DAFTAR PUSTAKA

[1] O. J. Vinueza, W. Pavon, A. Remache, F. Arroyo, M. Gutiérrez, and E. M. Figueroa, "Evaluation of Mechanical Behavior and Application Potential of Totora (Schoenoplectus californicus)-and-Recycled Low-Density Polyethylene–Aluminum (LDPE–Al) Hybrid Panels," *Buildings*, vol. 15, pp. 1–26, 2025.

[2] B. Haba, S. Djellali, Y. Abdelouahed, S. Boudjelida, F. Faleschini, and M. Carraro, "Transforming Plastic Waste into Value: A Review of Management Strategies and Innovative Applications in Sustainable Construction," *Polymers (Basel).*, vol. 17, no. 7, pp. 1–33, 2025, doi: 10.3390/polym17070881.

[3] B. Castro-Dominguez *et al.*, *Biopolymers and biocomposites: a comprehensive review of feedstocks, functionalities, and advanced manufacturing techniques for sustainable applications*, vol. 2, no. 8. BioMed Central, 2025. doi: 10.1186/s44316-025-00029-y.

[4] A. S. Dey, H. Bose, B. Mohapatra, and P. Sar, "Biodegradation of Unpretreated Low-Density Polyethylene (LDPE) by Stenotrophomonas sp. and Achromobacter sp., Isolated From Waste Dumpsite and Drilling Fluid," *Front. Microbiol.*, vol. 11, no. December, pp. 1–15, 2020, doi: 10.3389/fmicb.2020.603210.

[5] M. Ullah, P. Liu, S. Xie, and S. Sun, "Recent Advancements and Challenges in Lignin Valorization: Green Routes towards Sustainable Bioproducts," *Molecules*, vol. 27, no. 18, pp. 1–24, 2022, doi: 10.3390/molecules27186055.

[6] X. Lv, Y. Zhang, and M. Di, "Effect of PP-G-MAH on the compatibility of lignin/LDPE composites," *Adv. Mater. Res.*, vol. 194–196, pp. 1476–1479, 2011, doi: 10.4028/www.scientific.net/AMR.194-196.1476.

[7] S. Laurichesse and L. Avérous, "Chemical modification of lignins: Towards biobased polymers," *Prog. Polym. Sci.*, vol. 39, no. 7, pp. 1–25, 2013, doi: 10.1016/j.progpolymsci.2013.11.004.

[8] M. Lempang, "Pemanfaatan Lignin sebagai Bahan Perekat Kayu," *J. Bul. Eboni*, vol. 13, no. 2, pp. 139–150, 2016.

[9] Faizatul Falah, *Pemanfaatan Limbah Lignin Dari Proses Pembuatan Bioetanol Dari Tkks Sebagai Bahan Aditif Pada Mortar*. 2012.

[10] T. B. Santoso, F. I. Aryanti, and T. D. A.S., "Characterization Of Mechanical, Thermal, And Physical Properties Of Polypropylene Composites With Rice Husk Filler Using Coupling Agent Maleic Anhydride," *J. Teknol. Kim. Unimal*, vol. 12, no. 2, pp. 216–230, 2023.

[11] A. A. El-Wakil, H. Moustafa, and A. Abdel-Hakim, "Effect of LDPE-g-

MA as a compatibilizer for LDPE/PA6 blend on the phase morphology and mechanical properties," *Polym. Bull.*, pp. 1–14, 2021, doi: 10.1007/s00289-021-03618-9.

[12] E. Widodo and I. Dwiyoga, "Analisis Pengaruh Alkalisasi NaOH Terhadap Serat Daun Nanas Sebagai Penguatan Bio Komposit," *Otopro*, vol. 18, no. 1, pp. 1–6, 2022, doi: 10.26740/otopro.v18n1.p1-6.

[13] R. Ramadhan, *Analisa Kekuatan Lentur Dan Kekerasan Kampas Rem Non Asbestos Dengan Variasi Kandungan Filler Cangkang Kelapa Sawit*. 2024.

[14] K. Kumar and S. Surendran, "Design and analysis of composite panel for impact loads in marine environment," *Ships Offshore Struct.*, vol. 8, no. 5, pp. 597–606, 2013, doi: 10.1080/17445302.2012.736362.

[15] G. Supeni and I. Suryo, "Pengaruh Pengggunaan Kitosan Terhadap Sifat Barrier Edible Film Tapioka Termodifikasi," *J. Kim. Kemasan*, vol. 34, no. 1, pp. 199–206, 2012.

[16] P. Nargotra, V. Sharma, H. M. D. Wang, C. J. Shieh, Y. C. Liu, and C. H. Kuo, "Biocatalysis for Lignin Conversion and Valorization: Driving Sustainability in the Circular Economy," *Catalysts*, vol. 15, no. 91, pp. 1–34, 2025, doi: 10.3390/catal15010091.

[17] W. Boerjan, J. Ralph, and M. Baucher, "Lignin Biosynthesis," *Annu. Rev. Plant Biol.*, vol. 54, pp. 519–546, 2003, doi: 10.1146/annurev.arplant.54.031902.134938.

[18] O. Alfernando *et al.*, *Material Maju Berbasis Lingkungan*. U ME Publishing, 2025.

[19] M. R. Ridho *et al.*, "Lignin as Green Filler in Polymer Composites: Development Methods, Characteristics, and Potential Applications," *Adv. Mater. Sci. Eng.*, 2022, doi: 10.1155/2022/1363481.

[20] F. Ferruti *et al.*, "Mechanochemical Methacrylation of Lignin for Biobased Reinforcing Filler in Rubber Compounds," *ACS Sustain. Chem. Eng.*, vol. 12, no. 37, pp. 14028–14037, 2024, doi: 10.1021/acssuschemeng.4c05036.

[21] S. Sujadi and N. Supena, "Tahap Perkembangan Bunga Dan Buah Tanaman Kelapa Sawit," *War. Pus. Penelit. Kelapa Sawit*, vol. 25, no. 2, pp. 64–71, 2020, doi: 10.22302/iopri.war.warta.v25i2.22.

[22] M. Gozan, N. C. Natasha, and P. Srinophakun, "Lignin decomposition of Oil Palm Frond by Pleurotus ostreatus with a variation of corn and rice-husk media," *J. Integr. Adv. Eng.*, vol. 2, no. 1, pp. 55–62, 2022, doi: 10.51662/jiae.v2i1.40.

[23] F. Vásquez-Garay, I. Carrillo-Varela, C. Vidal, P. Reyes-Contreras, M. Faccini, and R. T. Mendonça, "A review on the lignin biopolymer and its integration in the elaboration of sustainable materials," *Sustainability*, vol.

13, no. 5, pp. 1–15, 2021, doi: 10.3390/su13052697.

[24] Darnoko, P. Guritno, Erwinsyah, and W. Pratiwi, “Pemanfaatan Pelepah Kelapa Sawit Untuk Pembuatan Pulp dan Kertas Cetak,” *J. Penelit. Kelapa Sawit*, vol. 9, no. 2–3, pp. 63–76, 2001.

[25] S. Suhartati, R. Puspito, F. Rizali, and D. Anggraini, “Analisis Sifat Fisika dan Kimia Lignin Tandan Kosong Kelapa Sawit asal Desa Sape, Kabupaten Sanggau, Kalimantan Barat,” *J. Kim. Val.*, vol. 2, no. 1, pp. 24–29, 2016, doi: 10.15408/jkv.v2i1.3102.

[26] S. S. Mohtar *et al.*, “Extraction and characterization of lignin from oil palm biomass via ionic liquid dissolution and non-toxic aluminium potassium sulfate dodecahydrate precipitation processes,” *Bioresour. Technol.*, vol. 192, pp. 212–218, 2015, doi: 10.1016/j.biortech.2015.05.029.

[27] I. Winarni and T. B. Bardant, “Pembuatan Bioetanol dari Limbah Kayu Sengon (Falcataria moluccana (Miq.) Barneby & J.W. Grimes) dengan Metode Substrat Konsentrasi Tinggi,” *J. Penelit. Has. Hutan*, vol. 35, no. 4, pp. 231–242, 2017.

[28] M. Müller, V. Kolář, and R. K. Mishra, “Mechanical and Thermal Degradation-Related Performance of Recycled LDPE from Post-Consumer Waste,” 2024. doi: 10.3390/polym16202863.

[29] J. Hopewell, R. Dvorak, and E. Kosior, “Plastics recycling: Challenges and opportunities,” *Philos. Trans. R. Soc. B Biol. Sci.*, vol. 364, pp. 2115–2126, 2009, doi: 10.1098/rstb.2008.0311.

[30] T. Zorgui, H. Ahmad, M. Romdhane, and D. Rodrigue, “Recycled Low Density Polyethylene Reinforced with Deverra tortuosa Vegetable Fibers,” *J. Compos. Sci.*, vol. 8, no. 394, pp. 1–14, 2024, doi: 10.3390/jcs8100394.

[31] CSR Plastic, *Recycled LDPE Granules Safety Data Sheet*. 2022.

[32] A. Ghodrati, N. S. Mashaan, and T. Paraskeva, “Incorporating Waste Plastics into Pavement Materials: A Review of Opportunities, Risks, Environmental Implications, and Monitoring Strategies,” *Appl. Sci.*, vol. 15, no. 14, pp. 1–26, 2025, doi: 10.3390/app15148112.

[33] H. Akgün, E. Yapıcı, Z. Günkaya, A. Özkan, and M. Banar, “Utilization of liquid product through pyrolysis of LDPE and C/LDPE as commercial wax,” *Environ. Sci. Pollut. Res.*, vol. 28, no. 33, pp. 45971–45984, 2021, doi: 10.1007/s11356-021-13999-z.

[34] J. Kleis, B. I. Lundqvist, D. C. Langreth, and E. Schröder, “Towards a working density-functional theory for polymers: First-principles determination of the polyethylene crystal structure,” *Phys. Rev. B - Condens. Matter Mater. Phys.*, vol. 76, no. 10, pp. 1–4, 2006, doi: 10.1103/PhysRevB.76.100201.

[35] J. L. Jordan, D. T. Casem, J. M. Bradley, A. K. Dwivedi, E. N. Brown, and C. W. Jordan, "Mechanical Properties of Low Density Polyethylene," *J. Dyn. Behav. Mater.*, vol. 2, no. 4, pp. 411–420, 2016, doi: 10.1007/s40870-016-0076-0.

[36] J.-P. Gibert, J. Lopez-Cuesta, A. Crespy, and A. Bergeret, "Study of the degradation of fire-retarded PP/PE copolymers using DTA/TGA coupled with FTIR," *Polym. Degrad. Stab.*, vol. 67, no. 3, pp. 437–447, 2000.

[37] O. Faruk, A. K. Bledzki, H. P. Fink, and M. Sain, "Biocomposites reinforced with natural fibers: 2000-2010," *Prog. Polym. Sci.*, vol. 37, no. 11, pp. 1552–1596, 2012, doi: 10.1016/j.progpolymsci.2012.04.003.

[38] M. Ghozali, P. D. B. Sinaga, and S. M. Yolanda, "Pengaruh Konsentrasi Anhidrida Maleat dan Peroksida Benzoil terhadap Persen Pencangkokan pada Sintesis Kompatibilizer Polyethylene-Graft-Maleic Anhydride," *J. Kim. dan Kemasan*, vol. 38, no. 1, p. 41, 2016, doi: 10.24817/jkk.v38i1.1977.

[39] E. A. Coleman, *Plastics Additives*. Elsevier, 2011. doi: 10.1016/B978-1-4377-3514-7.10023-6.

[40] Sabin Polymer Arvand, "Maleic Anhydride grafted Polyethylene," 2022.

[41] X. Zhang, P. Yu, J. Yan, and A. M. Ton, "An empirical study of impacts of hospital information systems success," *Int. J. Med. Inform.*, vol. 13, no. 8, pp. 104–118, 2020.

[42] A. K. M. M. Alam, M. D. H. Beg, Q. T. H. Shubhra, and M. A. Khan, "Study of Natural Fibers Reinforced Thermoplastic Composites and Their Comparative Study," *ReseachGate*, pp. 398–402, 2010, doi: 10.13140/2.1.1809.9208.

[43] Junaidi, Bukhari, and Nofriadi, "Rekayasa Alat Kempa Panas (Hot Press) Sistem Penekanan Dongkrak Hidrolik," *J. Tek. Mesin*, vol. 8, no. 1, pp. 1–8, 2011.

[44] P. K. Bajpai, F. Ahmad, and V. Chaudhary, "Processing and characterization of bio-composites," *Handb. Ecomater.*, vol. 1, pp. 123–139, 2019, doi: 10.1007/978-3-319-68255-6_98.

[45] B. C. Smith, *Fundamentals of Fourier Transform Infrared Spectroscopy*, 2nd ed. CRC Press, 2011.

[46] A. B. D. Nandiyanto, R. Oktiani, and R. Ragadhita, "How to Read and Interpret FTIR Spectroscope of Organic Material," *rnal Sci. Technol.*, vol. 4, no. 1, pp. 97–118, 2019.

[47] Dachriyanus, *Analisis Struktur Senyawa Organik Secara Spektroskopi*. Lembaga Pengembangan Teknologi Informasi dan Komunikasi (LPTIK) Universitas Andalas, 2004.

[48] ASTM International, “Standard Test Method for Tensile Properties of Plastics,” *ASTM Int.*, pp. 1–17, 2014, doi: 10.1520/D0638-14.1.

[49] Zulisma Anita, Fauzi Akbar, and Hamidah Harahap, “Pengaruh Penambahan Gliserol Terhadap Sifat Mekanik Film Plastik Biodegradasi Dari Pati Kulit Singkong,” *J. Tek. Kim. USU*, vol. 2, no. 2, pp. 37–41, 2013, doi: 10.32734/jtk.v2i2.1437.

[50] M. S. Huda, A. K. Mohanty, L. T. Drzal, E. Schut, and M. Misra, “‘green’ composites from recycled cellulose and poly(lactic acid): Physico-mechanical and morphological properties evaluation,” *J. Mater. Sci.*, vol. 40, no. 16, pp. 4221–4229, 2005, doi: 10.1007/s10853-005-1998-4.

[51] ASTM International, “Standard Test Method for Compositional Analysis by Thermogravimetry 1,” *ASTM Int.*, pp. 1–6, 2008, doi: 10.1520/E1131-08.2.

[52] M. Herrera, G. Matuschek, and A. Kettrup, “Thermal degradation of thermoplastic polyurethane elastomers (TPU) based on MDI,” *Polym. Degrad. Stab.*, vol. 78, no. 2, pp. 323–331, 2002, doi: 10.1016/S0141-3910(02)00181-7.

[53] W. Yang, E. Fortunati, F. Dominici, J. M. Kenny, and D. Puglia, “Effect of processing conditions and lignin content on thermal, mechanical and degradative behavior of lignin nanoparticles/polylactic (acid) bionanocomposites prepared by melt extrusion and solvent casting,” *Eur. Polym. J.*, vol. 71, pp. 126–139, 2015.

[54] S. Ahsan, A. Rusnaenah, F. D. Pranaridho, and I. N. Apriani, *Modul praktik karakterisasi dan uji polimer*. 2021.

[55] M. Wagner, *Thermal Analysis in Practice*. Hanser Publishers, 2017.

[56] A. Tariq *et al.*, “Reactive extrusion of maleic-anhydride-grafted polypropylene by torque rheometer and its application as compatibilizer,” *Polymers (Basel).*, vol. 13, no. 4, pp. 1–17, 2021, doi: 10.3390/polym13040495.

[57] R. S. Prajapati, S. Jain, and S. C. Shit, “Development of Basalt Fiber-Reinforced Thermoplastic Composites and Effect of PE-g-MA on Composites,” *Polym. Compos.*, pp. 1–8, 2015, doi: 10.1002/pc.

[58] M. Ghozali, Y. Irawan, and W. Waskitoaji, “Pengaruh Penambahan Lignin Terhadap Stabilitas Termal Biokomposit Poliasam Laktat / Lignin,” *J. Penelit. Pascapanen Pertan.*, vol. 14, no. 1, pp. 45–51, 2017.

[59] W. Liu, Y. J. Wang, and Z. Sun, “Effects of polyethylene-grafted maleic anhydride (PE-g-MA) on thermal properties, morphology, and tensile properties of low-density polyethylene (LDPE) and corn starch blends,” *J. Appl. Polym. Sci.*, vol. 88, no. 13, pp. 2904–2911, 2003, doi: 10.1002/app.11965.

[60] O. Gordobil, I. Egüés, R. Llano-Ponte, and J. Labidi, “Psycochemical Properties of Pla Lignin Blends,” *Polym. Degrad. Stab.*, vol. 108, pp. 330–338, 2014.

[61] R. R. N. Sailaja and M. V. Deepthi, “Mechanical and thermal properties of compatibilized composites of polyethylene and esterified lignin,” *Mater. Des.*, vol. 31, no. 9, pp. 4369–4379, 2010, doi: 10.1016/j.matdes.2010.03.046.