

# *Curriculum Vitae*

**D.Sc. Andrzej Antczak, associate professor**

## **Contact details:**

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## **Education:**

**Master engineer of chemistry** (2005, Faculty of Chemistry Warsaw University of Technology, chemical technology course, speciality: technology of high-energetic materials and safety of chemical processes);

**Doctor engineer of forestry sciences** (2010, Faculty of Wood Technology Warsaw University of Life Sciences);

**Doctor (with habilitation) engineer of agricultural sciences** (2019, Faculty of Wood Technology Warsaw University of Life Sciences).

## **Professional competence:**

**Research and technical employee** (2005, Department of Wood Science and Wood Preservation, Faculty of Wood Technology Warsaw University of Life Sciences);

**Assistant professor** (2010, Department of Wood Science and Wood Preservation, Faculty of Wood Technology Warsaw University of Life Sciences);

**Assistant professor (with habilitation)** (2019, Department of Wood Science and Wood Preservation, Faculty of Wood Technology Warsaw University of Life Sciences);

**Associate professor** (2022, Department of Wood Science and Wood Preservation, Institute of Wood Sciences and Furniture Warsaw University of Life Sciences).

## **Scientific activity:**

Classical (gravimetric) and chromatographic analysis of wood components, pulp and polymers, antioxidants and UV stabilizers. Application of gas chromatography coupled with mass detector (GC-MS), liquid chromatography (HPLC), ion exchange chromatography (IEC) and size exclusion chromatography (SEC). Spectrophotometric analysis of lignin content. Study of polymer degradation by SEC and viscometric technique. Study of hydrolysis process (acid and enzymatic) of lignocellulosic biomass and its polysaccharides. HPLC analysis of hydrolysates. Study of fermentation process in order to ethanol production from hydrolysates. Chromatographic analysis of fermentation mixture. Ethanol from biomass – biofuel technology development, including enzymatic wood saccharification (hydrolysis) and fermentation. Chromatographic analysis of starch content in plant biomass. Gravimetric analysis of protein content in plant biomass. Thermal modification of wood. Chemical modification of wood: furfurylation, acetylation and lumen polymerization. GC-MS analysis of terpenes content in the wood of domestic coniferous species.

### **cooperation**

- Department of Agronomy and the Laboratory for Biochemical and Biofuels (Zollikofen) at Bern University of Applied Sciences (Switzerland)
- Department of Food Engineering and Process Management, Faculty of Food Sciences, WULS
- Department of Forest Management and Forest Economics, Faculty of Forestry, WULS
- Department of Forest Utilization, Faculty of Forestry, WULS
- Department of Agricultural and Forest Machinery, Faculty of Production Engineering, WULS
- Department of Organization and Production Engineering, Faculty of Production Engineering, WULS
- Institute of Chemical Wood Technology, Poznan University of Life Sciences
- Department of Bioenergy, Wood Technology Institute in Poznan
- Department of Wood Chemistry and Forest Products, Faculty of Wood Technology, Poznan University of Life Sciences
- Department of Biotechnology and Bioprocess Engineering, Faculty of Chemical and Process Engineering, Warsaw University of Technology
- Faculty of Materials Science and Engineering, Warsaw University of Technology
- Department of High Energy Materials, Faculty of Chemistry, Warsaw University of Technology
- BIOAGRA S.A.

### **scientific offer**

- analysis of chemical composition of wood and other lignocellulosic materials
- chromatographic analysis (HPLC, SEC, IEC, GC-MS) of different low molecular substances and polymers including cellulose and starch
- spectrophotometric UV-Vis analysis - determination of lignin content
- viscosimetric analysis - determination of polymers molar mass

### **equipment**

- Shimadzu LC20 chromatograph with autosampler, detectors – refractometer, spectrophotometer UV-Vis, conductometer and viscometer; HPLC-RP, HPLC-NP, IEC, SEC modes
- Shimadzu GCMS-QP2010 Ultra chromatograph with autosampler
- Visco-Clock automatic Ubbelohde viscometer
- Shimadzu UVmini-1240 spectrophotometer
- steam gun for pretreatment of lignocellulosic biomass
- chamber for thermal and chemical modification of wood

### **Scientific achievements:**

**ORCID: 0000-0003-1876-351**

#### **• the most important publications**

1. Betlej I., Antczak A., Szadkowski J., Drożdżek M., Krajewski K., Radomski A., Zawadzki J., Borysiak S., 2022: „ Evaluation of the Hydrolysis Efficiency of Bacterial Cellulose Gel Film after the Liquid Hot Water and Steam Explosion Pretreatments”. Polymers, 14, 2032

2. Antczak A., Szadkowski J., Szadkowska D., Zawadzki J., 2022: „Assessment of the effectiveness of liquid hot water and steam explosion pretreatments of fast-growing poplar (*Populus trichocarpa*) wood”. *Wood Science and Technology*, 56, 87-109
3. Akus-Szylberg F., Antczak A., Zawadzki J., 2021: „Effect of soaking aqueous ammonia pretreatment on selected properties and enzymatic hydrolysis of poplar (*Populus trichocarpa*) wood”. *BioResources*, 16(3), 5618-5627
4. Gliszczyński T., Antczak A., 2020: „The study of selected properties of black poplar wood (*Populus nigra* L.) subjected to furfurylation and polymerization in lumen”. *Annals of Warsaw University of Life Sciences, Forestry and Wood Technology*, 112, 11-21
5. Akus-Szylberg F., Antczak A., Zawadzki J., 2020: „Hydrothermal pretreatment of poplar (*Populus trichocarpa*) wood and its impact on chemical composition and enzymatic hydrolysis yield”. *Drewno*, 63(206), 5-18
6. Brethauer S., Antczak A., Balan R., Zielenkiewicz T., Studer M.H., 2020: „Steam explosion pretreatment of beechwood. Part 2: quantification of cellulase inhibitors and their effect on Avicel hydrolysis”. *Energies*, 13(14), 1-17
7. Balan R., Antczak A., Brethauer S., Zielenkiewicz T., Studer M.H., 2020: „Steam explosion pretreatment of beechwood. Part 1: comparison of the enzymatic hydrolysis of washed solids and whole pretreatment slurry at different solid loadings”. *Energies*, 13(14), 1-15
8. Antczak A., Świerkosz R., Szeniawski M., Marchwicka M., Akus-Szylberg F., Przybysz P., Zawadzki J., 2019: „The comparison of acid and enzymatic hydrolysis of pulp obtained from poplar wood (*Populus* sp.) by the Kraft method”. *Drewno*, 63(203), 1-14
9. Akus-Szylberg F., Antczak A., Bytner O., Radomski A., Krajewski K., Zawadzki J., 2018: „Wpływ wstępnej obróbki słomy kukurydzianej gorącą wodą na jej skład chemiczny i hydrolizę enzymatyczną”. *Przemysł Chemiczny*, 97(11), 1866-1869
10. Krutul D., Zielenkiewicz T., Zawadzki J., Radomski A., Antczak A., Drożdżek M., 2018: „Influence of urban agglomeration environmental pollution on content of chosen metals in bark, roots and wood of Norway maple (*Acer platanoides* L.)”. *Wood Research*, 63(5), 741-754
11. Antczak A., Marchwicka M., Szadkowski J., Drożdżek M., Gawron J., Radomski A., Zawadzki J., 2018: „Sugars yield obtained after acid and enzymatic hydrolysis of fast-growing poplar wood species”. *BioResources*, 13(4), 8629-8645
12. Waliszewska H., Zborowska M., Waliszewska B., Borysiak S., Antczak A., Czekala W., 2018: „Transformation of Miscanthus and Sorghum cellulose during methane fermentation”. *Cellulose*, 25(2), 1207-1216
13. Krutul D., Zielenkiewicz T., Radomski A., Zawadzki J., Antczak A., Drożdżek M., Makowski T., 2017: „Metals accumulation in scots pine (*Pinus sylvestris* L.) wood and bark affected with environmental pollution”. *Wood Research*, 62(3), 353-364
14. Szadkowski J., Radomski A., Antczak A., Szadkowska D., Lewandowska A., Marchwicka M., Kupczyk A., 2017: „Wydajność procesów hydrolizy i fermentacji w technologii wytwarzania bioetanolu z drewna topoli (*Populus* sp.). *Przemysł Chemiczny*, 96(3), 518-520
15. Antczak A., Ziętek K., Marchwicka M., Tylko B., Gawkowski A., Gawron J., Drożdżek M., Zawadzki J., 2016: „Cukry wyodrębnione z biomasy szybko rosnących topoli (*Populus* sp.) jako surowiec do otrzymywania bioetanolu”. *Przemysł Chemiczny*, 95(9), 1770-1773
16. Zawadzki J., Gawron J., Antczak A., Kłosińska T., Radomski A., 2016: „The influence of heat treatment on the physico-chemical properties of pinewood (*Pinus sylvestris* L.)”. *Drewno*, 59(196), 49-57
17. Kamińska-Dwórznička A., Matusiak M., Samborska K., Witrowa-Rajchert D., Gondek E., Jakubczyk E., Antczak A., 2015: „The influence of kappa carrageenan and

- its hydrolysates on the recrystallization process in sorbet”. *Journal of Food Engineering*, 167 Part B, 162-165
18. Antczak A., Spyszewska N., Michałuszek A., Kłosińska T., Archanowicz E., 2014: „Hydroliza kwasowa drewna topoli (*Populus* sp.)”. *Przemysł Chemiczny*, 93(8), 1428-1431
  19. Ślesak I., Szechyńska-Hebda M., Fedak H., Sidoruk N., Dąbrowska-Bronk J., Witoń D., Rusaczek A., Antczak A., Drożdżek M., Karpińska B., Karpiński S., 2014: „*PHYTOALEXIN DEFICIENT 4* affects reactive oxygen species metabolism, cell wall and wood properties in hybrid aspen (*Populus tremula* L. × *tremuloides*)”. *Plant, Cell & Environment*, 38(7), 1275-1284
  20. Gawron J., Antczak A., Borysiak S., Zawadzki J., Kupczyk A., 2014: „The study of glucose and xylose content by acid hydrolysis of ash wood (*Fraxinus excelsior* L.) after thermal modification in nitrogen by HPLC method”. *BioResources*, 9(2), 3197-3210

- **participation in research projects**

1. Research project financed by the National Science Centre “Spectroscopic methods for rapid phenotyping of trees reflecting their ecological resilience” DendroSpec, UMO-2021/43/I/NZ9/02809 – researcher – 2022/2025
2. EU research project co-financed by the National Centre for Research and Development “Technologies of using agricultural by-products” PASZA PRO, POIR.01.01.01-00-0224/19-00 – researcher – 2019/2022
3. Research project financed by the National Centre for Research and Development “Intelligent farming and cultivation systems for wheat, maize and poplars for optimized production, biomass, biofuels and modified wood” BIOSTRATEG2/298241/10/NCBR/2016 – researcher – 2016/2019
4. Research project financed by the National Centre for Research and Development “The use of poplar lines with increased potential of biomass growth and improved chemical composition of wood in technology of paper production and biofuels” PBS1/A8/16/2013 – researcher – 2013/2016
5. Research project financed by the National Centre for Research and Development “A program to improve the level of the didactic approach to the question of how to obtain raw plant materials for the purposes of energy production in the context of the Europe 2020 Strategy objectives” – main researcher – 2014/2015
6. Research project financed by WULS “The possibilities of using birch wood (*Betula* L.) in modern technologies used in wood science” – researcher – 2014
7. Research project financed by WULS “The study of physico-chemical properties of tropical wood” – researcher – 2013
8. Research project financed by WULS “Elaboration of chemical microanalysis methods of lignocellulosic materials” – head – 2012
9. Research project financed by WULS “The development of selected modern methods of wood analysis” – head – 2011