska Rizani Eka dan Suyanto. 2015. Pengaruh Konsentrasi Karagenan Terhadap Sifat Fisik dan Mekanik Edible film dari Pati Bonggol Pisang dan Karagenan Dengan Plasticizer Gliserol. *Jurnal Kimia*. 4(3), 34-40.
- Arjun, J., Manju, R., Rajeswaran, S and Chandru, M. 2023. Banana peel starch to biodegradable alternative products for commercial plastics. *GSC Biological and Pharmaceutical Sciences*, 22(2), 234-244. <https://doi.org/10.30574/gscbps.2023.22.2.0066>
- Asngad, A., Marudin, E. J., dan Cahyo, D. S. 2020. Kualitas bioplastik dari umbi singkong karet dengan penambahan kombinasi plasticizer gliserol dengan sorbitol dan kitosan. *Bioeksperimen: Jurnal Penelitian Biologi*, 6(1), 36-44. <https://doi.org/10.23917/bioeksperimen.v6i1.10431>
- ASTM Annual Standar and Technical Measurement D 1005-95. 2001. *Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers*. United States.
- ASTM International. 2022. *Standard test method for waterabsorption of plastics. Technical report*. ASTM International. United States.
- ASTM, American Society for Testing and Materials (US). 2002. *Standard Test Methods for Tensile Properties of Plastics*. Standard Designation : D 882-02.
- Astuti, P. and Erprihana, A.A., (2014). Antimicrobial Edible Film from Banana Peels as Food Packaging. *American Journal of Oil and Chemical Technologies*, 2(2), pp.65-70.
- Azahari, N.A., Othman, N., Ismail, H., 2011. Biodegradation studies of polyvinyl alcohol/corn starch blend films in solid and solution media. *J. Phys. Sci.* 22 (2), 15–31.
- Badan Standardisasi Nasional. SNI. 2016. Standar Mutu Kategori Produk Tas Belanja Plastik dan Bioplastik Mudah Terurai. *SNI 7188.7.2016*. Standardisasi Indonesia, Jakarta.
- Badan Standardisasi Nasional. SNI. 2016. *Produk Tas Belanja Plastik dan Bioplastik Mudah Terurai SNI 7188:2016*. Standardisasi Indonesia, Jakarta.

- Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian Kementerian Lingkungan Hidup dan Kehutanan Republik Indonesia (KLHK RI), "Capaian Kinerja Pengelolaan Sampah," KLHK RI, diakses Juli 19, 2023, <https://sipsn.menlhk.go.id/sipsn/public/data/capaian>.
- Ballesteros-Mártinez, L., Pérez-Cervera, C., and Andrade-Pizarro, R. 2020. Effect of glycerol and sorbitol concentrations on mechanical, optical, and barrier properties of sweet potato starch film. *NFS journal*, 20, 1-9. <https://doi.org/10.1016/j.nfs.2020.06.002>
- Bank, M. S., Swarzenski, P.W., Duarte, C.M., Rilig, M. C., Koelmans, A.A., Metian, M., and Ok, Y. S. 2021. Global Plastic Pollution Observation System to Aid Policy. *Environmental Science and Technology*, 55 (12), 7770-7775. <https://doi.org/10.1021/acs.est.1c00818>
- Ben, Elfi Sahlan, Zulianis and Halim A. 2014. Studi Pemisahan Amilosa Dan Amilopektin Pati Singkong Dengan Fraksinasi Butanol – Air. *J Sains Dan Teknol Farm* [Internet]. 2014;12(Issn 1410 – 0177):1–11.
- Ben, Z. Y., Samsudin, H., and Yhaya, M. F. 2022. Glycerol: Its properties, polymer synthesis, and applications in starch based films. *European Polymer Journal*, 175, 111377. <https://doi.org/10.1016/j.eurpolymj.2022.111377>
- Bhatia, S. K., Hwang, J. H., Oh, S. J., Kim, H. J., Shin, N., Choi, T. R., Kim, H. J., Jeon, J. M., Yoon, J.J.,and Yang, Y. H. 2023. Macroalgae as a source of sugar and detoxifier biochar for polyhydroxyalkanoates production by *Halomonas* sp. YLGW01 under the unsterile condition. *Bioresource Technology*, 384, 129290.
- Bhavani, M., Morya, S., Saxena, D., and Awuchi, C. G. 2023. Bioactive, antioxidant, industrial, and nutraceutical applications of banana peel. *International Journal of Food Properties*, 26(1), 1277–1289. <https://doi.org/10.1080/10942912.2023.2209701>
- Budianto, A., Ayu, D. F., dan Johan, V. S. 2019. Pemanfaatan pati kulit ubi kayu dan selulosa kulit kacang tanah pada pembuatan plastik biodegradable. *Sagu*, 18(2), 11-18. <http://dx.doi.org/10.31258/sagu.v18i2.7868>
- Cao, Y., Tian, B., Zhang, Z., Yang, K., Cai, M., Hu, W., Guo, Y., Xia, Q., and Wu, W. 2022. Positive effects of dietary fiber from sweet potato (*Ipomoea batatas* L. Lam.) peels by different extraction methods on human fecal microbiota in vitro fermentation. *Frontiers in Nutrition*, 9. <https://doi.org/10.3389/fnut.2022.986667>
- Carpenter, M.A., Shaw, M., Cooper, R.D., Frew, T.J., Butler, R.C., Murray, S.R., Moya, L., Coyne, C.J., and Timmerman-Vaughan, G.M. 2017. Association mapping of starch chain length distribution and amylose content in pea (*Pisum sativum* L.) using carbohydrate metabolism candidate genes. *BMC Plant Biol*. 17, 132.

- Cengristitama, C., Herdiansyah, H., dan Sari, M. W. 2023. Pengaruh Penambahan Kitosan Dan Plasticizer Sorbitol Pada Proses Pembuatan Plastik Biodegradable Berbahan Dasar Pati Kulit Pisang Tanduk. *Jurnal TEDC*, 17(2), 134-140. <https://ejournal.poltekdedc.ac.id/index.php/tedc/article/view/712>
- Cerqueira, M.A., Souza, B.W.S., Teixeira, J.A., Vicente, A.A., 2012. Effect of glycerol and corn oil on physicochemical properties of polysaccharide films—A comparative study. *Food Hydrocolloids* 27 (1), 175–184. <https://doi.org/10.1016/j.foodhyd.2011.07.007>
- Chandarana, J., and Chandra, S. 2021. Production of Bioplastics from banana peels. *International Journal of Scientific Research & Engineering Trends*, 7(1), 131-133.
- Chandra, J., George, N., and Narayananakutty, S. 2016. Isolation and Characterization of Cellulose Nanofibrils from Arecanut Husk Fibre. *Journal Carbohydrate Polymers*, 142, 158-166.
- Chandrasekar, C. M., Krishnamachari, H., Farris, S., and Romano, D. 2023. Development and characterization of starch-based bioactive thermoplastic packaging films derived from banana peels. *Carbohydrate Polymer Technologies and Applications*, 100328. <https://doi.org/10.1016/j.carpta.2023.100328>
- Chiumarelli, M., and Hubinger, M. D. 2014. Evaluation of edible films and coatings formulated with cassava starch, glycerol, carnauba wax and stearic acid. *Food hydrocolloids*, 38, 20-27.
- Christwardana, M., Ismojo, I., and Marsudi, S. 2022. Biodegradation kinetic study of cassava and tannia starch-based bioplastics as green material in various media. *Molekul*, 17(1), 19-29. <https://doi.org/10.20884/1.jm.2022.17.1.5591>
- Clagnan, E., Cucina, M., De Nisi, P., Dell'Orto, M., D'Imporzano, G., Kron-Morelli, R., and Adani, F. 2023. Effects of the application of microbiologically activated bio-based fertilizers derived from manures on tomato plants and their rhizospheric communities. *Scientific Reports*, 13(1), 22478. <https://doi.org/10.1038/s41598-023-50166-5>
- Coates, J. P. 2010. Infrared spectroscopy for process analytical applications. *Process analytical technology: Spectroscopic tools and implementation strategies for the chemical and pharmaceutical industries*, 157-194.
- Coniwanti, P., Linda L, dan Mardiyah R.A. 2014. Pembuatan Film Plastik Biodegradable dari Pati Jagung Dengan Penambahan Khitosan dan Pemplastis Gliserol. *Jurnal Teknik Kimia Universitas Sriwijaya*, 20(4), 22-30.
- Cortés-Rodríguez, M., Villegas-Yépez, C., González, J. H. G., Rodríguez, P. E., and Ortega-Toro, R. 2020. Development and evaluation of edible films based on cassava starch, whey protein, and bees wax. *Heliyon*, 6(9).

<https://doi.org/10.1016/j.heliyon.2020.e04884>

- Czaikoski, A., da Cunha, R. L., and Menegalli, F. C. 2020. Rheological behavior of cellulose nanofibers from cassava peel obtained by combination of chemical and physical processes. *Carbohydrate Polymers*, 248. <https://doi.org/10.1016/j.carbpol.2020.116744>
- Darni, Y., Dewi, F.Y., & Lismeri, L., 2017. Modification of Sorghum Starch-Cellulose Bioplastics with Sorghum Stalks Filler. *Jurnal Rekayasa Kimia dan Lingkungan* 12 (1), 22–30. <https://doi.org/10.23955/rkl.v12i1.5410>
- De Azêvedo, L. C., Rovani, S., Santos, J. J., Dias, D. B., Nascimento, S. S., Oliveira, F. F., and Fungaro, D. A. 2021. Study of renewable silica powder influence in the preparation of bioplastics from corn and potato starch. *Journal of Polymers and the Environment*, 29, 707-720.
- Debterea, B. 2019. Synthesis and experimental study of production bioplastic from banana peels. *Addis Ababa Science and Technology University, College of Biological and Chemical Engineering*, 1-44.
- Deepa, B., Abraham, E., Pothan, L. A., Cordeiro, N., Faria, M., and Thomas, S. 2016. Biodegradable nanocomposite films based on sodium alginate and cellulose nanofibrils. *Materials*, 9(1), 50.
- Derardja, A. eddine, Pretzler, M., Kampatsikas, I., Radovic, M., Fabisikova, A., Zehl, M., Barkat, M., and Rompel, A. 2022. Polyphenol oxidase and enzymatic browning in apricot (*Prunus armeniaca* L.): Effect on phenolic composition and deduction of main substrates. *Current Research in Food Science*, 5, 196–206. <https://doi.org/10.1016/j.crfs.2021.12.015>
- Desramadhani, R., and 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.
- dos Santos Caetano, K., Lopes, N. A., Costa, T. M. H., Brandelli, A., Rodrigues, E., Flôres, S. H., and Cladera-Olivera, F. 2018. Characterization of active biodegradable films based on cassava starch and natural compounds. *Food packaging and shelf life*, 16, 138-147.
- Fakhouri, Farayde Matta, Silvia Maria Martelli, Thiago Caon, José Ignacio Velasco, and Lucia Helena Innocentini Mei. 2015. “Edible Films and Coatings Based on Starch/Gelatin: Film Properties and Effect of Coatings on Quality of Refrigerated Red Crimson Grapes.” *Postharvest Biology and Technology* 109. Elsevier B.V.: 57–64. doi:10.1016/j.postharvbio.2015.05.015.
- Falcomer, A. L., Riquette, R. F. R., de Lima, B. R., Ginani, V. C., & Zandonadi, R. P. J. N. 2019. Health Benefits of Green Banana Consumption: A Systematic Review. *Nutrients*, 11(6), 1222. <https://doi.org/10.3390/nu11061222>

- Fani, A. M., Suryanto, F., Wahjono, H. D., Sahwan, F. L., Wahyono, S., dan Sopiah, R. N. 2022. Perancangan Sistem Lisimeter untuk Pengujian Biodegradabilitas Sampah Bioplastik: Lysimeter Design for Biodegradability Testing of Bioplastic Waste. *Jurnal Teknologi Lingkungan*, 23(1), 092-099.
- FAOSTAT. 2020. *Production quantity of banana 2018*. Food and Agriculture Organisation of the United Nations <http://www.fao.org/faostat/en/#data/QC>.
- Fardhyanti Dewi Selvia, dan Syara SJ. 2015. Karakteristik Edible film Berbahan Dasar Ekstrak Karagenan Dari Rumput Laut (*Eucheuma Cottonii*). *Jurnal Bahan Alam Terbarukan (JBAT)* 4(2):68-73.
- Ferreira, A. R., Alves, V. D., and Coelhos, I. M. 2016. Polysaccharide-Based Membranes In Food Packaging Applications. *Membranes*, 6(2), 22. <https://doi.org/10.3390/membranes6020022>
- Ferreira, D. C. M., Molina, G., and Pelissari, F. M. 2020. Biodegradable trays based on cassava starch blended with agroindustrial residues. *Composites Part B: Engineering*, 183. <https://doi.org/10.1016/j.compositesb.2019.107682>
- Fidrianny, I., and Insanu, M. 2014. In vitro antioxidant activities from various extracts of banana peels using ABTS, DPPH assays and correlation with phenolic, flavonoid, carotenoid content. *International Journal of Pharmacy and Pharmaceutical Sciences*, 299–303.
- Garlotta, D. 2001. A literature review of poly (lactic acid). *Journal of Polymers and the Environment*, 9, 63-84. <https://doi.org/10.1023/A:1020200822435>
- Geyer, R., Jambeck, J. R., and Law, K. L. 2017. Production, use, and fate of all plastics ever made. *Science advances*, 3(7), e1700782. <https://doi.org/10.1126/sciadv.1700782>
- Ghamande, M., Kulkarni, A., Shah, N., Kothari, S., and Bhosale, S. 2018. Bio-plastic (generating plastic from banana peels). In International conference on new frontiers of engineering, management, social science and humanities (pp. 39-42). <http://data.conferenceworld.in/25FebEM SSH/9.pdf>
- Ghoshal, G., and Chopra, H. 2022. Impact of apricot oil incorporation in tamarind starch/gelatine based edible coating on shelf life of grape fruit. *Journal of Food Measurement and Characterization*, 16(2), 1274–1290. <https://doi.org/10.1007/s11694-021-01234-9>
- Ghoshal, G., and Kaur, M. 2023. Optimization of extraction of starch from sweet potato and its application in making edible film. *Food Chemistry Advances*, 3, 100356. <https://doi.org/10.1016/j.focha.2023.100356>
- Goel, V., Luthra, P., Kapur, G.S., and Ramakumar, S., 2021. Biodegradable/Bio-Plastics: Myths and Realities. *J. Polym. Environ.* 29 (10), 3079–3104. <https://doi.org/10.1007/s10924-021-02099-1>

- Gomes, S., Vieira, B., Barbosa, C., and Pinheiro, R. 2020. Evaluation of mature banana peel flour on physical, chemical and texture properties of a gluten free Rissol. *Journal of Food Processing and preservation*, e14441. <https://doi.org/10.1111/jfpp.14441>
- Guidotti, G., Soccio, M., Lotti, N., Gazzano, M., Siracusa, V., and Munari, A. 2018. Poly (propylene 2, 5-thiophenedicarboxylate) vs. Poly (propylene 2, 5-furandicarboxylate): Two examples of high gas barrier bio-based polyesters. *Polymers*, 10(7), 785. <https://doi.org/10.3390/polym10070785>
- Haedar, N., Clara, T., Fahrudin, Abdullah, A. A., Fausiah, S., and Rapak, M. T. 2019. Selection of plastic degradation indigenous bacteria isolated from tamangapa landfill Macassar city. In *Journal of physics: conference series* (Vol. 1341, No. 2, p. 022023). IOP Publishing.
- Haedara, N., Jamaluddina, M. P., Fahruddina, Z. D., Zainuddinb, Z., Gania, F., and Tuwoa, M. 2023. Optimization and Analysis of Polyhydroxyalkanoate (PHA) by Bacillus sp. Strain CL33 and Bacillus flexus Strain S5a from Palm Oil Mill Waste. *International Journal on Advanced Science, Engineering & Information Technology*, 13(6).
- Hamidah, H., Muzaki, H., and Kholidah, N. 2021. Rice Flour Potential As Biodegradable Plate (Bioplastic) In Terms Of It's Characteristics. *Stannum: Jurnal Sains dan Terapan Kimia*, 3(2), 49-55.
- Hamzah, F. H., Sitompul, F. F., Ayu, D. F., and Pramana, A. 2021. Effect of the glycerol addition on the physical characteristics of biodegradable plastic made from oil palm empty fruit bunch. *Industria: Jurnal Teknologi dan Manajemen Agroindustri*, 10(3), 239-248. <https://doi.org/10.21776/ub.industria.2021.010.03.5>
- Hasri, H., Syahrir, M., and Pratiwi, D. E. 2021. Synthesis and characterization of bioplastics made from chitosan combined using glycerol plasticizer. *Indonesian Journal Of Fundamental Sciences*, 7(2), 110-119. <https://doi.org/10.26858/ijfs.v7i2.26348>
- Hayati, N., and Lazulva, L. 2018. Preparing of Cornstarch (*Zea mays*) Bioplastic Using ZnO Metal. *Indonesian Journal of Chemical Science and Technology*, 1(1), 23-30.
- Hidayat, S., Hanif, A., Abdullah, D., Septiyanto, R. F., Rama, Y., Muchtar, D., and Affifah, I. 2019. Perbandingan Sifat Mekanik Bioplastik Terhadap Penambahan Zinc Oxide (ZnO). Gravity: *Jurnal Ilmiah Penelitian Dan Pembelajaran Fisika*, 5(2), 8–12.
- Huzaisham, N. A., and Marsi, N. 2020. Utilization of Banana (*Musa paradisiaca*) Peel As Bioplastic for Planting Bag Application. *International Journal of Advanced Research in Engineering and Technology (IJARET)*, 11(4). <https://ssrn.com/abstract=3598064>

- Iamareerat, Butsadee, Manisha Singh, Muhammad Bilal Sadiq, and Anil Kumar Anal. 2018. Reinforced Cassava Starch Based Edible Film Incorporated with Essential Oil and Sodium Bentonite Nanoclay As Food Packaging Material. *Journal of food science and technology* 55: 1953-1959. <https://doi.org/10.1007/s13197-018-3100-7>
- Ibrahim, N. I., Shahar, F. S., Sultan, M. T. H., Shah, A. U. M., Safri, S. N. A., and Mat Yazik, M. H. 2021. Overview of bioplastic introduction and its applications in product packaging. *Coatings*, 11(11), 1423.
- Iflah, T. Sutrisno, dan T.C. Sunarti. 2012. Pengaruh kemasan starchbased plastics (Bioplastik) terhadap mutu tomat dan paprika selama penyimpanan dingin. *Jurnal Teknologi Industri Pertanian*. 22(3): 189–197.
- Indriyanto, I., Wahyuni, S., dan Pratjojo, W. 2014. Pengaruh penambahan kitosan terhadap karakteristik plastik biodegradable pektin lidah buaya. *Indonesian Journal of Chemical Science*, 3(2). <https://doi.org/10.15294/ijcs.v3i2.3506>
- Ingrao, C., Bacenetti, J., Bezama, A., Blok, V., Goglio, P., Koukios, E. G., and Huisingsh, D. 2018. The potential roles of bio-economy in the transition to equitable, sustainable, post fossil-carbon societies: Findings from this virtual special issue. *Journal of Cleaner Production*, 204, 471-488.
- Intandiana, S., Dawam, A. H., Denny, Y. R., Septiyanto, R. F., dan Affifah, I. 2019. Pengaruh karakteristik bioplastik pati singkong dan selulosa mikrokristalin terhadap sifat mekanik dan hidrofobisitas. *EduChemia (Jurnal Kimia dan Pendidikan)*, 4(2), 185-194. <https://doi.org/10.30870/educhemia.v4i2.5953>
- Ismet, Amni, C., Purwantiningsih, Saprudin, D., and Ellysa. 2021. Production of biodegradable plastics from sweet potato skins with the addition of chitosan. *Rasayan Journal of Chemistry*, 14(4). p2749. <https://doi.org/10.31788/RJC.2021.1446363>
- Jaakkola, S. T., Ravantti, J. J., Oksanen, H. M., and Bamford, D. H. 2016. Buried alive: microbes from ancient halite. *Trends in microbiology*, 24(2), 148-160.
- Japanese Industrial Standard 2-1707*. 1975. Japanese Standards Association. Japan.
- Jiang, H., Wang, F., Ma, R., Yang, T., Liu, C., Shen, W., and Tian, Y. 2024. Advances in valorization of sweet potato peels: A comprehensive review on the nutritional compositions, phytochemical profiles, nutraceutical properties, and potential industrial applications. *Comprehensive Reviews in Food Science and Food Safety*, 23(4), e13400. <https://doi.org/10.1111/1541-4337.13400>
- Johnson, PR, B., G., and VB, L. G. 2019. *Synthesis and Characterization of Biodegradable Plastic Films From Banana Peels-A Green Chemical Approach* (Doctoral dissertation, St. Teresa's College (Autonomous), Ernakulam).

- Kaeb, H. 2009. *Bioplastics: technology, markets, policies*. Berlin: European Bioplastics.
- Kakoria, A., and Sinha-Ray, S. 2018. A Review On Biopolymer-Based Fibers Via Electrospinning and Solution Blowing and Their Applications. *Fibers*, 6(3), 45. <https://doi.org/10.3390/fib6030045>
- Kamsiati, E., Herawati, H., dan Purwani, E. Y. 2017. *Potensi Pengembangan Plastik Biodegradable Berbasis Pati Sagu dan Ubikayu di Indonesia*. Jurnal Litbang Pertanian Vol. 36 No. 2 Desember 2017 : 67 – 76.
- Kawaguchi, H., Takada, K., Elkasaby, T., Pangestu, R., Toyoshima, M., Kahar, P., Ogino, C., Kaneko, T., and Kondo, A., 2022. Recent Advances In Lignocellulosic Biomass White Biotechnology for Bioplastics. *Bioresour. Technol.* 344, 126165. <https://doi.org/10.1016/j.biortech.2021.126165>
- Khodijah, S., dan Tobing, J. M. L. 2023. Tinjauan Plastik Biodegradable dari Limbah Tanaman Pangan sebagai Kantong Plastik Mudah Terurai. *TEKNOTAN*, 17(1), 21-26.
- Koller, M. 2019. Polyhydroxyalkanoate biosynthesis at the edge of water activity-haloarchaea as biopolyester factories. *Bioengineering*, 6(2), 34.
- Kumar, R., Ghoshal, G., and Goyal, M. 2019a. Moth bean starch (*Vigna aconitifolia*): isolation, characterization, and development of edible/biodegradable films. *Journal of food science and technology*, 56, 4891-4900. <https://doi.org/10.1007/s13197-019-03959-4>
- Kumar, R., Ghoshal, G., and Goyal, M. 2019b. Synthesis and functional properties of gelatine/CA-starch composite film: Excellent food packaging material. *Journal of Food Science and Technology*, 56, 1954–1965. <https://doi.org/10.1007/s13197-019-03662-4>
- Kumoro, A.C. and Hidayat, J.P. 2018. Functional and Thermal Properties of Flour Obtained from Submerged Fermentation os Durian (*Durio zibethinus Murr.*) Seed Chips Using *Lactobacillus Plantarum*. *Potravinarstvo*, 12, 607-614.
- Kumoro, A.C., dan A. Purbasari. 2014. Sifat mekanik dan morfologi plastik biodegradable dari limbah tepung nasi aking dan tepung tapioka menggunakan gliserol sebagai plasticizer. *J. Teknik*. 35(1): 8–16.
- Kustiyah, E., Novitasari, D., Wardani, L. A., Hasaya, H., dan Widiantoro, M. 2023. Pemanfaatan Limbah Ampas Tebu untuk Pembuatan Plastik Biodegradable dengan Metode Melt Intercalation: Utilization of Sugarcane Bagasses for Making Biodegradable Plastics with the Melt Intercalation Method. *Jurnal Teknologi Lingkungan*, 24(2), 300-306. Available from: <https://ejournal.brin.go.id/JTL/article/view/993>.

- Lamberti, F. M., Román-Ramírez, L. A., and Wood, J. 2020. Recycling of bioplastics: routes and benefits. *Journal of Polymers and the Environment*, 28, 2551-2571.
- Liang, R., Xu, S., Shoemaker, C.F., Li, Y., Zhong, F., and Huang, Q., 2012. Physical and Antimicrobial Properties of Peppermint Oil Nanoemulsions. *Journal of agricultural and food chemistry*, 60(30), pp.7548-7555. <https://doi.org/10.1021/jf301129k>
- Lin, Y. J., Qin, Z., Paton, C. M., Fox, D. M., and Kong, F. 2021. Influence of cellulose nanocrystals (CNC) on permeation through intestinal monolayer and mucus model in vitro. *Carbohydrate Polymers*, 263, 117984. <https://doi.org/10.1016/j.carbpol.2021.117984>
- Liu, M., Li, X., Zhou, S., Wang, T. T. Y., Zhou, S., Yang, K., and Wang, J. 2020. Dietary fiber isolated from sweet potato residues promotes a healthy gut microbiome profile. *Food and Function*, 11(1), 689–699. <https://doi.org/10.1039/c9fo01009b>
- Lusiana, S. W., Putri, D., Nurazizah, I. Z., and Bahruddin. 2019. Bioplastic Properties of Sago-PVA Starch with Glycerol and Sorbitol Plasticizers. *Journal of Physics: Conference Series*, 1351(1). <https://doi.org/10.1088/1742-6596/1351/1/012102>
- Ma, T., Hu, X., Lu, S., Cui, R., Zhao, J., Hu, X., and Song, Y. 2021. Cellulose nanocrystals produced using recyclable sulfuric acid as hydrolysis media and their wetting molecular dynamics simulation. *International Journal of Biological Macromolecules*, 184, 405-414.
- Maneking, E., Sangian, H. F., dan Tongkukut, S. H. J. 2020. Pembuatan dan Karakterisasi Bioplastik Berbahan Dasar Biomassa dengan Plasticizer Gliserol. *Jurnal Mipa*, 9(1), 23-27. <https://doi.org/10.35799/jmuo.9.1.2020.27420>
- Mardiyana, M. dan Kristiningsih, A. 2020. Dampak Pencemaran Mikroplastik di Ekosistem Laut terhadap Zooplankton. *Jurnal Pengendalian Pencemaran Lingkungan*, 2(1):29-36. <https://doi.org/10.35970/jppl.v2i1.147>
- Marlina, A., Widiaستuti, E., Chamidy, H. N., Lintang, N., Vidiati, A., dan Halawa, P. 2024. Pemanfaatan Bunga Kecombrang Sebagai Antioksidan dalam Pembuatan Plastik Film yang Edible. *Jurnal Serambi Engineering*, 9(2), 8829-8836. <https://jse.serambimekkah.id/index.php/jse/article/view/164>
- Marsita, A. R., Ratna, R., dan Putra, B. S. 2019. Kajian Variasi Lama Perendaman Dalam Larutan Natrium Metabisulfit (Na₂S₂O₅) Terhadap Kualitas Tepung Pisang Kepok (*Musa Paradisiaca*). *Jurnal Ilmiah Mahasiswa Pertanian*, 4(4), 552-561. <https://doi.org/10.17969/jimfp.v4i4.12670>

- Maulida, M. B., Harahap, A., Manullang, A., and Ginting, M. H. S. 2018. Utilization of jackfruit seeds (*Artocarpus heterophyllus*) in the preparing of bioplastics by plasticizer ethylene glycol. *ARPN Journal of Engineering and Applied Sciences*, 13, 240-244.
- Maura, C. S., Athariq, M., and Mulmeyda, R. 2024. Utilization of Plantain Peel (Musa sapientum) and Sweet Potato Starch (Ipomea batatas) Waste in Combination with Glycerol Addition to Produce Biodegradable Plastic. *Chemistry and Materials*, 3(2), 50-55. <https://doi.org/10.56425/cma.v3i2.77>
- Mohanan, N., Montazer, Z., Sharma, P. K., and Levin, D. B. 2020. Microbial and enzymatic degradation of synthetic plastics. *Frontiers in Microbiology*, 11, 580709. <https://doi.org/10.3389/fmicb.2020.580709>
- Moorthy, S. N., Sajeev, M. S., and Shnavas, S. 2012. Sweet Potato Starch : Physico-Chemical, Functional, Thermal and Rheological Characteristics. *Fruit, Vegetable and Cereal Science and Biotechnology* 6 (Special Issue 1). 124–133.
[http://www.globalsciencebooks.info/Online/GSBOnline/images/2012/FVCSB_6\(SI1\)/FVCSB_6\(SI1\)124-133o.pdf](http://www.globalsciencebooks.info/Online/GSBOnline/images/2012/FVCSB_6(SI1)/FVCSB_6(SI1)124-133o.pdf).
- Moro, T. M., Ascheri, J. L., Ortiz, J. A., Carvalho, C. W., and Meléndez-Arévalo, A. 2017. Bioplastics of native starches reinforced with passion fruit peel. *Food and Bioprocess Technology*, 10, 1798-1808. <https://doi.org/10.1007/s11947-017-1944-x>
- Nafchi, Abdorreza Mohammadi, Mahdiyeh Moradpour, Maliheh Saeidi, and Abd Karim Alias. 2013. "Thermoplastic Starches: Properties, Challenges, and Prospects." *Starch/Stärke* 65(1–2): 61–72.
- Nafianto, I. 2019. Pembuatan Plastik Biodegradable Dari Limbah Bonggol Pisang Kepok Dengan Plasticizer Gliserol Dari Minyak Jelantah Dan Ko. *Integrated Lab Journal*, 7(1), 75-89. <https://doi.org/10.5281/zenodo.2656812>
- Naing, H. H., Shwe, H. H., Pe, N. N., and Tun, Y. 2020. Utilization of Waste Banana Peel for Synthesis of Biopolymeric Film. In 3rd Myanmar Korea Conference Research Journal (Vol. 3, No. 4, pp. 1353-1361).
- Nandiyanto, A. B. D., Ragadhita, R., and Fiandini, M. 2023. Interpretation of Fourier transform infrared spectra (FTIR): A practical approach in the polymer/plastic thermal decomposition. *Indonesian Journal of Science and Technology*, 8(1), 113-126. <https://doi.org/10.17509/ijost.v8i1.53297>
- Napid, S., Budi, R. S., & Susanto, E. 2021. Pembakaran Sampah Anorganik Menimbulkan Dampak Positif Dengan Perolehan Asap Cair Bagi Masyarakat Lingkungan Ix Kecamatan Amplas. *Jurnal Pengabdian Mitra Masyarakat (JURPAMMAS)*, 1(1), 30-36. <https://doi.org/10.30743/jurpammas.v1i1.4192>

- National Plastic Action Partnership (NPAP), "Radically Reducing Plastic Pollution in Indonesia: A Multistakeholder Action Plan National Plastic Action Partnership," NPAP Insight Report, April, 2020 https://globalplasticaction.org/wp-content/uploads/NPAP-Indonesia-Multistakeholder-Action-Plan_April2020.pdf.
- National Standardization Agency. SNI. 2016. *Plastic and Biodegradable Shopping Bag Products SNI 7188:2016*. Indonesian Standardization. Jakarta.
- Naveena, B., Sharma, A., 2020. Review on properties of bio plastics for packaging applications and its advantages. *Int. J. Curr. Microbiol. App. Sci.* 9, 1428–1432. <https://doi.org/10.20546/IJCMAS.2020.905.163>
- Nisah, Khairun. 2018. "Study Pengaruh Kandungan Amilosa Dan Amilopektin Umbi-Umbian Terhadap Karakteristik Fisik Plastik Biodegradable Dengan Plastizicer Gliserol." *Biotik: Jurnal Ilmiah Biologi Teknologi dan Kependidikan* 5(2): 106.
- Nur, R. A., Nazir, N., dan Taib, G. 2020. Karakteristik bioplastik dari pati biji durian dan pati singkong yang menggunakan bahan pengisi MCC (*microcrystalline cellulose*) dari kulit kakao. *Gema Agro*, 25(1), 01-10.
- Obruča, S., Dvořák, P., Sedláček, P., Koller, M., Sedlář, K., Pernicová, I., and Šafránek, D. 2022. Polyhydroxyalkanoates synthesis by halophiles and thermophiles: towards sustainable production of microbial bioplastics. *Biotechnology Advances*, 58, 107906.
- Ohn, M., Ohn, K., Souza, U., Yusof, S., and Ariffin, Z. 2019. Banana Peel: is It Useful for Surgical Suturing Training ?. *Journal of Physics: Conference Series*. IOP Publishing, Article 012018. Vol. 1358. <https://doi.org/10.1088/1742-6596/1358/1/012018>
- Olivares, B. O., Rey, J. C., Lobo, D., Navas-Cortés, J. A., Gomez, J. A., and Landa, B. B. 2021. Fusarium Wilt of Bananas: A Review of Agro-Environmental Factors In The Venezuelan Production System Affecting Its Development. *Agronomy*, 11(5), 986. <https://doi.org/10.3390/agronomy11050986>
- Osés, J., Fernández-Pan, I., Mendoza, M., and Maté, J. I. 2009. Stability of the mechanical properties of edible films based on whey protein isolate during storage at different relative humidity. *Food Hydrocolloids*, 23(1), 125–131
- Pakerti, L. H. 2021. Karakteristik Plastik Biodegradabale Dari Pati Ubi Jalar Dengan Variasi Kitosan. *Journal Printing and Packaging Technology*, 2(1). <https://doi.org/10.32722/printpack.v2i1.2974>
- Patel, M., Islam, S., Kallem, P., Patel, R., Banat, F., and Patel, A. 2023. Potato starch-based bioplastics synthesized using glycerol–sorbitol blend as a plasticizer: characterization and performance analysis. *International Journal of Environmental Science and Technology*, 20(7), 7843-7860. <https://doi.org/10.1007/s13762-022-04492-2>

- Pellá, M. C., Silva, O. A., Pellá, M. G., Beneton, A. G., Caetano, J., Simões, M. R., and Dragunski, D. C. 2020. Effect of gelatin and casein additions on starch edible biodegradable films for fruit surface coating. *Food chemistry*, 309, 125764.
- Pereira, A., and Maraschin, M. 2015. Banana (*Musa* spp) from peel to pulp: Ethnopharmacology, source of bioactive compounds and its relevance for human health. *Journal of ethnopharmacology*, 160, 149–163. <https://doi.org/10.1016/j.jep.2014.11.008>
- Pérez, S., dan Bertoft, E., 2010. The molecular structures of starch components and their contribution to the architecture of starch granules: a comprehensive review. *Starch/Stärke* 62, 389– 420.
- Pfister, B., Sánchez-Ferrer, A., Diaz, A., Lu, K., Otto, C., Holler, M., Shaik, F.R., Florence, M., Mezzenga, R., Zeeman, S.C., 2016. Recreating the synthesis of starch granules in yeast. *eLife* 5, 15552
- Polnaya, F. J., Huwae, A. A., and Tetelepta, G. 2018. Karakteristik sifat fisiko-kimia dan fungsional pati sagu ihur (*Metroxylon sylvestre*) dimodifikasi dengan hidrolisis asam. *Agritech*, 38(1), 7-15. <https://doi.org/10.22146/agritech.16611>
- Pramitha, C. P., Kristanti, A. N., dan Aminah, N. S. 2016. Skopoletin, senyawa fenilpropanoid dari kulit umbi ubi jalar (*Ipomoea batatas* L.) varietas IR-melati. *Jurnal Kimia Riset*, 1(2), 81-85. <https://doi.org/10.20473/jkr.v1i2.3087>
- Purbasari, A., Wulandari, A. A., and Marasabessy, F. M. 2020. Sifat mekanis dan fisis bioplastik dari limbah kulit pisang: pengaruh jenis dan konsentrasi pemlastis. *Jurnal Kimia Dan Kemasan*, 42(2), 66.
- Purnavita, S., Subandriyo, D. Y., dan Anggraeni, A. 2020. Penambahan gliserol terhadap karakteristik bioplastik dari komposit pati aren dan glukomanan. *Metana*, 16(1), 19-25.
- Purnomo. 2017. *Material Teknik*. CV. Seribu Bintang : Malang.
- Putra, E. P. D., dan Saputra, H. 2020. Karakterisasi plastik biodegradable dari pati limbah kulit pisang muli dengan plasticizer sorbitol. *Jurnal Teknologi Pertanian Andalas*, 24(1), 29-36.
- Rafika, R., Masrullita, M., Dewi, R., Zulnazri, Z., Nasrul, Z. A., dan Ulfa, R. 2023. Sintesis Plastik Biodegradable Dari Pati Ubi Jalar Dengan Variasi Penambahan Plasticizer Gliserol. *Chemical Engineering Journal Storage (CEJS)*, 3(1), 42-51
- Rahardian, D., Moko, E. M., Tan, J. S., and Lee, C. K. 2023. Thermoplastic starch (TPS) bioplastic, the green solution for single-use petroleum plastic food packaging—A review. *Enzyme and microbial technology*, 168, 110260. <https://doi.org/10.1016/j.enzmictec.2023.110260>

- Rahmatullah, Putri, R. W., Rendana, M., Waluyo, U., and Andrianto, T. 2022. Effect of Plasticizer and Concentration on Characteristics of Bioplastic Based on Cellulose Acetate from Kapok (*Ceiba pentandra*) Fiber. *Science and Technology Indonesia*, 7(1), 73–83. <https://doi.org/10.26554/sti.2022.7.1.73-83>
- Ram, B., Chauhan, G. S., Mehta, A., Gupta, R., and Chauhan, K. 2018. Spherical Nanocellulose-Based Highly Efficient and Rapid Multifunctional Naked-Eye Cr (VI) Ion Chemosensor and Adsorbent with Mild Antimicrobial Properties. *Chemical Engineering Journal*, 349, 146–155. <https://doi.org/10.1016/j.cej.2017.08.128>
- Ramadhan, M.O. dan Handayani, M. N. 2020. The potential of food waste as bioplastic material to promote environmental sustainability: A review. *IOP Conf. Ser.: Mater. Sci. Eng.* 980, 012082.
- Ramdhani, R., Amalia, V., dan Junitasari, A. 2022. Pengaruh Konsentrasi Sorbitol terhadap Karakteristik Edible Film Pati Kentang (*Solanum tuberosum L.*) dan Pengaplikasiannya pada Dodol Nanas. In *Gunung Djati Conference Series* (Vol. 15, pp. 103-111).
- Ranganathan, S., Dutta, S., Moses, J. A., and Anandharamakrishnan, C. 2020. Utilization of food waste streams for the production of biopolymers. *Helixon*, 6(9).
- Rangaswamy BE, Vanitha KP, Hungund BS. 2015. Microbial cellulose production from bacteria isolated from rotten fruit. *International Journal of Polymer Science*; 2015(280784): 1-8.
- Rehm, B. H. 2010. Bacterial polymers: biosynthesis, modifications and applications. *Nature Reviews Microbiology*, 8(8), 578-592.
- Rihayat, T., Suryani, Siregar, J. P., Zaimahwati, Salmyah, Helmi, and Jaafar, J. 2019. Wound Dressing Based On Banana Peels Waste and Chitosan by Strengthening Lignin As Wound Healing Medicine. In *IOP Conference Series: Materials Science and Engineering* (Vol. 506, p. 012056). *IOP Publishing*. <https://doi.org/10.1088/1757-899X/506/1/012056>
- Risty, A. E., and Syaifulah, R. D. 2017. *Pembuatan dan karakterisasi bioplastik dari pati umbi bengkuang (Pachyrhizus erosus)* (Doctoral dissertation, Institut Teknologi Sepuluh Nopember).
- Rohani, D. A., Juswono, U. P., dan Nuriyah, L. 2015. *Pengukuran Efektivitas Kulit Singkong, Kulit Ubi Jalar, Kulit Pisang Dan Kulit Jeruk Sebagai Bahan Penyerap Besi (Fe) Dan Mangan (Mn) Pada Air Lindi Tpa* (Doctoral dissertation, Brawijaya University).
- Rosenboom, J. G., Langer, R., and Traverso, G. 2022. Bioplastics for a circular economy. *Nature Reviews Materials*, 7(2), 117-137.

- Rudend, Jasmine, A., dan Hermana, J., 2020. "Kajian Pembakaran Sampah Plastik Jenis Polipropilena (PP) Menggunakan Insinerator," *Jurnal Teknik ITS*, vol. 9, no. 2, pp. 124–130.
- Rusli A, Metusalach, Salengke, Tahir Mm. Karakterisasi Edible Film Karagenan Dengan Pemlastis Gliserol. *Jphpi*. 2017;20(2):219–29.
- Santhoskumar, A. U., Vaishnavi, R., and Karunakaran, T. 2019. Studies on mechanical properties and biodegradation of edible food wrapper from banana peel. *Asian J. Adv. Basic Sci.*, 7(2), 01–04. <https://doi.org/10.33980/ajabs.2019.v07i02.001>
- Sanyang, M.L., Sapuan, S.M., Jawaid, M., Ishak, M.R., Sahari, J., 2016. Effect of plasticizer type and concentration on physical properties of biodegradable films based on sugar palm (*Arenga pinnata*) starch for food packaging. *J. Food Sci. Technol.* 53 (1), 326–336. <https://doi.org/10.1007/s13197-015-2009-7>
- Sardon, H., and Dove, A.P., 2018. Plastics recycling with a difference. *Science* 360 (6387), 380–381. <https://doi.org/10.1126/science.aat4997>
- Schmaltz, E., Melvin, E. C., Diana, Z., Gunady, E. F., Rittschof, D., Somarelli, J. A., and Dunphy-Daly, M. M. 2020. Plastic pollution solutions: emerging technologies to prevent and collect marine plastic pollution. *Environment international*, 144, 106067.
- Shafqat, A., Al-Zaqri, N., Tahir, A., and Alsalme, A. 2021. Synthesis and characterization of starch based bioplastics using varying plant-based ingredients, plasticizers and natural fillers. *Saudi Journal of Biological Sciences*, 28(3), 1739-1749. <https://doi.org/10.1016/j.sjbs.2020.12.015>
- Shah, A. A., Hasan, F., Hameed, A., and Ahmed, S. 2008. Biological Degradation Of Plastics: A Comprehensive Review. *Biotechnology Advances* 26 (2008) 246–265.
- Sidhu, J. S., and Zafar, T. A. 2018. Bioactive compounds in banana fruits and their health benefits. *Food Quality and Safety*, 2(4), 183–188. <https://doi.org/10.1093/fqsafe/fyy019>
- Sijabat, E. K., Nuruddin, A., Aditiawati, P., and Purwasasmita, B. S. 2019. Synthesis and Characterization of Bacterial Nanocellulose from Banana Peel for Water Filtration Membrane Application. In , 1230. *Journal of Physics: Conference Series*. IOP Publishing, Article 012085. <https://doi.org/10.1088/1742-6596/1230/1/012085>
- Singh, A., and Singh, A. K. 2017. Haloarchaea: worth exploring for their biotechnological potential. *Biotechnology letters*, 39, 1793-1800.
- Singh, P., Pandey, V.K., Singh, R., Singh, K., Dash, K.K. and Malik, S., 2024. Unveiling The Potential of Starch-Blended Biodegradable Polymers for Substantializing The Eco-Friendly Innovations. *Journal of Agriculture and Food*

Research, 15, p.101065. <https://doi.org/10.1016/j.jafr.2024.101065>

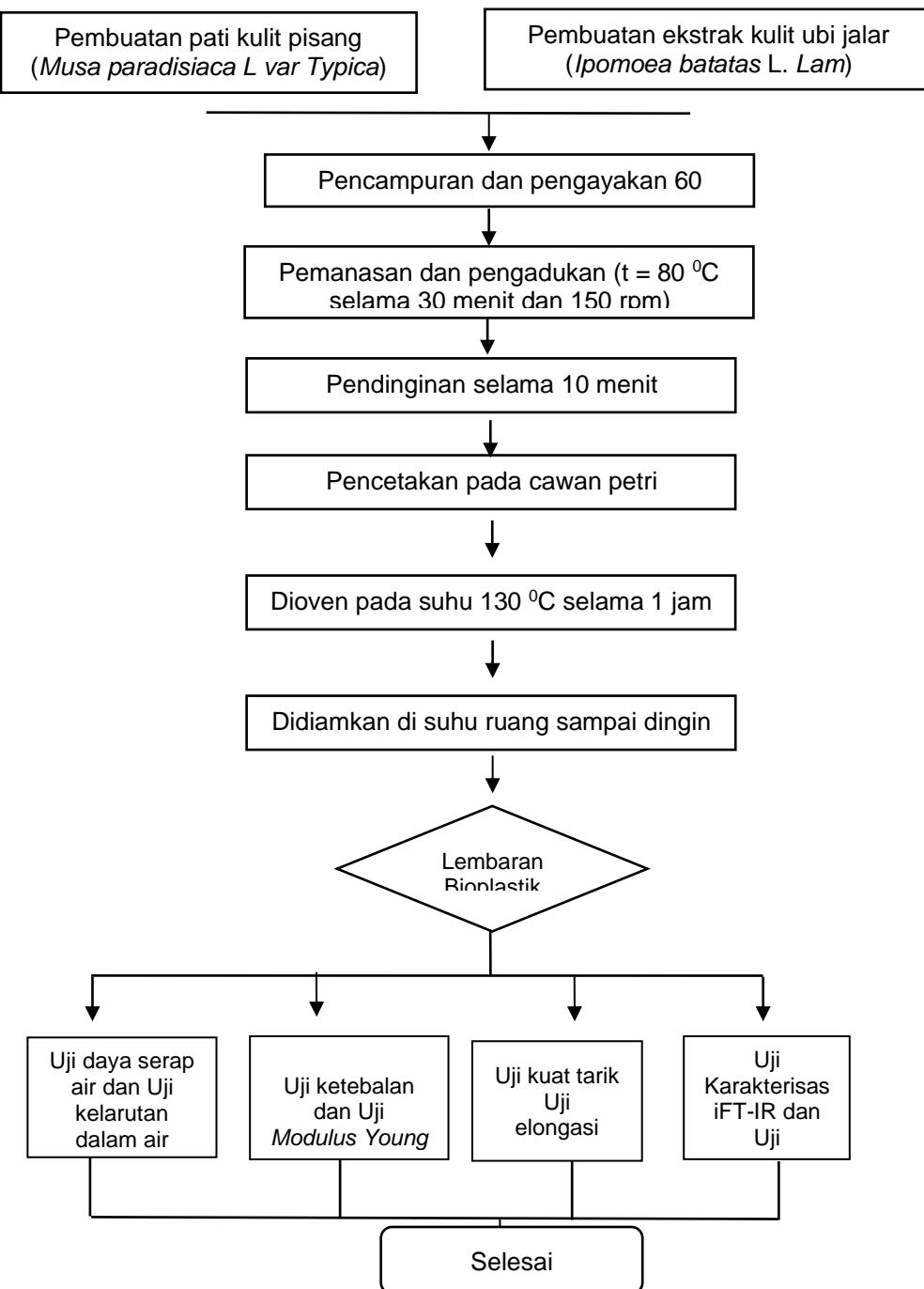
- Situmorang, F. U., Hartati, A., dan Harsojuwono, B. A. 2019. Pengaruh Konsentrasi Pati Ubi Talas (*Colocasia Esculenta*) Dan Jenis Plasticizer Terhadap Karakteristik Bioplastik. *Jurnal Rekayasa dan Manajemen Agroindustri* /ISSN, 2503, 488X.
- Skurlys, O., Velásquez, P., Henriquez, O., Matiacevich, S., Enrione, J., and Osorio, F. 2011. Wetting behavior of chitosan solutions on blueberry epicarp with or without epicuticular waxes. *LWT-Food Science and Technology*, 44(6), 1449-1457. <https://doi.org/10.1016/j.lwt.2011.02.007>
- Smittipong, W., Chollakup, R., and Nardin, M. 2014. *Bio-based composites for high-performance materials: from strategy to industrial application*. CRC Press. <https://doi.org/10.1201/b17601>
- Soison, B., Jangchud, K., Jangchud, A., Harnsilawat, T., and Piyachomkwan, K. 2015. Characterization of starch in relation to flesh colors of sweet potato varieties. *International Food Research Journal*, 22(6), 2302.
- Song, X., Zuo, G. and Chen, F. 2018. Effect of Essential Oil and Surfactant On The Physical and Antimicrobial Properties of Corn and Wheat Starch Films. *International journal of biological macromolecules*, 107, pp.1302-1309. <https://doi.org/10.1016/j.ijbiomac.2017.09.114>
- Steed, L. and Truong, V. 2008. Anthocyanin content, antioxidant activity, and selected physical properties of flowable purplefleshed sweetpotato purees. *Journal of Food Science*, v.73, n.5, p.S215-S221. <https://doi.org/10.1111/j.1750-3841.2008.00774.x>
- Sugiharto, A., Syarifa, A., Handayani, N., and Mahendra, R. 2021. Effect of Chitosan, Clay, and CMC on Physicochemical Properties of Bioplastic from Banana Corm with Glycerol. *Jurnal Bahan Alam Terbarukan*, 10(1), 31–35. <https://doi.org/10.15294/jbat.v10i1.25323>.
- Sujuthi, R.A.F., Liew, K.C., 2016. Properties of Bioplastic Sheets Made from Different Types of Starch Incorporated With Recycled Newspaper Pulp. *Trans. Sci. Technol.* 3 (1–2), 257–264.
- Sultan, N. F. K., and Johari, W. L. W. 2017. The development of banana peel/corn starch bioplastic film: A preliminary study. *Bioremediation Science and Technology Research*, 5(1), 12-17.
- Supriya, N. K., and Shivani, K. K. 2019. Production of bioplastic from banana peels. *J Emerg Technol Innov Res*, 6(5), 218-224.
- SWA. 2014. *Enviplast, Inovasi Kantong Ramah Lingkungan*. <http://swa.co.id/swa/trends/marketing/enviplast-inovasi-kantongramah-lingkungan>. [7 Juli 2023].

- Syuhada, M., Sofa, S. A., and Sedyadi, E. 2020. The effect of cassava peel starch addition to bioplastic biodegradation based on chitosan on soil and river water media. *Biology, Medicine, & Natural Product Chemistry*, 9(1), 7-13. <https://doi.org/10.14421/biomedich.2020.91.7-13>
- Tan, Z., Yi, Y., Wang, H., Zhou, W., Yang, Y., and Wang, C. 2016. Physical and degradable properties of mulching films prepared from natural fibers and biodegradable polymers. *Applied Sciences*, 6(5), 147.
- Taodharos, S. E. R. 2018. Banana peels based bio-plastic. *J Zenodo*.
- Tejavathi, D. H., Sujatha, B. S., and Karigar, C. S. 2020. Physicochemical properties of starch obtained from Curcuma karnatakensis-A new botanical source for high amylose content. *Helicon*, 6(1). <https://doi.org/10.1016/j.heliyon.2020.e03169>
- Thomas, T., Sudesh, K., Bazire, A., Elain, A., Tan, H. T., Lim, H., and Bruzaud, S. 2020. PHA production and PHA synthases of the halophilic bacterium Halomonas sp. SF2003. *Bioengineering*, 7(1), 29.
- Thuppahige, V. T. W., Moghaddam, L., Welsh, Z. G., Wang, T., and Karim, A. 2023. Investigation of critical properties of Cassava (*Manihot esculenta*) peel and bagasse as starch-rich fibrous agro-industrial wastes for biodegradable food packaging. *Food Chemistry*, 422, 136200. <https://doi.org/10.1016/j.foodchem.2023.136200>
- Tibolla, H., Pelissari, F. M., and Menegalli, F. C. 2014. Cellulose nanofibers produced from banana peel by chemical and enzymatic treatment. *LWT - Food Science and Technology*, 59, 1311–1318. <https://doi.org/10.1016/j.lwt.2014.04.011>
- Tibolla, H., Pelissari, F. M., Martins, J. T., Vicente, A. A., and Menegalli, F. C. 2018. Cellulose nanofibers produced from banana peel by chemical and mechanical treatments: Characterization and cytotoxicity assessment. *Food Hydrocolloids*, 75, 192–201. <https://doi.org/10.1016/j.foodhyd.2017.08.027>
- Ulyarti, U., Lavlinesia, L., Surhaini, S., Lisani, L., and Nazarudin, N. 2021. Development of yam-starch-based bioplastics with the addition of chitosan and clove oil. *Makara Journal of Science*, 25(5), 71-79.
- Veerasingam, S., Ranjani, M., Venkatachalapathy, R., Bagaev, A., Mukhanov, V., Litvinyuk, D., Mugilarasan, M., Gurumoorthi, K., Guganathan, L., and Vethamony, P., 2021. Contributions of Fourier transform infrared spectroscopy in microplastic pollution research: a review. *Critical Reviews in Environmental Science and Technology*, 51(22):2681-2743. <https://doi.org/10.1080/10643389.2020.1807450>
- Vilpoux, O. and Averous, L. 2004. Starch-based plastics. Dalam: M. P. Cereda and O. Vilpoux (Ed.). *Collection Latin American Starchy Tubers* (h. 521-553). Sao Paolo: Raizes and Cargill Foundation

- Wang, H., Yang, Q., Gao, L., Gong, X., Qu, Y., and Feng, B. 2020. Functional and physicochemical properties of flours and starches from different tuber crops. *International journal of biological macromolecules*, 148, 324-332. <https://doi.org/10.1016/j.ijbiomac.2020.01.146>.
- Wang, Y.J. and Wang, L. 2003. Physicochemical properties of common and waxy corn starches oxidized by different levels of sodium hypochlorite. *Carbohydrate Polymers*, Vol. 52: 207-217
- Waterschoot, J., Gomand, S.V., and Delcour, J.A. 2016. Impact of swelling power and granule size on pasting of blends of potato, waxy rice and maize starches. *Food Hydrocolloids*, 52, 69-77. <https://doi.org/10.1016/j.foodhyd.2015.06.012>
- Wei, L., Deng, N., Wang, X., Zhao, H., Yan, J., Yang, Q., Kang, W., and Cheng, B. (2021). Flexible ordered MnS@ CNC/carbon nanofibers membrane based on microfluidic spinning technique as interlayer for stable lithium-metal battery. *Journal of Membrane Science*, 637, 119615.
- Widiatmono, B. R., Sulianto, A. A., and Debora, C. 2021. Biodegradabilitas Bioplastik Berbahan Dasar Limbah Cair Tahu dengan Penguat Kitosan dan Plasticizer Gliserol. *Jurnal Sumberdaya Alam dan Lingkungan*, 8(1), 21-27.
- Xiao, H. X., Lin, Q. L., Liu, G. Q., and Yu, F. X. 2012. A comparative study of the characteristics of cross-linked, oxidized and dual-modified rice starches. *Molecules*, 17(9), 10946-10957. <https://doi.org/10.3390/molecules170910946>
- Yadav, B. S., Yadav, R. B., Kumari, M., and Khatkar, B. S. 2014. Studies on suitability of wheat flour blends with sweet potato, colocasia and water chestnut flours for noodle making. *Lwt-Food Science and Technology*, 57(1), 352–358. <https://doi.org/10.1016/j.lwt.2013.12.042>. <https://doi.org/10.1016/j.lwt.2013.12.042>.
- Yang, M., Chang, L., Jiang, F., Zhao, N., Zheng, P., Simbo, J., and Du, S. 2022. Structural, Physicochemical and Rheological Properties of Starches Isolated from Banana Varieties (*Musa* sp.). *Food Chemistry*: X, 16, Article 100473. <https://doi.org/10.1016/j.fochx.2022.100473>
- Yang, X., Biswas, S. K., Han, J., Tanpichai, S., Li, M. C., Chen, C., and Yano, H. 2021. Surface and Interface Engineering for Nanocellulosic Advanced Materials. *Advanced Materials*, 33(28), 2002264. <https://doi.org/10.1002/adma.202002264>
- Yuliasih, I., dan Sunarti, T., C. 2014. Pati Sagu Termodifikasi Sebagai Bahan Starch-Based Plastics. *In Prociding Seminar Nasional Kulit, Karet, dan Plastik*. Vol. 3.
- Zaini, H. M., Roslan, J., Saallah, S., Munsu, E., Sulaiman, N. S., and Pindi, W. 2022. Banana peels as a bioactive ingredient and its potential application in the food industry. *Journal of Functional Foods*, 92, 105054. <https://doi.org/10.1016/j.jff.2022.105054>

- Zhang, Liming, Ruichao Li, Feng Dong, Aiying Tian, Zhengjun Li, and Yujie Dai. 2015. "Physical, Mechanical and Antimicrobial Properties of Starch Films Incorporated with ϵ -Poly-L-Lysine." *Food Chemistry* 166:107–14. <https://doi.org/10.1016/j.foodchem.2014.06.008>
- Zhu, Z., Wang, F., Rosell' o-Soto, E., Martí-Quijal, F. J., Barba, F. J., Ghafoor, K., and Remize, F. 2019. Recovery of antioxidant bioactive compounds from sweet potato and by-products. In *Green extraction and valorization of by-products from food processing* (pp. 141–152). CRC Press. <https://doi.org/10.1201/9780429325007-5>.

Lampiran 1. Skema Kerja Penelitian

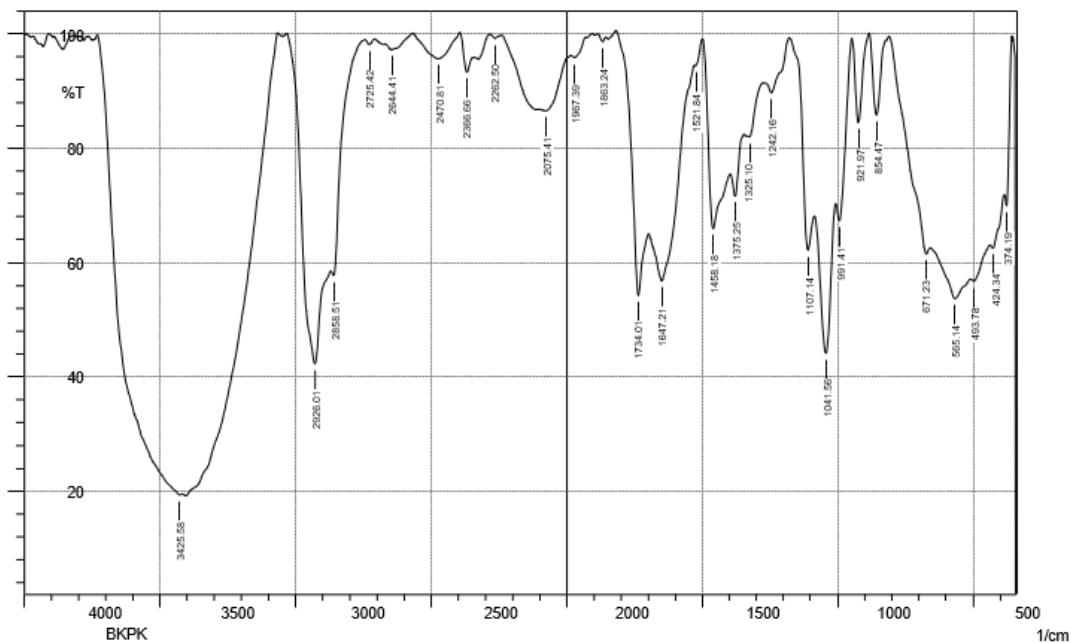


Lampiran 2. Skema Proses Pembuatan Bioplastik

Gambar 13. Diagram skema proses pembuatan bioplastik.

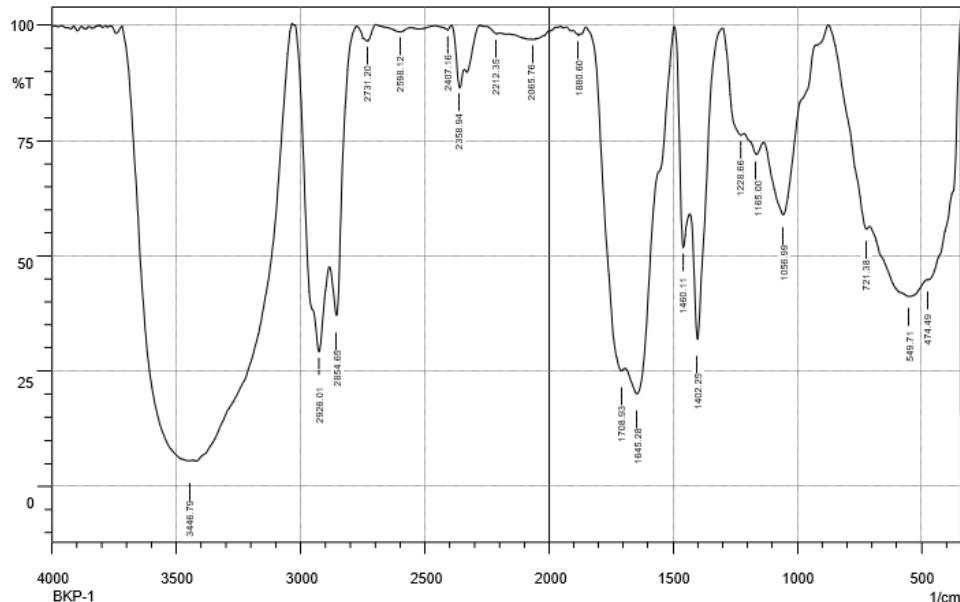
Lampiran 3. Hasil Uji FTIR BKPK

 SHIMADZU



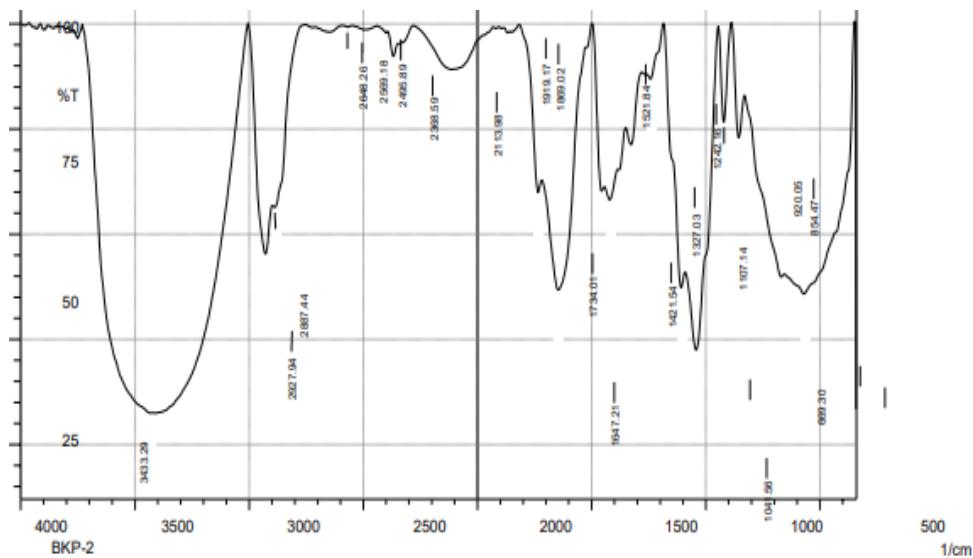
No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	374.19	69.9362	10.1177	381.91	356.83	2.4972	0.7515
2	424.34	62.5329	2.4552	435.91	383.83	9.4951	0.5858
3	493.78	56.7726	1.3192	505.35	437.84	15.253	0.3119
4	565.14	53.688	5.5504	653.87	507.28	35.5047	2.6793
5	671.23	61.4948	4.8086	808.17	655.8	17.0086	1.2809
6	854.47	85.8074	14.0889	881.47	810.1	2.0394	1.9806
7	921.97	84.4539	14.9235	943.19	883.4	2.0315	1.9119
8	991.41	67.3347	9.4768	1004.91	945.12	6.0646	1.5827
9	1041.56	44.1301	25.0479	1082.07	1006.84	19.341	7.2732
10	1107.14	62.1608	13.7576	1176.58	1083.99	8.931	2.0632
11	1242.16	89.682	3.657	1263.37	1178.51	2.672	0.9145
12	1325.1	81.9777	1.3814	1332.81	1274.95	3.6343	0.1807
13	1375.25	71.6217	6.4593	1392.61	1346.31	5.4345	0.7176
14	1458.18	65.9449	24.421	1494.83	1394.53	12.7394	6.2624
15	1521.84	94.3811	0.6904	1525.69	1496.76	0.4818	0.0627
16	1647.21	56.7314	16.7435	1695.43	1527.62	26.0486	8.465
17	1734.01	54.2335	21.831	1815.02	1697.36	14.5121	4.2906
18	1863.24	98.605	0.9783	1884.45	1853.59	0.101	0.0592
19	1967.39	95.8291	1.2576	1982.82	1926.89	0.7383	0.1953
20	2075.41	86.5403	2.2613	2100.48	1982.82	5.2704	0.7823
21	2262.5	99.1628	0.669	2281.79	2239.36	0.0838	0.0511
22	2366.66	93.3155	4.7252	2391.73	2341.58	0.9365	0.5001
23	2470.81	95.6328	4.54	2565.33	2393.66	1.8736	1.9998
24	2644.41	97.1917	1.4034	2665.62	2565.33	0.75	0.3794
25	2725.42	98.1093	0.8967	2742.78	2706.13	0.2261	0.0677
26	2858.51	57.7509	3.2464	2866.22	2742.78	9.0649	0.287
27	2926.01	42.3067	31.0302	3030.17	2868.15	33.7786	14.9252
28	3425.58	19.3892	2.5731	3728.4	3415.93	142.8437	31.2792

Lampiran 4. Hasil Uji FTIR BKP 1



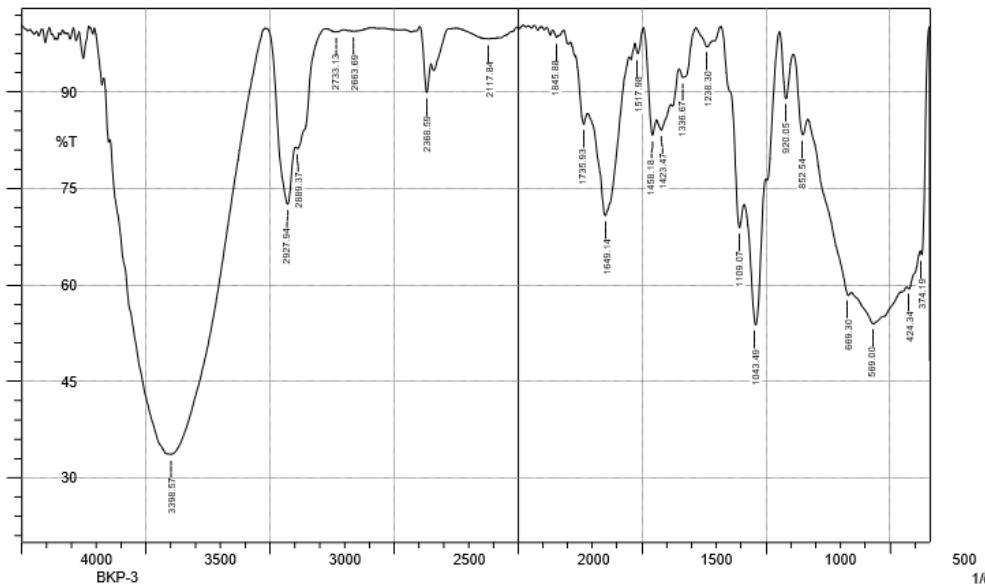
No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	474.49	44.905	0.81	476.42	345.26	31.788	9.253
2	549.71	41.255	7.211	709.8	478.35	79.364	10.289
3	721.38	55.86	3.143	875.68	711.73	19.516	0.711
4	1056.99	58.984	23.433	1136.07	877.61	28.85	12.7
5	1165	72.026	3.254	1215.15	1138	10.069	0.67
6	1228.66	76.227	3.557	1298.09	1217.08	6.744	1.807
7	1402.25	31.963	36.635	1433.11	1301.95	25.088	11.301
8	1460.11	51.869	24.219	1494.83	1435.04	10.729	3.751
9	1645.28	20.15	23.66	1693.5	1496.76	71.46	15.189
10	1708.93	25.144	6.901	1851.66	1695.43	43.693	3.475
11	1880.6	97.819	0.536	1903.74	1872.88	0.229	0.03
12	2065.76	96.961	1.583	2162.2	1998.25	1.759	0.67
13	2212.35	98.17	0.529	2254.79	2198.85	0.267	0.039
14	2358.94	86.434	7.347	2391.73	2341.58	1.886	0.77
15	2407.16	98.985	1.009	2457.31	2391.73	0.121	0.111
16	2598.12	98.594	1.132	2696.48	2553.75	0.433	0.34
17	2731.2	96.617	1.469	2746.63	2696.48	0.452	0.158
18	2854.65	37.158	23.48	2881.65	2773.64	19.453	4.874
19	2926.01	29.292	34.64	3020.53	2883.58	42.872	20.601
20	3446.79	5.639	4.591	3716.83	3433.29	205.591	32.238

Lampiran 5. Hasil Uji FTIR BKP 2



No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	570.93	35.803	20.92	653.87	347.19	103.952	44.471
2	669.3	39.821	3.965	829.39	655.8	43.603	2.467
3	854.47	72.937	17.174	887.26	831.32	4.868	2.557
4	920.05	76.691	23.026	945.12	889.18	3.091	3.035
5	1041.56	22.533	38.08	1089.78	947.05	53.87	26.313
6	1107.14	37.273	13.519	1184.29	1091.71	21.376	3.259
7	1242.16	86.915	3.684	1257.59	1186.22	2.701	0.784
8	1327.03	71.305	8.367	1350.17	1280.73	7.449	1.445
9	1421.54	58.174	4.603	1442.75	1384.89	12.458	0.993
10	1521.84	94.35	0.895	1525.69	1498.69	0.426	0.096
11	1647.21	36.751	37.624	1716.65	1527.62	49.4	28.078
12	1734.01	59.933	8.781	1815.02	1718.58	9.484	1.18
13	1869.02	97.835	0.581	1884.45	1861.31	0.167	0.023
14	1919.17	98.89	0.338	1930.74	1905.67	0.102	0.018
15	2113.98	89.168	9.143	2279.86	1975.11	9.17	7.032
16	2368.59	92.253	4.33	2391.73	2349.3	1.049	0.419
17	2495.89	98.644	0.129	2546.04	2488.17	0.243	0.018
18	2569.18	99.191	0.397	2592.33	2546.04	0.114	0.031
19	2648.26	98.046	1.365	2709.99	2592.33	0.682	0.375
20	2887.44	56.398	3.349	2897.08	2756.28	14.639	1.096
21	2927.94	45.323	23.42	3003.17	2899.01	22.396	9.369
22	3433.29	7.488	2.973	3730.33	3423.65	201.076	29.951

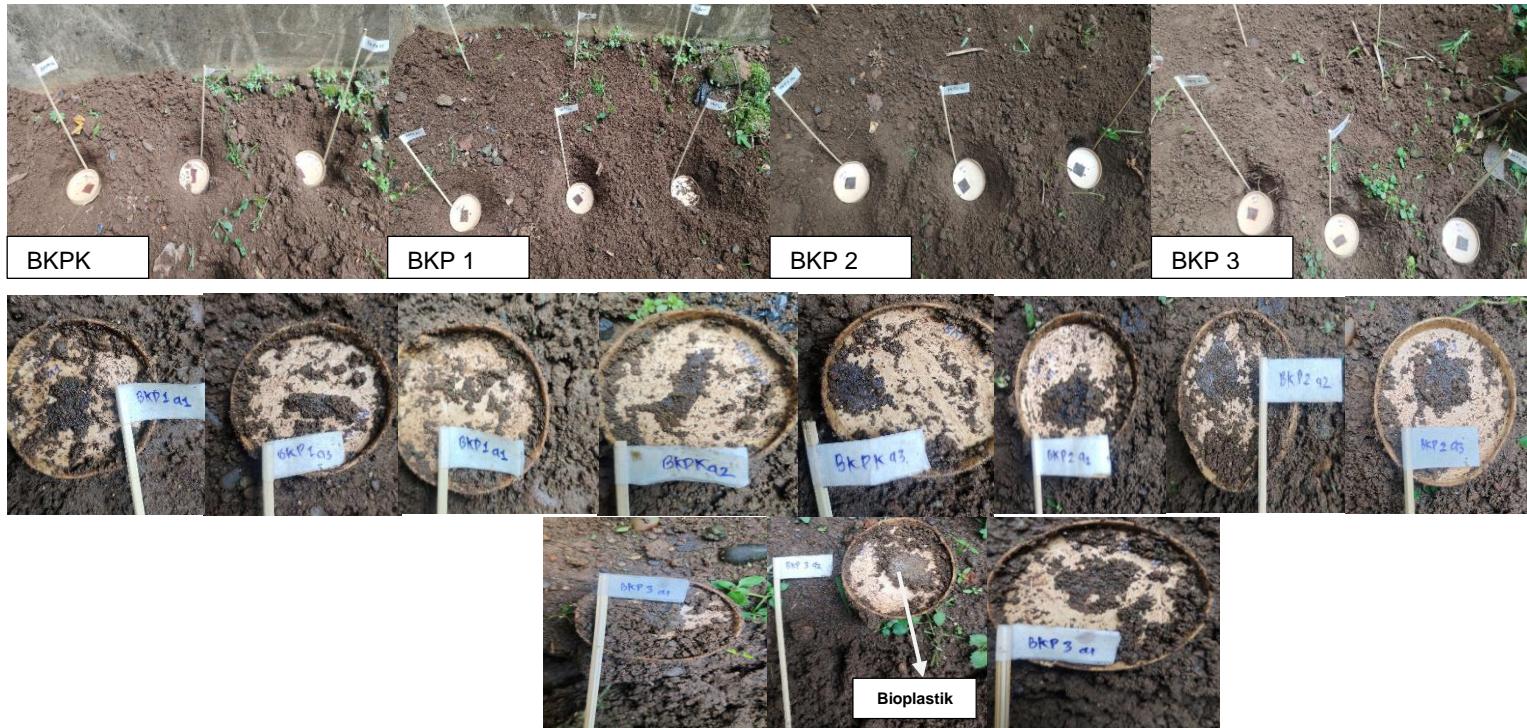
Lampiran 6. Hasil Uji FTIR BKP 3



No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	374.19	64.685	4.607	378.05	345.26	3.172	0.487
2	424.34	59.395	1.267	433.98	379.98	11.312	0.292
3	569	53.97	5.156	655.8	435.91	54.477	4.443
4	669.3	58.351	2.247	831.32	657.73	26.786	0.913
5	852.54	83.339	5.735	891.11	833.25	3.317	0.815
6	920.05	88.956	8.591	947.05	893.04	1.649	1.048
7	1043.49	53.806	20.718	1087.85	1002.98	16.543	5.67
8	1109.07	68.877	9.377	1182.36	1089.78	7.469	1.199
9	1238.3	96.977	1.607	1284.59	1215.15	0.56	0.231
10	1336.67	92.235	2.584	1350.17	1284.59	1.455	0.523
11	1423.47	84.042	2.387	1442.75	1384.89	3.899	0.355
12	1458.18	83.256	6.176	1494.83	1444.68	2.477	0.726
13	1517.98	95.913	2.416	1529.55	1494.83	0.38	0.187
14	1649.14	70.762	19.615	1720.5	1554.63	15.199	8.351
15	1735.93	84.942	3.919	1788.01	1722.43	2.75	0.411
16	1845.88	98.449	1.094	1861.31	1816.94	0.196	0.107
17	2117.84	98.219	0.229	2249	2102.41	0.709	0.113
18	2368.59	89.881	6.702	2395.59	2351.23	1.195	0.62
19	2663.69	99.405	0.301	2702.27	2588.47	0.207	0.086
20	2733.13	99.291	0.385	2775.57	2702.27	0.164	0.065
21	2889.37	81.186	1.37	2897.08	2777.5	5.014	0.491
22	2927.94	72.545	13.268	3018.6	2899.01	9.075	3.81
23	3398.57	33.7	55.608	3643.53	3020.53	165.002	138.814

Lampiran 7. Lokasi Pengambilan Kulit Pisang dan Kulit Ubi

Gambar 13. Lokasi pengambilan kulit pisang dan kulit ubi jalar.

Lampiran 8. Hasil Uji *Soil Burial Test*

Gambar 14. Hasil uji bioplastik pati kulit pisang dan kulit ubi penguburan selama 7 hari.