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Research outputs

Belt, T., & Awais, M. (2025). Progressive degradation of acetylated wood by the brown rot fungi *Coniophora puteana* and *Rhodonia placenta*. *Wood Science and Technology*, *59*(1), Article 13. https://doi.org/10.1007/s00226-024-01620-8

Cucharero Moya, J., Awais, M., Valkonen, M., Kammiovirta, K., Rautkari, L., Lokki, T., & Hänninen, T. (2024). Influence of moisture on the sound absorption properties of wood-based pulp fibre foams. *Materials Today Sustainability*, *27*, Article 100854. https://doi.org/10.1016/j.mtsust.2024.100854

Sultan, M. T., Altgen, D., Awais, M., Rautkari, L., & Altgen, M. (2024). Impact of a conditioning step during the treatment of wood with melamine-formaldehyde resin on dimensional stabilisation. *Holzforschung*, *78*(1), 37-46. https://doi.org/10.1515/hf-2023-0084

Belt, T., Altgen, M., Awais, M., Nopens, M., & Rautkari, L. (2024). Degradation by brown rot fungi increases the hygroscopicity of heat-treated wood. *International Biodeterioration and Biodegradation*, *186*, Article 105690. https://doi.org/10.1016/j.ibiod.2023.105690

Altgen, M., Awais, M., Altgen, D., Klüppel, A., Koch, G., Mäkelä, M., Olbrich, A., & Rautkari, L. (2023). Chemical imaging to reveal the resin distribution in impregnation-treated wood at different spatial scales. *Materials & Design*, *225*, Article 111481. https://doi.org/10.1016/j.matdes.2022.111481

Awais, M., Altgen, M., Belt, T., Teräväinen, V., Mäkelä, M., Altgen, D., Nopens, M., & Rautkari, L. (2022). Wood−Water Relations Affected by Anhydride and Formaldehyde Modification of Wood. *ACS Omega*, *7*(46), 42199-42207. https://doi.org/10.1021/acsomega.2c04974

Belt, T., Awais, M., & Mäkelä, M. (2022). Chemical Characterization and Visualization of Progressive Brown Rot Decay of Wood by Near Infrared Imaging and Multivariate Analysis. *Frontiers in Plant Science*, *13*, Article 940745. https://doi.org/10.3389/fpls.2022.940745

Awais, M., Altgen, M., Mäkelä, M., Belt, T., & Rautkari, L. (2022). Quantitative prediction of moisture content distribution in acetylated wood using near-infrared hyperspectral imaging. *Journal of Materials Science*, *57*(5), 3416-3429. https://doi.org/10.1007/s10853-021-06812-2

Spiliopoulos, P., Spirk, S., Pääkkönen, T., Viljanen, M., Svedström, K., Pitkänen, L., Awais, M., & Kontturi, E. (2021). Visualizing Degradation of Cellulose Nanofibers by Acid Hydrolysis. *Biomacromolecules*, *22*(4), 1399-1405. https://doi.org/10.1021/acs.biomac.0c01625

Penttilä, P. A., Altgen, M., Awais, M., Österberg, M., Rautkari, L., & Schweins, R. (2020). Bundling of cellulose microfibrils in native and polyethylene glycol-containing wood cell walls revealed by small-angle neutron scattering. *Scientific Reports* , *10*(1), Article 20844. https://doi.org/10.1038/s41598-020-77755-y

Altgen, M., Awais, M., Altgen, D., Kyyrö, S., Seppäläinen, H., & Rautkari, L. (2020). Micro-tensile behavior of Scots pine sapwood after heat treatments in superheated steam or pressurized hot water. *Journal of Materials Science*, *55*(26), 12621-12635. https://doi.org/10.1007/s10853-020-04943-6

Awais, M., Altgen, M., Mäkelä, M., Altgen, D., & Rautkari, L. (2020). Hyperspectral Near-Infrared Image Assessment of Surface-Acetylated Solid Wood. *ACS Applied Bio Materials*, *3*(8), 5223-5232. https://doi.org/10.1021/acsabm.0c00626

Altgen, M., Awais, M., Altgen, D., Klüppel, A., Mäkelä, M., & Rautkari, L. (2020). Distribution and curing reactions of melamine formaldehyde resin in cells of impregnation-modified wood. *Scientific Reports*, *10*(1), 3366. Article 3366. https://doi.org/10.1038/s41598-020-60418-3

Awais, M., Tanninen, P., Leppänen, T., Matthews, S., Sorvari, J., Varis, J., & Backfolk, K. (2018). A computational and experimental analysis of crease behavior in press forming process. *Procedia Manufacturing*, *17*, 835 - 842. https://doi.org/10.1016/j.promfg.2018.10.135

Zaheer, M., Awais, M., Rautkari, L., & Sorvari, J. (2018). Finite element analysis of paperboard package under compressional load. *Procedia Manufacturing*, *17*, 1162 - 1170. https://doi.org/10.1016/j.promfg.2018.10.008

Awais, M., Sorvari, J., Tanninen, P., & Leppänen, T. (2017). Finite element analysis of the press forming process. *International Journal of Mechanical Sciences*, *131-132*, 767-775. https://doi.org/10.1016/j.ijmecsci.2017.07.053

Prizes

1. **Puumiehet Ry**
   Awais, M. (Recipient), 2023
2. **Puumiesten Foundation**
   Awais, M. (Recipient), 1 Jun 2019
3. **Suomen Sahateollisuusmiesten Yhdistys ry**
   Awais, M. (Recipient), 2023
4. **Tekniikan Edistämissäätiö**
   Awais, M. (Recipient), 2023
5. **Walter Ahlström Foundation**
   Awais, M. (Recipient), 2023
6. **Yrjö ja Senja Koivusen säätiö**
   Awais, M. (Recipient), 1 Dec 2019

Projects

Charred wood modification
Rautkari, L. (Principal investigator), Hautamäki, S. (Project Member), Kyyrö, S. (Project Member), Awais, M. (Project Member), Kymäläinen, M. (Project Member) & Altgen, D. (Project Member)
01/08/2017 → 31/12/2018

VERYCOAT: Novel high-performance veneer products by effective drying and nano-coating
Rautkari, L. (Principal investigator), Seppäläinen, H. (Project Member), Valkonen, M. (Project Member), Altgen, D. (Project Member), Vergara Lourencon, T. (Project Member), Mäkelä, M. (Project Member), Awais, M. (Project Member), Altgen, M. (Project Member) & Yamamoto, A. (Project Member)
01/06/2019 → 31/05/2022

WATERWOOD: Water vapour sorption behaviour of wood under load
Rautkari, L. (Principal investigator), Collins, S. (Project Member), Altgen, M. (Project Member), Awais, M. (Project Member), Arabzadeh, V. (Project Member), Wang, S. (Project Member), Vergara Lourencon, T. (Project Member), Valkonen, M. (Project Member) & Greca, L. (Project Member)
01/09/2021 → 31/08/2025

Wood modification using pressurized hot water
Rautkari, L. (Principal investigator), Kyyrö, S. (Project Member), Valkonen, M. (Project Member), Awais, M. (Project Member), Hautamäki, S. (Project Member), Jansson, E. (Project Member), Vergara Lourencon, T. (Project Member), Mörttinen, S. (Project Member), Altgen, M. (Project Member), Hänninen, T. (Project Member), Barrett, D. (Project Member) & Belt, T. (Project Member)
01/09/2017 → 31/08/2021