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DAFTAR PUSTAKA

Ardina, V., Irawan, B., Prajitno, D. H., & Roesyadi, A. (2018). Active Alkali Charge Effect on Kraft Pulping Process of *Acacia mangium* and *Eucalyptus pellita*. *AIP Conference Proceedings, 2014*(1), Article 020036. doi.org:10.1063/1.5054440

Area, M. C., & Popa, V. I. (2014). Wood Fibres For Papermaking. Smithers Rapra Technology Ltd. Shropshirea. *AIP Conference Proceedings*. 1(2): 3-6.

Arip Wijayanto dkk. (2015). Phenolic and Lipophilic Extractives in *Pinus Merkusii* Jungh. Et De Vries Knots and Stemwood. *Industrial Crops and Products*, *69*, 466–47. https://doi.org/10.1016/j.indcrop.2015.02.061

Bajpai, P. (2023). Environmentally benign pulping. *Springer*.

Banavath, H. N., Bhardwaj, N. K., & Ray, A. K. (2011). A Comparative Study of The Effect of Refining on Charge of Various Pulps. *Bioresource Technology*, *102*(6), 4544-4551.

Bassa, A. G. M. C., Duarte, F. A. S., da Silva Jr, F. G., & Sacon, V. M. (2006). The Effect of Alkali Charge on *Eucalyptus spp.* Kraft Pulping. In Proceedings of the 2006 TAPPI Fall Technical Conference on Pulping, *Engineering and Environmental*.

Baucher, M., Halpin, C., Petit-Conil, M., & Boerjan, W. (2003). Lignin: Genetic Engineering and Impact on Pulping. *Critical Reviews in Biochemistry and Molecular Biology*, *38*(4),305-350. https://doi.org/10.1080/10409230391036757

Brännvall, E., & Reimann, A. (2018). The Balance Between Alkali Diffusion and Alkali Consuming Reactions during Impregnation of Softwood: Impregnation For Kraft Pulping Revisited. *Holzforschung, 72*(3), 169–178. https://doi.org/10.1515/hf-2017-0078

Brännvall, E., Norberg, L. & Karlström, K. Effect of Residual Alkali Level in Softwood Kraft Cooking. *Cellulose*. 31, 9385–9394 (2024). https://doi.org/10.1007/s10570-024-06025-1

Casey, J. P. (1980). Pulp and paper: Chemistry and Chemical Technology, 3rd Edition. Wiley-Interscience Publisher Inc, New York.

Chen, C., Duan, C., Li, J., Liu, Y., Ma, X., Zheng, L., Stavik, J., & Ni, Y. (2016). Cellulose (Dissolving Pulp) Manufacturing Processes and Properties: A Mini-Review. *BioResources, 11*(2), 5553–5564. https://doi.org/10.15376/biores.11.2.Chen

Copur, Y., Makkonen, H., & Amidon, T. E. (2005). The Prediction of Pulp Yield Using Selected Fiber Properties. *Holzforschung, 59*(5), 477–480. https://doi.org/10.1515/HF.2005.079.

Dean, G. H. (1995). Objectives For Wood Fibre Quality And Uniformity. In B. M. Potts & G. H. Dean (Eds.), *Eucalypt plantations: Improving Fibre Yield And*

UNIVERSITAS
GADJAH MADA
Pengaruh Konsentrasi Alkali Aktif terhadap Kualitas Pulp dan Sifat Fisik Kertas Pada Kayu Araucaria cunninghamii Aiton ex D.Don
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Quality (pp. 5–9). Cooperative Research Centre for Temperate Hardwood Forestry.

Direktorat Jenderal Kehutanan. (1976). *Vademecum Kehutanan Indonesia*. Direktorat Jenderal Kehutanan, Departemen Pertanian.

Duke, J. A., & Martínez, R. V. (1994). *Handbook of Ethnobotanicals (Peru).* CRC Press.

Ek, M., Gellerstedt, G., & Henriksson, G. (Eds.). (2009). Pulp and Paper Chemistry and Technology. *Wood Chemistry and Biotechnology*. De Gruyter GmbH & Co, Berlin.

Ek, M., Gellerstedt, G., & Henriksson, G. (2009). Pulping Chemistry and Technology (2)**.** Walter de Gruyter**.**

Esteves, C., Brännvall, E., Östlund, S. & Sevastyanova, O. (2022). The Effects of High Alkali Impregnation and Oxygen Delignification of Softwood Kraft Pulps On The Yield And Mechanical Properties. *Nordic Pulp & Paper Research Journal*, *37*(2), 223-231. https://doi.org/10.1515/npprj-2022-0022

Fatrawana, A., Setiawan, D., Novriyanti, E., Nawawi, D. S., Irmayanti, L., & Nurhikmah, N. (2021). Sifat Kimia dan Proksimat Kayu Tekan *Pinus merkusii*. *Journal of Science and Applicative Technology*, *5*(1), 231-235. doi: 10.35472/jsat.v5i1.414.

Fengel, D., & Wegener, G. (1984). Wood: Chemistry, ultrastructure, reactions. Walter de Gruyter

Fitri, F. A., Permanasari, I., & Zaman, M. (2023). Pembuatan Pulp Dari Campuran Tandan Kosong Kelapa Sawit dan Tongkol Jagung Menggunakan Pengeringan Tray. *Jurnal Pendidikan Tambusai*, *7*(3), 21447–21455.

Food and Agriculture Organization of the United Nations. (1980). *Guideline for utilization and marketing of tropical wood species*. FAO.

Gao, C., Cui, X., & Matsumura, J. (2024). Multidimensional Exploration of Wood Extractives: A Review of Compositional Analysis, Decay Resistance, Light Stability, And Staining Applications. *Forests*, *15*(10), 1782.

Gusamo, B. K., & Towalis, K. A. (2022). A Comparative Evaluation of Combustion Characteristics of *Araucaria Cunninghamii*, *Intsia Bijuga* and *Pometia Pinnata* for Bio-Energy Source. *Forests*, *13*(4), 563. https://doi.org/10.3390/f13040563

Hartati, N. S. (2016). Prospek Penggunaan Kayu Rendah Lignin Hasil Teknologi DNA Untuk Proses Pulping yang Efisien dan Ramah Lingkungan. *Jurnal Ecolab*, *10*(1), 29–40. https://doi.org/10.20886/jklh.2016.10.1.29-40

Heinrich, I., Weidner, K., Helle, G., Vos, H., Lindesay, J., & Banks, J. C. (2009). Interdecadal Modulation of The Relationship Between ENSO, IPO and Precipitation: Insights From Tree Rings in Australia. *Climate dynamics*, *33*(1), 63-73. https://doi.org/10.1007/s00382-009-0544-5.

UNIVERSITAS
GADJAH MADA
Pengaruh Konsentrasi Alkali Aktif terhadap Kualitas Pulp dan Sifat Fisik Kertas Pada Kayu Araucaria cunninghamii Aiton ex D.Don
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Henriksson, G., Berglund, J., Lindström, M. E., & Lawoko, M. (2024). A Review on Chemical Mechanisms of Kraft Pulping. *Nordic Pulp & Paper Research Journal, 39*(2), 297–311.
https://doi.org/10.1515/npprj-2023-0015

Horn, R. A. (1978). Morphology of pulp fiber from hardwoods and influence on paper strength. *Research Paper FPL 312*. U.S. Department of Agriculture, Forest Service, Forest Products Laboratory.

Hubbe, M. A., Maitland, C., Nanjiba, M., Horst, T., Ahn, K., and Potthast, A. (2023). Archival Performance of Paper as Affected by Chemical Components: A Review. *BioResources* 18(3), 6430-6498.

Indrawan, D. A., Efiyanti, L., Tampubolon, R. M., & Roliadi, H. (2015). Pembuatan Pulp untuk Kertas Bungkus dari Bahan Serat Alternatif. *Jurnal Penelitian Hasil Hutan, 33*(4), 283–302. https://doi.org/10.20886/jphh.2015.33.4.283-302

Istikowati, W. T., Aiso, H., Sunardi, Sutiya, B., Ishiguri, F., Ohshima, J., Iizuka, K., & Yokota, S. (2016). Wood, Chemical, and Pulp Properties of Woods From Less-Utilized Fast-Growing Tree Species Found in Naturally Regenerated Secondary Forest In South Kalimantan, Indonesia. *Journal of Wood Chemistry and Technology, 36*(4), 250–258. https://doi.org/10.1080/02773813.2015.1124121.

Jafari, V., Labafzadeh, S. R., King, A., Kilpeläinen, I., Sixta, H., & van Heiningen, A. (2014). Oxygen Delignification of Conventional and High Alkali Cooked Softwood Kraft Pulps, and Study of The Residual Lignin Structure. *RSC Advances, 4*(34), 17469–17479. https://doi.org/10.1039/C4RA00115J

Jardim, J. M., Hart, P. W., Lucia, L. A., Jameel, H., & Chang, H.-M. (2022). The Effect of The Kraft Pulping Process, Wood Species, and Ph on Lignin Recovery From Black Liquor. *Fibers, 10*(2), 16. https://doi.org/10.3390/fib10020016

Kasmudjo. (2010). *Teknologi Hasil Hutan*. Cakrawala Media. Yogyakarta.

Kaur, H., & Dutt, D. (2013). Anatomical and Fibre Characteristics of Some Agro Waste Materials for Pulp and Paper Making. *International Journal of Engineering Research and Applications, 3*(1), 83–92.

Kien, N. D., Quang, T. H., Jansson, G., Harwood, C., Clapham, D., & Arnold, S. (2009). Cellulose Content As A Selection Trait in Breeding for Kraft Pulp Yield in *Eucalyptus urophylla*. *Annals of Forest Science, 66*, 711. https://doi.org/10.1051/forest/2009064.

Kohútová, M., Peciar, P., Němeček, M., and Fekete, R. (2022). Selected Physical Parameters of Spruce Chips *Vs.* Alkali Consumptions In The Impregnation Step Of Kraft Pulping**,** *BioResources* 17(4), 6490-6495.

Lehr, M., Miltner, M., & Friedl, A. (2021). Removal of Wood Extractives As Pulp (Pre-)Treatment: A technological review. *SN Applied Sciences, 3*, 886. https://doi.org/10.1007/s42452-021-04873-1

UNIVERSITAS
GADJAH MADA
Pengaruh Konsentrasi Alkali Aktif terhadap Kualitas Pulp dan Sifat Fisik Kertas Pada Kayu Araucaria cunninghamii Aiton ex D.Don
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Lempang, M. (2017). Sifat Dasar dan Kegunaan Kayu *Agathis hamii* M. dari Sulawesi Selatan. *Jurnal Penelitian Kehutanan Wallacea, 6*(2), 157–167. https://doi.org/10.18330/jwallacea.2017.vol6iss2pp157-167.

Lempang, M. (2017). Basic Properties And Uses of Agathis (*Agathis Hamii* M. Dr.) Wood From South Sulawesi. *Jurnal Penelitian Kehutanan Wallacea, 6*(2), 159–171.

Lestari, S. B., & Pari, G. (1990). Analisa Kimia Beberapa Jenis Kayu Indonesia. *Jurnal Penelitian Hasil Hutan, 7*(3), 96–100.

Lukmandaru, G., Setiaji, F., & Siagian, R. M. (2019). Effects of Mixing Ratio of Heavily Beaten *Pinus merkusii* Pulp on Physical Properties of Kraft *Acacia Nilotica* Pulp Sheets. *Wood Research Journal, 10*(2), 53–60. https://doi.org/10.51850/wrj.2019.10.2.53-60

Lukmandaru, G., Siagian, R. M., & Marsoem, S. N. (2002). Kualitas Kayu Nilotika (*Acacia Nilotica*) sebagai Bahan Baku Pulp. *Prosiding Seminar Nasional MAPEKI V. Puslitbang Bogor* (pp. 397-402).

Mahdiyanti, S. F., & Marsoem, S. N. (2015). Rendemen dan Sifat Fisik Pulp Sulfat Kayu Gubal dan Teras Mangium (*Acacia Mangium* Willd.) Asal Merauke pada Tiga Konsentrasi Alkali Aktif (Skripsi tidak dipublikasikan). Fakultas Kehutanan, Universitas Gadjah Mada.

Marsoem, S. N. (2002). Pulp dan Kertas. Yayasan Pembina Fakultas Kehutanan Universitas Gadjah Mada. Yogyakarta.

Marsoem, S. N. (2004). Pemanfaatan Hasil Hutan Tanaman *Acacia mangium*. PT Musi Hutan Persada.

Masrol, S. R., Ibrahim, M. H. I., Adnan, S., Abdul Raub, R., Sa'adon, A. M., Sukarno, K. I., & Yusoff, M. F. H. (2018). Durian Rind Soda-Anthraquinone Pulp and Paper: Effects of Elemental Chlorine-Free Bleaching and Beating. *Journal of Tropical Forest Science, 30*(1), 106–116. https://doi.org/10.26525/jtfs2018.30.1.106116

Naidu, R. D. (2003). The Impact of Physical Characteristics of Pinus Patula on Kraft Pulp Properties. Master's thesis, University of Natal.

Orwa, C., Mutua, A., Kindt, R., Jamnadass, R., & Anthony, S. (2009). Agroforestree Database: A Tree Reference and Selection Guide (Version 4.0). World Agroforestry Centre (ICRAF).
http://www. worldagroforestry. org/sites/treedbs/treedatabases. asp.

Park, H.-H., Kim, C.-H., Park, J.-H., Park, M.-S., & Lee, J.-S. (2025). Comparative Analysis of Ultra-Fine Bar Refining and Valley Beating on Softwood and Hardwood Kraft Pulps: Implications for Fiber Integrity and Paper Strength Enhancement. *Applied Sciences*, *15*(16), 9160 https://doi.org/10.3390/app15169160.

Park, S. G., Tak, J. H., Lee, J. Y., Shin, K. S., & Park, S. I. (2025). Evaluation of Cellulase Effect on The Refining Process of Softwood Bleached Kraft Pulp. *BioResources 20*(1), 1059–1068. *doi: 10.15376/biores.20.1.1059-1068.*

UNIVERSITAS
GADJAH MADA
Pengaruh Konsentrasi Alkali Aktif terhadap Kualitas Pulp dan Sifat Fisik Kertas Pada Kayu Araucaria cunninghamii Aiton ex D.Don
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Patil, R., & Van Heiningen, A. (2022). Increasing Softwood Kraft Pulp Yield Using Sodium Methyl Mercaptide. *Cellulose*, *29*(6), 3427–3442. https://doi.org/10.1007/s10570-022-04470-4.

Popa, V. I. (2013). Pulp Production and Processing: From Papermaking to High-Tech Products. Smithers Rapra.

Prabandaru, B. G., Lukmandaru, G., & Nirsatmanto, A. (2023). Sifat Pulp dan Kertas Proses Sulfat *Acacia Crassicarpa* dengan Variasi Alkali Aktif dan Derajat Giling (Skripsi Tidak Dipublikasikan). Fakultas Kehutanan, Universitas Gadjah Mada.

Purnawati, R., Wahyudi, I., & Priadi, T. (2012). Anatomical properties of *Flindersia pimenteliana* F. Muell. from Wondama Bay, West Papua. *Jurnal Ilmu dan Teknologi Kayu Tropis*, *10*(2), 122–129. https://doi.org/10.51850/jitkt.v10i2.111.

Rizqiani, K. D., Aprianis, Y., & Junaedi, A. (2019). Potensi Tiga Jenis Kayu Tanah Gambut Sumatera sebagai Bahan Baku Pulp dan Kertas. *Jurnal Ilmu dan Teknologi Kayu Tropis*, *17*(2), 112–121. https://doi.org/10.51850/jitkt.v17i2.192.

Roliadi, H., Indrawan, D. A., Pari, G., & Tampubolon, R. M. (2012). Potensi Teknis Pemanfaatan Pelepah Nipah dan Campurannya dengan Sabut Kelapa untuk Pembuatan Papan Serat Berkerapatan Sedang. *Jurnal Penelitian Hasil Hutan*, *30*(3), 183–198. https://doi.org/10.20886/jphh.2012.30.3.183-198

Rosli, W. D., Mazlan, I., & Law, K. N. (2009). Effects of Kraft Pulping Variables on Pulp and Paper Properties of *Acacia mangium* Kraft Pulp. *Cellulose Chemistry and Technology*, *43*(1), 9–15.

Rowell, R. M. (Ed.). (2013). *Handbook Of Wood Chemistry and Wood Composites* (2nd ed.). CRC Press.

Royal Botanic Gardens, Kew. (2026). Araucaria cunninghamii. Plants of the World Online. https://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:60455476-2 (diakses 29 Juli 2026)

Sahara, Azijah, Setiadi, & Yasmin, T. (2024). *Global Value Chain of Indonesian Pulp and Paper Industry*. IPB University. Bogor.

Santos, A. J. A., Anjos, O., Morais, M. C., Diogo, G., Simões, R., & Pereira, H. (2014). Characterization of Cypress Wood for Kraft Pulp Production. *BioResources*, *9*(3), 4764–4774.

Santos, A., Anjos, O., Amaral, M. E., Gil, N., Pereira, H., & Simões, R. (2012). Influence on Pulping Yield and Pulp Properties of Wood Density of *Acacia melanoxylon*. *Journal of Wood Science*, *58*(6), 479–486. https://doi.org/10.1007/s10086-012-1286-2

Setiadi, D., Susanto, M., & Fauzi, M. A. (2015). Analisa Kimia Kayu pada Tanaman *Araucaria cunninghamii* Aiton ex D. Don untuk Bahan Baku pulp. *Jurnal Pemuliaan Tanaman Hutan*, *9*(1), 53–60.

UNIVERSITAS
GADJAH MADA
Pengaruh Konsentrasi Alkali Aktif terhadap Kualitas Pulp dan Sifat Fisik Kertas Pada Kayu Araucaria cunninghamii Aiton ex D.Don
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Serkov, A. A., & Alén, R. (2004). Beating-Induced Yellowing of TCF- and ECF-Bleached Pulps. *TAPPI Journal, 3*(1), 3–6.

Shmulsky, R., & Jones, P. D. (2019). Forest Products and Wood Science: An introduction, 7th Edition. Wiley-Blackwell, Oxford.

Silvestre, A. J. D., et al. (2021). Removal of Wood Extractives as Pulp (Pre) Treatment: A technological review. *SN Applied Sciences*, *3*, 753. https://doi.org/10.1007/s42452-021-04873-1

Simatupang, M. H. (2002). *Teknologi Pulp dan Kertas*. Gadjah Mada University Press. Yogyakarta.

Sixta, H. (Ed.). (2006). Handbook of Pulp, Volume 1. Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim.

Sjöström, E. (1993). Wood Chemistry: Fundamentals and Applications, 2nd Edition. Academic Press. San Diego.

Soerianegara, I., & Lemmens, R. H. M. J. (Eds.). (1993). Plant Resources of South-East Asia, Timber Trees: Major Commercial Timbers, 5(1). Pudoc Scientific Publishers.

Sugesty, S., Kardiansyah, T., & Pratiwi, W. (2015). Potensi *Acacia crassicarpa* sebagai Bahan Baku Pulp Kertas untuk Hutan Tanaman Industri. *Jurnal Selulosa, 5*(1), 21–32.

Syafii, W., & Siregar, I. Z. (2006). Sifat Kimia dan Dimensi Serat Kayu Mangium (*Acacia Mangium* Willd.) dari Tiga Provenans. *Jurnal Ilmu dan Teknologi Kayu Tropis, 4*(1), 28–32. https://doi.org/10.51850/jitkt.v4i1.286.

Tsoumis, G. (1991). Science And Technology Of Wood: Structure, Properties, Utilization. Van Nostrand Reinhold, Stellenbosch.

Universitas Gadjah Mada. 2023. *Kementerian Lingkungan Hidup dan Kehutanan ungkap rumitnya masalah hutan Indonesia*. https://ugm.ac.id/id/berita/kementerian-lingkungan-hidup-dan-kehutanan-ungkap-rumitnya-masalah-hutan-indonesia/
(diakses November 2025).

Wessels, C. B., Malan, F. S., & Rypstra, T. (2003). The Impact of Physical Characteristics of Pinus Patula on Kraft Pulp Properties. Durban.

Wijayanto, A., Dumarçay, S., Gérardin-Charbonnier, C., Sari, R. K., Syafii, W., & Gérardin, P. (2015). Phenolic and Lipophilic Extractives in *Pinus merkusii* Jungh. Et De Vries Knots and Stemwood. *Industrial Crops and Products*, *69*, 466-471. https://doi.org/10.1016/j.indcrop.2015.02.061.

Wong, K. K. Y., Kibblewhite, R. P., & Signal, F. A. (1999). Effect of Xylanase and Dosage on the Refining Properties of Unbleached Softwood Kraft Pulp. *Journal of Wood Chemistry and Technology*, *19*(3), 203–212. https://doi.org/10.1080/02773819909349608

Xiang, H. L., & He, J. (2013). Diethanolamine Pulping Process of *Pinus kesiya*. *Applied Mechanics and Materials, 291–294*, 347–350. https://doi.org/10.4028/www.scientific.net/AMM.291-294.347.

UNIVERSITAS
GADJAH MADA
Pengaruh Konsentrasi Alkali Aktif terhadap Kualitas Pulp dan Sifat Fisik Kertas Pada Kayu Araucaria cunninghamii Aiton ex D.Don
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Yamada, N., Khoo, K. C., & Yusoff, M. N. M. (1990). Sulphate Pulping Characteristics of *Acacia* hybrid, *Acacia mangium*, and *Acacia auriculiformis* from Sabah. *Journal of Tropical Forest Science*, *4*(3), 206–214. http://www.jstor.org/stable/43594803.

Yang, X., & Berglund, L. A. (2021). Structural and ecofriendly holocellulose materials from wood: Microscale fibers and nanoscale fibrils. *Advanced Materials*, *33*(28), 2001118. https://doi.org/10.1002/adma.202001118

Zhang, B., Shi, L., Zhang, X., & Xu, M. (2026). Physics-Guided Multi-Task Learning for Small-Sample Soft Sensing: Simultaneous Prediction of Kappa Number and Viscosity in Continuous Kraft Pulping. *Sensors*, *26*(8), 2395. https://doi.org/10.3390/s26082395.