

## WOOD RESEARCH

64(5): 2019

Wood Research publishes original papers aimed at recent advances in all branches of wood science (biology, chemistry, wood physics and mechanics, mechanical and chemical processing etc.) Authors are responsible for the fact that the paper has not been published before and it is not under consideration for publication elsewhere.

### EDITORS:

Štefan ŠTELLER, Slovak Forest Products Research Institute, Dúbravská cesta 14, SK-841 04 Bratislava, Slovak Republic.

Radoslav MIKULÁŠIK, Slovak Forest Products Research Institute, Dúbravská cesta 14, SK-841 04 Bratislava, Slovak Republic.

### ASSOCIATE EDITOR:

Vladimír IHNÁT, Slovak Forests Products Research Institute, Dúbravská cesta 14, SK-841 04 Bratislava, Slovak Republic

### EDITORIAL BOARD:

Ingo BURGERT, ETH Zürich, Institute for Building Materials, HIF E 23.2, Stefano-Franscini-Platz 3, 8093 Zürich, CH-Switzerland

Ignacio J. DIAZ-MAROTO, University of Santiago de Compostela, High School Polytechnic, University Campus s/n, 27002 Lugo, Spain

Miroslav GAŠPARIK, Czech University of Life Science in Prague, Kamýcká 1176, CZ-165 21 Praha 6 Suchdol, Czech Republic

Vladimír GRYC, Mendel University in Brno, Zemedelska 3, CZ-613 00 Brno, Czech Republic

Miha HUMAR, University of Ljubljana, Jamnikarjeva 101, SI-1001 Ljubljana, Slovenia

Jan KANÓCZ, Technical University of Košice, Letná 9, 042 00 Košice

Bohuš KASAL, Fraunhofer Institute for Wood Research, Wilhelm-Klauditz-Institut WKI, Bienroder Weg 54 E, D-38108 Braunschweig, Germany

Marián KUČERA, Faculty of Environmental and Manufacturing Technology of Technical University in Zvolen, Študentská 26, 960 53 Zvolen, Slovak Republic

Jozef KÚDELA, Faculty of Wood Sciences and Technology of Technical University in Zvolen, Masarykova 24, 960 53 Zvolen, Slovak Republic

Jozef MARTINKA, Slovak University of Technology in Bratislava Faculty of Materials Science and Technology in Trnava, Jána Bottu č. 2781/25, 917 24 Trnava, Slovak Republic

Bartłomiej MAZELA, Poznań University of Life Sciences, ul. Wojska Polskiego 28, PL-60-637 Poznań, Poland

Holger MILITZ, University of Göttingen, Büsgenweg 4, D-37077, Göttingen, Germany

Róbert NÉMETH, University of Sopron, Bajcsy Zs. u. 4, H-9400 Sopron, Hungary

Roman RÉH, Technical University in Zvolen, Masarykova 24, SK-960 53 Zvolen, Slovak Republic

Ján SEDLIAČIK, Faculty of Wood Sciences and Technology of Technical University in Zvolen, Masarykova 24, 960 53 Zvolen, Slovak Republic

Alfred TEISCHINGER, Boku-University of Natural Resources and Life Sciences, Institute for Wood Technology and Renewable Materials, Konrad Lorenz Strasse 24, 3430 Tulln, Austria

### EDITORIAL OFFICE

Slovenský drevársky výskumný ústav/ Slovak Forest Products Research Institute

Dúbravská cesta 14, SK-841 04, Bratislava, Slovak Republic

Phone: 0911 728 622 E-mail: woodresearch@vupc.sk, WEB: www.woodresearch.sk

### SUBSCRIPTION INFORMATION:

Wood Research is published six times a year. Subscription rate 150 EUR (including mailing expenses). Subscription order should be sent to Slovak Forest Products Research Institute, Dúbravská cesta 14, SK-841 04 Bratislava, Slovak Republic

© 2019 by SDVÚ Bratislava, Slovak Republic

All rights reserved. By submitting a manuscript, the authors agree that the copyright for their article is transferred to their publisher if and when the article is accepted for publication. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproductions of similar nature and translations. No part of this publication may be reproduced, stored in retrieval system or transmitted in any form or by any means, photocopying, electronic, recording, etc. without the prior written permission of the publisher as mentioned in Slovak Copyright Law No 383/1997.

Issued: October 2019

IČO 31 380 051

Printed by Pulp and Paper Research Institute, Dúbravská cesta 14, Bratislava, e-mail: sekretariat@vupc.sk

**WOOD RESEARCH**  
**Volume 64, Number 5, 2019**

**CONTENTS**

1. WIDYANTO DWI NUGROHO, RINI PUJIARTI, NOVENA PUTERI TIYASA:  
Wood anatomical characteristics of agarwood-producing species (*Aquilaria* sp.) .....759
2. TIAGO CAPOBIANCO MORANDO, ANDRÉ LUIS CHRISTOFORO,  
VINICIUS BORGES DE MOURA AQUINO, FRANCISCO ANTONIO ROCCO  
LAHR, GREYCE BERNARDES DE MELLO REZENDE, RAUL TADEU  
LOBATO FERREIRA: Characterization of the wood species *Qualea albiflora* for structural  
purposes .....769
3. WENBO CHE, ZEFANG XIAO, YANJUN XIE: Modification of radiata pine wood  
with low molecular weight modifying agents and large molecular weight styrene/acrylic acid  
copolymer dispersion .....777
4. ONDŘEJ SCHÖNFELDER, ALEŠ ZEIDLER, VLASTIMIL BORŮVKA,  
LUKÁŠ BÍLEK: Impact of silvicultural measures on the quality of scots pine wood  
Part II. Effect of site. ....789
5. BAILING SUN, YUBO CHAI, JUNLIANG LIU, HOLGER MILITZ: Acetylation  
of plantation softwood without catalysts or solvents .....799
6. EDINA PREKLET, LASZLÓ TOLVAJ, ENDRE A. BANADICS, TIBOR ALPAR,  
DENES VARGA: Colour modification and homogenisation of larch wood by steaming .....811
7. YING GUAN, HUI GAO, WENQI LI, JUN RAO, YUQI ZHANG: Preparation and  
characterization of antibacterial films from bamboo .....821
8. DIAZ-MAROTO, IGNACIO JAVIER, TAHIR, SYLVAIN: Test of wood properties  
in oak species (*Quercus robur* L., *Quercus petraea* (Matts) Liebl. and *Quercus pyrenaica* willd.) for wine  
aging. Part III: Porosity versus void ratio .....833
9. JUN ZHANG, LIHONG XIONG, XIAOJIAN ZHOU, GUANBEN DU,  
JIANGKUN LIANG, XUEDONG XI: Development of mimosin-based adhesive  
cross-linked by furfuryl alcohol-formaldehyde and epoxy resins .....847
10. DENISA VALACHOVA, IVETA SKOTNICOVA: Using the finite element method to  
predict heat dissipation in a timber frame building construction .....859
11. HAN QUE, YUGUO DONG, HAOQUAN GUO, XINYU LU, XIAOJUN ZHU  
YIMENG ZHANG, XIAOLI GU: Pyrolytic kinetics of steam exploded lignin by TG/DTG  
analysis.....871
12. ZDENĚK KOPECKÝ, LUĎKA HLÁSKOVÁ, ALEŠ SOLAŘ, PETR NESÁZAL:  
Cutting forces in quasi-orthogonal CNC milling.....879
13. YAN YAN, FEI BENHUA: Axial compression properties of bamboo/wood composite column  
constrained with sliced bamboo veneer.....891
14. TATIANA VILKOVSKÁ, IVAN KLEMENT, IGOR ČUNDERLÍK: Longitudinal  
contraction of reaction and opposite wood during drying process .....903
15. MUSTAFA ÖNCEL, HASAN VURDU, HAKAN AYDOĞAN, OSMAN EMRE  
ÖZKAN, ALPEREN KAYMAKCI: The tensile shear strength of outdoor type plywood produced  
from fir, alnus, pine and poplar wood .....913
16. XUDONG ZHU, YINGYING XUE, JIE SHEN, SUJUN ZHANG: Withdrawal strength  
of welded dowel joints made of birch and larch wood.....921