UNIVERSITAS
GADJAH MADA
Effect of Pressing Temperature and Citric Acid-Sorbitol Ratio on Physical and Mechanical Properties of Petung Bamboo Waste Particleboard
Muhammad Zuhair, Prof. Dr.Agr.Sc. Ir. Ragil Widyorini, S.T., M.T., IPU.
Universitas Gadjah Mada, 2024 | Diunduh dari http://etd.repository.ugm.ac.id/

BIBLIOGRAPHY

Aini, E. N., Widyorini, R., Prayitno, T. A., & Setyayunita, T. 2020. Characteristics of bamboo particleboard bonded with citric acid-starch using three-step press cycle method. *Key Engineering Materials*, *840 KEM*, 543–550. DOI: https://doi.org/10.4028/www.scientific.net/kem.840.543

Apelblat, A. 2014. Properties of Citric Acid and Its Solutions. In *Citric Acid* (pp 13–126). New York City: Springer International Publishing. DOI: https://doi.org/10.1007/978-3-319-11233-6

Arias, A., Entrena-Barbero, E., Feijoo, G., & Moreira, M. T. 2022. Sustainable non-isocyanate polyurethanes bio-adhesives for engineered wood panels are revealed as promising candidates to move from formaldehyde-based alternatives. *Journal of Environmental Chemical Engineering*, *10*, 107053. DOI: https://doi.org/10.1016/j.jece.2021.107053

Baharuddin, M. N. M., Zain, N. M., Harun, W. S. W., Roslin, E. N., Ghazali, F. A., & Md Som, S. N. 2023. Development and performance of particleboard from various types of organic waste and adhesives: A review. *International Journal of Adhesion and Adhesives*, *124*, 103378. DOI: https://doi.org/10.1016/j.ijadhadh.2023.103378

Balducci, F., Adamopoulos, S., Pettinari, C., Canti, E., Di Nicola, C., Tombesi, A., Cecchini, A., & Gabbani, C. 2020. A formaldehyde-free adhesive for particleboards based on soy flour, magnesium oxide, and a plant-derived enzymatic hydrolysate. *BioResources*, *15*(2), 3087–3102. DOI: https://doi.org/10.15376/biores.15.2.3087-3102

Bekhta, P., Ráheľ, J., Pipíška, T., Nociar, M., Leiter, L. M., & Rousek, R. 2024. Properties of particleboards made from mixture of oversized fibers from MDF waste process and wood particles of Norway spruce (*Picea abies*). *Wood Material Science & Engineering*, 1–9. DOI: https://doi.org/10.1080/17480272.2024.2362753

BPS (Badan Pusat Statistik Indonesia). 2023. Statistik Produksi Kehutanan Tahun 2022. *Statistics of Forestry Production 2022* (pp 24). Jakarta: Badan Pusat Statistik Indonesia.

UNIVERSITAS
GADJAH MADA
Effect of Pressing Temperature and Citric Acid-Sorbitol Ratio on Physical and Mechanical Properties of Petung Bamboo Waste Particleboard
Muhammad Zuhair, Prof. Dr.Agr.Sc. Ir. Ragil Widyorini, S.T., M.T., IPU.
Universitas Gadjah Mada, 2024 | Diunduh dari http://etd.repository.ugm.ac.id/

BPS (Badan Pusat Statistik Indonesia). 2024. Statistik Produksi Kehutanan Tahun 2023. *Statistics of Forestry Production 2023* (pp 24). Jakarta: Badan Pusat Statistik Indonesia.

Cahyono, T. D., & Syahidah. 2019. Citric acid, an environmentally friendly adhesive and wood impregnation material-review of research. *IOP Conference Series: Materials Science and Engineering*, *593*(1). DOI: https://doi.org/10.1088/1757-899X/593/1/012009

Centolella, A.P., Razor, B.G. 1972. Polyesters of Citric Acid and Sorbitol. US Patent No. US3661955. Washington DC: US Patent and Trademark Office.

Dewi, G. K., Widyorini, R., & Lukmandaru, G. 2022. Application of Maltodextrin-based Adhesive on Particleboard Made from Salacca Frond. *BioResources*, *17*(1). DOI: https://doi.org/10.15376/biores.17.1.190-206

DLHK-DIY (Dinas Lingkungan Hidup dan Kehutanan - Daerah Istimewa Yogyakarta). 2024. Rencana Kerja Dinas Lingkungan Hidup dan Kehutanan-Daerah Istimewa Yogyakarta 2024. Work Plan of the Environmental and Forestry Office-Special Region of Yogyakarta 2024 (pp. 2–136). Yogyakarta: DLHK DIY.

Doll, K. M., Shogren, R. L., Willett, J. L., & Swift, G. 2006. Solvent-free polymerization of citric acid and D-sorbitol. *Journal of Polymer Science, Part A: Polymer Chemistry*, *44*(14), 4259–4267. DOI: https://doi.org/10.1002/pola.21535

FAO (Food and Agriculture Organization of the United Nations). 2023. FAOSTAT-Statistical Database Forestry production and trade. https://www.fao.org/faostat/en/#data/FO

Guo, X., Wang, X., Guan, J., Chen, X., Qin, Z., Mu, X., & Xian, M. 2014. Selective hydrogenation of D-glucose to D-sorbitol over Ru/ZSM-5 catalysts. *Cuihua Xuebao/Chinese Journal of Catalysis*, *35*(5), 733–740. DOI: https://doi.org/10.1016/s1872-2067(14)60077-2

Han, S., He, Y., Ye, H., Ren, X., Chen, F., Liu, K., Shi, S. Q., & Wang, G. 2024. Mechanical Behavior of Bamboo, and Its Biomimetic Composites and Structural Members: A Systematic Review. In *Journal of Bionic Engineering: Springer*, *21*(1), 56–73.

UNIVERSITAS
GADJAH MADA
Effect of Pressing Temperature and Citric Acid-Sorbitol Ratio on Physical and Mechanical Properties of Petung Bamboo Waste Particleboard
Muhammad Zuhair, Prof. Dr.Agr.Sc. Ir. Ragil Widyorini, S.T., M.T., IPU.
Universitas Gadjah Mada, 2024 | Diunduh dari http://etd.repository.ugm.ac.id/

DOI: https://doi.org/10.1007/s42235-023-00430-1

Hashim, R., Said, N., Lamaming, J., Baskaran, M., Sulaiman, O., Sato, M., Hiziroglu, S., Sugimoto, T. 2011. Influence of press temperature on the properties of binderless particleboard made from oil palm trunk. *Materials & Design*, *32*(5), 2520–2525.
DOI: https://doi.org/10.1016/j.matdes.2011.01.053

He, Z., & Umemura, K. 2017. Utilization of citric acid in wood bonding. In *Bio-based Wood Adhesives* (pp. 221–238). Boca Raton: CRC Press-Taylor and Francis Group.
DOI: https://doi.org/10.1201/9781315369242

He, Z., & Wan, H. 2017. Bio-based wood adhesives research advances and outlooks. In *Bio-Based Wood Adhesives* (pp. 340–353). Boca Raton: CRC Press-T&F Group.
DOI: https://doi.org/10.1201/9781315369242

Hiziroglu, S., Jarusombuti, S., & Fueangvivat, V. 2004. Surface characteristics of wood composites manufactured in Thailand. *Building and Environment*, *39*(11), 1359–1364.
DOI: https://doi.org/10.1016/j.buildenv.2004.02.004

Hiziroglu, S., & Suzuki, S. 2007. Evaluation of surface roughness of commercially manufactured particleboard and medium density fiberboard in Japan. *Journal of Materials Processing Technology*, *184*(1–3), 436–440.
DOI: https://doi.org/10.1016/j.jmatprotec.2006.11.011

JIS (Japanese Industrial Standard). 2015. JIS A 5908-2015 Particleboards. Tokyo: Japanese Standards Association.

Karlinasari, L., Sejati, P. S., Adzkia, U., Arinana, A., & Hiziroglu, S. 2021. Some of the physical and mechanical properties of particleboard made from betung bamboo (*Dendrocalamus asper*). *Applied Sciences (Switzerland)*, *11*(8).
DOI: https://doi.org/10.3390/app11083682

Kawalerczyk, J., Kuliński, M., Majlingová, A., Dukarska, D., & Mirski, R. 2024. The effect of wood particles polyesterification with sorbitol and citric acid on the properties of particleboard produced with the use of PF/pMDI adhesive. *European Journal of Wood and Wood Products*, *82*(5), 1725–1737.
DOI: https://doi.org/10.1007/s00107-024-02124-9

UNIVERSITAS
GADJAH MADA
Effect of Pressing Temperature and Citric Acid-Sorbitol Ratio on Physical and Mechanical Properties of Petung Bamboo Waste Particleboard
Muhammad Zuhair, Prof. Dr.Agr.Sc. Ir. Ragil Widyorini, S.T., M.T., IPU.
Universitas Gadjah Mada, 2024 | Diunduh dari http://etd.repository.ugm.ac.id/

Kayo, C., Sanjo, K., Sato, I., Liu, M., Prasetyadi, G. V., & Hirahara, S. 2023. Carbon stocks of particle board and fiberboard in Japan. *Scientific Reports*, *13*(1), 9846. DOI: https://doi.org/10.1038/s41598-023-37132-x

Kelly, M. W. 1977. Critical literature review of relationships between processing parameters and physical properties of particleboard; pp 2–15, 20–23, 46–52. Madison, Wisconsin: US Department of Agriculture.

Kurkowiak, K., Emmerich, L., & Militz, H. 2021. Sorption behavior and swelling of citric acid and sorbitol (SorCA) treated wood. *Holzforschung*, *75*(12), 1136–1149. DOI: https://doi.org/10.1515/hf-2021-0068

Kusumah, S. S., Umemura, K., Guswenrivo, I., Yoshimura, T., & Kanayama, K. 2017. Utilization of sweet sorghum bagasse and citric acid for manufacturing of particleboard II: influences of pressing temperature and time on particleboard properties. *Journal of Wood Science*, *63*(2), 161–172. DOI: https://doi.org/10.1007/s10086-016-1605-0

Larnøy, E., Karaca, A., Gobakken, L. R., & Hill, C. A. S. 2018. Polyesterification of wood using sorbitol and citric acid under aqueous conditions. *International Wood Products Journal*, *9*(2), 66–73. DOI: https://doi.org/10.1080/20426445.2018.1475918

Lee, S. H., Tahir, P. M., Lum, W. C., Tan, L. P., Bawon, P., Park, B. D., Al Edrus, S. S. A. O., & Abdullah, U. H. 2020. A review on citric acid as green modifying agent and binder for wood. In *Polymers*, *12*(8), 1692. DOI: https://doi.org/10.3390/POLYM12081692

Lerbret, A., Mason, P. E., Venable, R. M., Cesàro, A., Saboungi, M. L., Pastor, R. W., & Brady, J. W. 2009. Molecular dynamics studies of the conformation of sorbitol. *Carbohydrate Research*, *344*(16), 2229–2235. DOI: https://doi.org/10.1016/j.carres.2009.08.003

Li, J., Lei, H., Xi, X., Li, C., Hou, D., Song, J., & Du, G. 2023. A sustainable tannin-citric acid wood adhesive with favorable bonding properties and water resistance. *Industrial Crops and Products*, *201*, 116933. DOI: https://doi.org/10.1016/j.indcrop.2023.116933

UNIVERSITAS
GADJAH MADA
Effect of Pressing Temperature and Citric Acid-Sorbitol Ratio on Physical and Mechanical Properties of Petung Bamboo Waste Particleboard
Muhammad Zuhair, Prof. Dr.Agr.Sc. Ir. Ragil Widyorini, S.T., M.T., IPU.
Universitas Gadjah Mada, 2024 | Diunduh dari http://etd.repository.ugm.ac.id/

Lin, C. F., Karlsson, O., Jones, D., & Sandberg, D. 2022. Bio-based adhesive derived from citric acid and sorbitol for wood-composite manufacture. *Wood Material Science and Engineering*, *17*(5), 397–399. DOI: https://doi.org/10.1080/17480272.2022.2090278

Maloney, T. M. 1977. Modern Particleboard and Dry Process Fiberboard Manufacturing; pp 384. Miller Freeman Inc, San Francisco.

Marbun, S. D., Dwianto, W., Meliala, S. B. P. S., Widyorini, R., Augustina, S., & Hiziroglu, S. 2023. Dimensional stability mechanisms of binderless boards by heat or steam treatment: a review. *Cellulose*, *30*(14), 8571–8593. DOI: http://dx.doi.org/10.1007/s10570-023-05429-9

Neitzel, N., Hosseinpourpia, R., Walther, T., & Adamopoulos, S. 2022. Alternative materials from agro-industry for wood panel manufacturing—a review. *Materials*, *15*(13), 4542. DOI: https://doi.org/10.3390/ma15134542

Poletto, M. 2017. Assessment of the thermal behavior of lignins from softwood and hardwood species. *Maderas. Ciencia y tecnología*, *19*(1), 63–74. DOI: http://dx.doi.org/10.4067/S0718-221X2017005000006

Popescu, C. M. 2017. Wood as bio-based building material. In *Performance of Bio-based Building Materials* (pp. 21–96). Amsterdam: Elsevier Inc. DOI: https://doi.org/10.1016/B978-0-08-100982-6.00002-1

Prasetiyo, K. W., Hermawan, D., Muliana, F., Sudarmanto, S., Narto, N., Hadi, Y. S., & Subyakto, S. 2022. Hybrid Adhesive Made from Citric Acid and Sucrose for Particleboard Composed of Sengon (Paraserianthes falcataria (L.) Nielsen) Veener By-Products and Sorghum Stalk. *Jurnal Bahan Alam Terbarukan*, *11*(2), 68–76. DOI: https://doi.org/10.15294/jbat.v11i2.38471

Roulon, S., Soulairol, I., Cazes, M., Lemierre, L., Payre, N., Delbreilh, L., & Alié, J. 2021. D-sorbitol physical properties effects on filaments used by 3d printing process for personalized medicine. *Molecules*, *26*(10), 3000. DOI: https://doi.org/10.3390/molecules26103000

Rowe, R. C., Sheskey, P., & Quinn, M. 2009. *Handbook of pharmaceutical excipients*: pp 181–183, 679–681. London: Pharmaceutical Press.

UNIVERSITAS
GADJAH MADA
Effect of Pressing Temperature and Citric Acid-Sorbitol Ratio on Physical and Mechanical Properties of Petung Bamboo Waste Particleboard
Muhammad Zuhair, Prof. Dr.Agr.Sc. Ir. Ragil Widyorini, S.T., M.T., IPU.
Universitas Gadjah Mada, 2024 | Diunduh dari http://etd.repository.ugm.ac.id/

Santoso, M., Widyorini, R., Agus Prayitno, T., & Sulistyo, J. 2019. The Effects of Extractives Substances for Bonding Performance of Three Natural Binder on Nipa Fronds Particleboard. *KnE Life Sciences*, *4*(11), 227.
DOI: https://doi.org/10.18502/kls.v4i11.3868

Santoso, M., Widyorini, R., Prayitno, T. A., Sulistyo, J., & Hamidah, N. 2020. Effect of pressing temperatures on bonding properties of sucrose-citric acid for nipa palm fronds particleboard. *Wood Research*, *65*(5), 747–756.
DOI: https://doi.org/10.37763/WR.1336-4561/65.5.747756

Scharf, A., Sandberg, D., & Jones, D. 2024. The influence of chemical content and pressing temperature on the properties of citric acid-bonded particleboards from softwood sawmilling residues. *Wood Material Science and Engineering*, *19*(4), 987–992.
DOI: https://doi.org/10.1080/17480272.2024.2367608

Sucipto, T., Widyorini, R., Prayitno, T. A., & Lukmandaru, G. 2022. The Effect of Gambir Adhesive Level and Hot Press Temperature on Physical and Mechanical Properties of Bamboo Particleboard. In *Proceedings of the 1st International MIPAnet Conference on Science and Mathematics (IMC - SciMath 2019)*, 362–367.
DOI: https://doi.org/10.5220/0010182800002775

Supriadi, A., & Trisatya, D. R. 2021. Engineered bamboo: The promising material for building and construction application in Indonesia. In *IOP Conference Series: Earth and Environmental Science*. 886(1), 012040. IOP Publishing.
DOI: https://doi.org/10.1088/1755-1315/886/1/012040

Suriani, E. 2020. A study of the physical-mechanical properties of bamboo in Indonesia. In *Proceedings of the Built Environment, Science and Technology International Conference*, 154–162.
DOI: http://dx.doi.org/10.5220/0008904601540162

Umemura, K., Sugihara, O., & Kawai, S. 2013. Investigation of a new natural adhesive composed of citric acid and sucrose for particleboard. *Journal of Wood Science*, *59*(3), 203–208.
DOI: https://doi.org/10.1007/s10086-013-1326-6

UNIVERSITAS
GADJAH MADA
Effect of Pressing Temperature and Citric Acid-Sorbitol Ratio on Physical and Mechanical Properties of Petung Bamboo Waste Particleboard
Muhammad Zuhair, Prof. Dr.Agr.Sc. Ir. Ragil Widyorini, S.T., M.T., IPU.
Universitas Gadjah Mada, 2024 | Diunduh dari http://etd.repository.ugm.ac.id/

Umemura, K., Sugihara, O., & Kawai, S. 2015. Investigation of a new natural adhesive composed of citric acid and sucrose for particleboard II: effects of board density and pressing temperature. *Journal of Wood Science*, *61*(1), 40–44. DOI: https://doi.org/10.1007/s10086-014-1437-8

Widjaja, E. A. (2000). Bamboo diversity and its future prospect in Indonesia. In *Proceedings of The Third International Wood Science Symposium*. 235–240.

Widyorini, R., Nugraha, P. A., Rahman, M. Z. A., & Prayitno, T. A. 2016a. Bonding ability of a new adhesive composed of citric acid-sucrose for particleboard. *BioResources*, *11*(2), 4526–4535. DOI: https://doi.org/10.15376/biores.11.2.4526-4535

Widyorini, R., Umemura, K., Isnan, R., Putra, D. R., Awaludin, A., & Prayitno, T. A. 2016b. Manufacture and properties of citric acid-bonded particleboard made from bamboo materials. *European Journal of Wood and Wood Products*, *74*(1), 57–65. DOI: https://doi.org/10.1007/s00107-015-0967-0

Widyorini, R., Umemura, K., Kusumaningtyas, A. R., & Prayitno, T. A. 2017. Effect of starch addition on properties of citric acid-bonded particleboard made from bamboo. *BioResources*, *12*(4), 8068-8077. DOI: https://doi.org/10.15376/biores.12.4.8068-8077

Widyorini, R., Umemura, K., Septiano, A., Soraya, D. K., Dewi, G. K., & Nugroho, W. D. 2018. Manufacture and properties of citric acid-bonded composite board made from salacca frond: Effects of maltodextrin addition, pressing temperature, and pressing method. *BioResources*, *13*(4), 8662–8676. DOI: https://doi.org/10.15376/biores.13.4.8662-8676

Widyorini, R. 2020. Evaluation of physical and mechanical properties of particleboard made from petung bamboo using sucrose-based adhesive. *BioResources*, *15*(3), 5072. DOI: https://doi.org/10.15376/biores.15.3.5072-5086

Widyorini, R., Syahri, I., & Dewi, G. K. 2020. Properties of Particleboard made from Petung Bamboo (*Dendrocalamus asper*) and Wulung Bamboo (*Gigantochloa atroviolacea*) Particles with Extraction Treatment. *Jurnal Ilmu Kehutanan*, *14*(1), 84–93.

UNIVERSITAS
GADJAH MADA
Effect of Pressing Temperature and Citric Acid-Sorbitol Ratio on Physical and Mechanical Properties of Petung Bamboo Waste Particleboard
Muhammad Zuhair, Prof. Dr.Agr.Sc. Ir. Ragil Widyorini, S.T., M.T., IPU.
Universitas Gadjah Mada, 2024 | Diunduh dari http://etd.repository.ugm.ac.id/

DOI: https://doi.org/10.22146/jik.57476

Widyorini, R., Dewi, G. K., Nuryawan, A., & Alamsyah, E. M. 2022. Physical and Mechanical Properties of Bamboo Particleboard using Dextrin-citric Acid as Adhesive. In *Proceedings of the 1st International MIPAnet Conference on Science and Mathematics (IMC-SciMath 2019)*, 475–480.
DOI: https://doi.org/10.5220/0010205200002775

Widyorini, R., Dewi, G. K., Nuryawan, A., Heraldy, E., & Masruchin, N. 2024. Properties of Eco-Friendly Oriented Strand Board Produced from Oil Palm Trunk. *Journal of Renewable Materials*, *12*(10), 1757–1770.
DOI: https://doi.org/10.32604/jrm.2024.054821

Xiang, J., Yang, S., Zhang, J., Wu, J., Shao, Y., Wang, Z., & Yang, M. (2022). The preparation of sorbitol and its application in polyurethane: a review. In *Polymer Bulletin*: Springer, *79*(4), 2667–2684.
DOI: https://doi.org/10.1007/s00289-021-03639-4

Yang, X., Li, X., Zhao, J., Liang, J., & Zhu, J. 2023. Production of Sorbitol via Hydrogenation of Glucose over Ruthenium Coordinated with Amino Styrene-co-maleic Anhydride Polymer Encapsulated on Activated Carbon (Ru/ASMA@AC) Catalyst. *Molecules*, *28*(12), 4830.
DOI: https://doi.org/10.3390/molecules28124830

Zeidler, A., Borůvka, V., Brabec, P., Tomczak, K., Bedřich, J., Vacek, Z., Cukor, J., & Vacek, S. 2024. The Possibility of Using Non-Native Spruces for Norway Spruce Wood Replacement—A Case Study from the Czech Republic. *Forests*, *15*(2), 255.
DOI: https://doi.org/10.3390/f15020255

Zhao, Z., Umemura, K., & Kanayama, K. 2016. Effects of the addition of citric acid on tannin-sucrose adhesive and physical properties of the particleboard. *BioResources*, *11*(1), 1319–1333.
DOI: https://doi.org/10.15376/biores.11.1.1319-1333

Zhou, Y., Smith, R. L., & Qi, X. 2024. Chemocatalytic production of sorbitol from cellulose via sustainable chemistry - a tutorial review. In *Green Chemistry*: Royal Society of Chemistry, *26*(1), 202–243.
DOI: https://doi.org/10.1039/d3gc04082h