



COST Action CA22155

EU•PoTaRCh Network

for forest by-products charcoal, resin, tar, potash



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CA22155 PoTaRCh 1st General Meeting of Action Prague, Czech Republic March 5-7, 2024

Programme and abstracts

More Info about EU•PoTaRCh:



potarch@up.poznan.pl



www.potarch.eu

COST Action overview

CA22155 – Network for forest by-products charcoal, resin, tar, potash (EU-PoTaRCh)

EU-PoTaRCh-establishes a network for the past, present and future of use of major non-timber forest raw materials and products in Europe and beyond. Whilst it focuses on forest by-products mainly Potash, Tar, Resin and Charcoal (PoTaRCh) as representatives of traditional forest exploitation heritage, it touches upon other forest by-products (tannins, pitches). The scholarly vision is to enlighten the relevance of these products in history, especially their role in industrialization. The goal is to identify and assess production changes and their social and environmental impacts on sustainable development, and based on their heritage, to draw lessons for the future. The Action supports stakeholders who know these products and are interested in them, as they use them in the production, education, and promotion of heritage. Due to the participation of stakeholders with significantly different activity profiles (museums, state forests, associations, etc.), hence high diversity of needs is to be answered by this Action. Last but not least, the Action helps to find ways to sustainable forest use and transfer knowledge to better methods and products in the bioeconomy.

CA22155 structure and leadership

Action Chair: Prof. Magdalena Zborowska

Action Vice-Chair: Prof. Jeannette Jacqueline Lucejko

Science Communication Coordinator: Dr. Jakub Brózdowski

Grant Awarding Coordinator: Dr. Katja Tikka

Working Group 1 „Heritage“: Dr. Jakob Starlander (Leader), Dr. Jiří Woitsch (Co-Leader)

Working Group 2 „Analytical Characterization“: Prof. Erika Ribechini (Leader), Prof. Rodica-Mariana Ion (Co-Leader)

Working Group 3 „Archaeology“: Dr. Oliver Nelle (Leader), Prof. Koen Deforce (Co-Leader)

Working Group 4 „Environmental History“: Dr. Anna Varga (Leader), Dr. Péter Szabó (Co-Leader)

Working Group 5 „Future Perspectives“: Dr. Johannes Tintner-Olifiers (Leader), Dr. Elena Badea (Co-Leader)

CA22155 Contacts and Information

<https://www.cost.eu/actions/CA22155/>

<https://potarch.eu>

e-mail: potarch@up.poznan.pl

Venues

1st General Meeting of Action, March 5 and 6, 2024

Building of the Institutes of the Academy of Sciences of the Czech Republic, Na Florenci 3, Prague 1
(Meeting Room of the Institute of Ethnology, Lower Hall of the Institute for Czech Literature, Upper Hall of the Institute for Czech Literature)

Conference, March 7, 2024

Vila Lanna, Representative residence of the Academy of Sciences of the Czech Republic, V sadech 1,
160 00 Praha 6 (<https://www.vila-lanna.cz/en/>)

Venues location: <https://mapy.cz/s/dofojonofo>

CA22155 PoTaRCh 1st General Meeting of Action Programme

March 5, hybrid

Venue: Building of the Institutes of the Academy of Sciences of the Czech Republic, Na Florenci 3, Prague 1

MS Teams link (valid all the day): [HERE](#)

8.30-9.30	Registration / coffee	Registration desk / IE CAS Meeting Room
9.30-9.40	Jiří Woitsch : Local organiser welcome	IE CAS Meeting Room
9.40-10.00	Magdalena Zborowska & Jeannette J. Łucejko : PoTaRCh chairs Welcome & Introduction & Action Status and Overview	
10.00-10.15	Jakub Brózdowski : PoTaRCh Action Dissemination	
10.15-10.30	Katja Tikka : PoTaRCh Action Grant Awarding	
10.30-12.00	Open CG and MC meeting with keynotes, chair Magdalena Zborowska Jakob Starlander (WG1) : A sustainable balance – Lessons drawn from early modern peasant communities in their effort to achieve ecological, institutional, and economic sustainability Erika Ribechini (WG2) : Plant resins, pitch, and tar in archaeological records: revealing ancient knowledge through chromatography and mass spektrometry	
12.00-13.30	Light lunch + Group photo	Upper Hall
13.30-14.30	Open CG and MC meeting with keynotes, chair Jeannette J. Łucejko Oliver Nelle & Koen Deforce & Sylvain Burri (WG 3) : The production of potash, tar, resin and charcoal in the archaeological record Anna Varga (WG4) : Insights of PoTaRCh (potash, tar, resin and charcoal) productions and environmental history in Hungary Elena Badea et al. (WG5) : Tannin profile, antioxidant properties and antimicrobial activity of extracts from oak and alder bark	IE CAS Meeting Room
14.30-15.00	Coffee break	
15.00-16.30	Speed dating	IE CAS Meeting Room and Upper Hall
18.00	Social Dinner	

CA22155 PoTaRCh 1st General Meeting of Action Programme

March 6, hybrid

Venue: Building of the Institutes of the Academy of Sciences of the Czech Republic, Na Florenci 3, Prague 1

MS Teams links indicated below

8.30–9.00	Registration & Helpdesk Grant Holder (reimbursement rules)	Registration desk / IE CAS Meeting Room
9.00–10.30	WG1 parallel meeting (chaired by WG1 leader and co-leader)	IE CAS Meeting Room
9.00–10.30	WG2 parallel meeting (chaired by WG2 leader and co-leader)	Upper Hall
9.00–10.30	WG3 parallel meeting (chaired by WG3 leader and co-leader)	Lower Hall
10.30–11.00	Coffee break	
11.00–12.00	WG1 + WG3 + WG4 joint meeting (chaired by WGs leaders and co-leaders)	IE CAS Meeting Room
11.00–12.00	WG2 + WG5 joint meeting (chaired by WGs leaders and co-leaders)	Upper Hall
12.00–13.00	Light lunch	Lower Hall
13.00–14.30	WG4 parallel meeting (chaired by WG4 leader and co-leader)	IE CAS Meeting Room
13.00–14.30	WG5 parallel meeting (chaired by WG5 leader and co-leader)	Lower Hall
14.30–15.00	Coffee break	
15.00–16.00	Continue tasks and action plan WG1+WG3+WG4+WG2+WG5	IE CAS Meeting Room
16.00 – 17.30	Feedback from working groups (WGs leaders and co-leaders), chair Jiří Woitsch	IE CAS Meeting Room

CA22155 PoTaRCh Conference

March 7, face to face only

Venue: Vila Lanna, Representative residence of the Academy of Sciences of the Czech Republic, V sadech 1, 160 00 Praha 6

- 8.30–9.00 Registration & Helpdesk Grant Holder (reimbursement rules) & Morning coffee
- 9.00–10.30 *WG1 presentations (20+10 min QandA each), chair Jakob Starlander*
- Jiří Woitsch:** Heritage: Contemporary approaches to an old concept
- Triin Kusmin:** Cultural heritage in the landscape – mapping and highlighting heritage by Estonian State Forest Management Centre
- Martin Stuber:** Visual history of forest practices in the mirror of the present
- 10.30–12.00 *WG2 presentations, chairs Erika Ribechini & Rodica-Mariana Ion*
- Veronika Brychová et al.:** Organic residue analysis of pottery from Bohemian medieval tar production sites – first results and future objectives
- Geeske Langejans:** Archaeological adhesives at TU Delft
- Volker Haag et al.:** Identification of timbers in charcoal and substitutes based on NTFPs and residues
- 12.00–13.00 Light lunch
- 13.00–14.30 *WG3 presentations, chair Oliver Nelle*
- Koen Deforce:** Typology and chronology of archaeological remains of charcoal production
- Thomas Raab et al.:** Mapping and classifying the legacy: Relict Charcoal Hearths (RCHs) and their geopedological signatures in forested landscapes
- Ole Risbøl et al.:** Iron Age wood tar production in Scandinavia
- 14.30–16.00 *WG4 presentations, chairs Anna Varga & Péter Szabó*
- Katja Tikka:** Tar and it's social environment in Sweden during the 17th century
- Iva Lučić:** Timber colonialism without colonies: Forest exploitation in Bosnia and Herzegovina in the era of empires 1850–1918
- František Máliš et al.:** Multi-taxa diversity response to experimental restoration of historical forest-use in Carpathian oak forests
- 16.00–16.30 Coffee break
- 16.30–18.00 *WG5 presentations, chairs Johannes Tintner-Olifjers & Elena Badea*
- Ondřej Mašek:** Biochar production and it's applications
- Jale Yanik et al.:** Pine wood biochar for use as seed-coating material and seed priming agent
- 18.00–23.00 Social dinner

Abstracts (keynotes & conference presentations), in alphabetical order

Badea, Elena – Ilaria Quaratesi – Ioana Popa – Ioan Calinescu – Petre Chipurici

University of Craiova

Tannin profile, antioxidant properties and antimicrobial activity of extracts from oak and alder bark

Bark represents a reservoir of bioactive compounds. The aim of this study was to compare the effect of conventional (solvent extraction; SE) and modern (ultrasound-assisted extraction; UAE) methods for the extraction of antioxidants and polyphenols from wood bark. The effect of independent variables (temperature, liquid to solid ratio, time and solvent) was investigated to optimize the UAE process. The results indicate that an important quantity of bioactive compounds can be extracted from oak and alder bark by UAE green technology.

Brychová, Veronika – Tomáš Krofta – Kateřina Pachnerová Brabcová – Kateřina Blažková – Ivo Světlík

Nuclear Physics Institute, Czech Academy of Sciences

Organic residue analysis of pottery from Bohemian medieval tar production sites - first results and future objectives

Tar was an indispensable substance with a wide range of applications. Evidence of the tar use in Bohemia is dated back to the Paleolithic. Pottery for the tar production and refinement from several supposedly medieval tar kilns and tar production sites in Bohemian region were sampled and subjected to solvent extraction and gas chromatography analysis to scan organic compounds preserved. Total lipid extracts were very concentrated, dominated with di- and triterpenic residues from birch and pine tars together with long and very long chain fatty acids - probably of animal fat origin. Appreciable concentrations of tar residues could be promising also for radiocarbon dating on a compound-specific level - not only for accurate dating of medieval tar kilns but also for dating of tar and resin residues from later historical periods and different contexts.

Deforce, Koen

Ghent University

Typology and chronology of archaeological remains of charcoal production

Understanding the historical development of various (pre)historical charcoal production methods remains a challenge. This paper addresses this gap by providing a comprehensive review of charcoal kiln typology and chronology in Europe, drawing on a significant dataset of radiocarbon dated charcoal kilns primarily from Belgium and the Netherlands spanning approximately 2500 years. Additionally, the paper discusses challenges associated with accurately dating archaeological remains of charcoal production, including the old wood effect and Suess-effect, which can complicate age determination. Alternative dating techniques to mitigate these challenges are also examined.

Haag, Volker¹ – Tim Lewandrowski¹ – Kilian Dremel² – Simon Zabler² – Stephanie Helmling¹ – Valentina Zemke¹ – Andrea Olbrich¹

¹Thünen Institute of Wood Research, ²Fraunhofer Development Center X-ray Technology EZRT

Identification of timbers in charcoal and substitutes based on NTFPs and residues

For about a decade, the Thünen Institute of Wood Research has been analyzing wood species in charcoal and briquettes. The anatomical analyses can be used to check whether the species declarations of the product samples are correct. In addition, the origin information on the distribution areas of the specific taxa can be scrutinized (e.g., tropical vs. non-tropical). The investigations make an important contribution to quality assurance for the producers and traders of the products, and also serve to protect consumers. In the context of the studies, it has been observed that more raw and residual materials, such as non-timber forest products (NTFPs), are becoming established on the charcoal substitutes market. Anatomical studies are currently being carried out to characterize the structure of important NTFPs, such as coconut shells, olive or mango kernels, in order to describe them and reliably identify them using 3D-Reflected-Light-Microscopy (3D-RLM) and nano-CT in practical applications for market analyses.

Langejans, Geeske

Delft University of Technology

Archaeological adhesives at TU Delft

Here we present an overview of the research conducted at the Delft University of Technology, the Netherlands. We will introduce the TUD team and their work: 1) experimental archaeology in which we test adhesive performance, preservation and production, 2) results of archaeological analysis, 3) results of spectrographic and chemical analysis of experimental and archaeological adhesives, 4) ethnobotanical study in Zambia, 5) computational approaches, 6) archaeo-inspired debondable future adhesives. Our presentation is focussed on relevance for the Action.

Kusmin, Triin

Estonian State Forest Management Centre

Cultural heritage in the landscape – mapping and highlighting heritage by Estonian State Forest Management Centre

Cultural heritage in the landscape – the inherited signs of the life of previous generations, cannot be protected only by law and regulations. The best option to preserve these objects would be by proprietorial care. However, the cultural heritage in the landscape is often unknown and unprotected mainly due to a lack of awareness. To recover cultural markers that have sunk into oblivion for our attention, Estonian State Forest Centre (RMK) has undertaken an extensive inventory on the landscape. The objective is to map Estonia's objects of cultural heritage, regardless of the form of land and ownership. In the midst of more than 40 000 objects mapped so far, there are also objects connected to pine resin collecting, tar and charcoal production. The history of forest use and objects of cultural heritage are acknowledged and highlighted in the Estonian state forest recreational areas.

Lučić, Iva

Department of History, Stockholm University – Swedish Collegium for Advanced Studies Uppsala

Timber colonialism without colonies: Forest exploitation in Bosnia and Herzegovina in the era of empires 1850–1918

The lecture proposes an environmental perspective on the Habsburg imperial governance. It does so by bringing the question of access to natural resources, in this case timber, into the frame of imperial governance formation, which is analysed from the perspective of property relations, timber export, and the political economy of the Habsburg Empire. It proposes the concept of Timber Colonialism for illustrating a web of colonialist type of dependencies without official colonialism. It illustrates how a steering mechanism of late Habsburg governance in Bosnia was the homogenizing logic of the global capitalist market as well as Austria-Hungary's urge to secure its place as a major timber exporter on the global market. Its mode of timber colonialism involved the participation and intersection of multiple actors and interest groups in different places including Habsburg politicians, French merchants, Italy as a country and a major consumer of Bosnian timber, Italian wood-processing firms, German and Austrian private capitalist enterprises. The Bosnian case invites for new approaches that de-center our analytical prisms by going beyond the imperial state as a framework for analysing extraction-based colonialism. Instead, it is formed by a web of economic and ecological entanglements that go far beyond the geographies of the Habsburg Empire. It is the logic of these geographies that give us the true nature of imperial governance—a nature far more complex than a bidirectional metropole-colony or centre-periphery model.

Máliš, František – Marek Čiliak – Mariana Ujházyová – Marek Kotrík – Erika Gömöryová – Pavel Širka – Vlastimil Knopp – Judita Kochjarová – Blažena Benčaťová – Linda Csölleová – Mikuláš Kočíš – Danica Krupová – Juraj Cipa – Karol Ujházy

Technical University in Zvolen

Multi-taxa diversity response to experimental restoration of historical forest-use in Carpathian oak forests.

Biodiversity of oak temperate forests in Europe seriously declined due to environmental changes, particularly land-use changes and nitrogen deposition. Restoration of historical management which typically maintained high light levels at the herb layer is promising approach to recover oak forests diversity. However, its positive effects could be vanished by climate warming or eutrophication. To develop suitable management strategies for recovery of oak forest biodiversity, we established the field experiment testing effects of three treatments: canopy reduction, litter raking, fertilising on changes in multi-taxa biodiversity. Response of vascular plant, bryophyte, fungi and soil microbiota diversity was studied on five experimental sites established in 2017. While for vascular plants and mosses we found the positive trends, negative effects were observed for fungi. Directional shifts of vegetation indicate increase of drought tolerant plants rather than expected thermophilization.

Mašek, Ondřej
University of Edinburgh

Biochar production and its applications

Biochar's potential to store atmospheric carbon has been estimated to be 0.7-1.8 Gt CO₂-C(eq) yr⁻¹. This presentation will focus on ways to achieve or increase this potential, while maximizing positive and minimizing potential negative environmental and economic impacts. Options for integration of biomass pyrolysis for biochar production into bioenergy systems and negative emission technologies concepts will be discussed. This will be followed by a discussion of selected applications for biochar, including agricultural and horticultural applications, construction and engineering applications, as well as environmental applications. The focus will be on matching biochar properties to the application requirements, as well as potential risks and challenges associated with production and use of biochar produced from different biomass materials and organic residues.

Nelle, Oliver¹ – Koen Deforce² – Sylvain Burri³

¹State Office for Cultural Heritage Baden-Württemberg, ²Ghent University, ³Centre National de la Recherche Scientifique

The Production of Potash, Tar, Resin and Charcoal in the Archaeological Record

Potash, tar, resin, and charcoal (PoTaRCh) are four non-timber materials made from trees. Their production has altered woodlands and landscapes and has left innumerable remains in the case of charcoal production, a considerable number of remains in the case of tar production, but only a few or no traces in the case of potash and resin production or sourcing. In this contribution, we address aspects of the archaeological record of PoTaRCh, show examples of case studies and what we know, and start to identify the gaps which we want to close by networking during the COST action. The archaeology of PoTaRCh provides the (pre-)historic material base, the legacy found in the soil, to be able to address questions of competitive material sourcing, sustainability, overexploitation and socio-economic consequences. Production sites, if dated, serve as a temporal-spatial sequence of palaeoarchives of the PoTaRCh-technological evolution in Europe, as well as environmental changes, and as sources for material for analytical characterisations.

Raab, Thomas – Alexandra Raab – Alexander Bonhage – Anna Schneider

Brandenburg University of Technology Cottbus-Senftenberg

Mapping and classifying the legacy: Relict Charcoal Hearths (RCHs) and their geopedological signatures in forested landscapes

Relict Charcoal Hearths (RCHs), remnants of historical anthropogenic activities in European and North American forested regions, have gained significance in pedology, archaeology, geomorphology, and ecology. Enhanced collaboration among disciplines is crucial for a comprehensive understanding and proper classification of RCHs using geopedological properties, contributing to the development of a universally applicable taxonomy. The distinctive feature of RCH soils lies in their charcoal-rich technogenic substrate, resulting in elevated carbon (C) contents, low bulk density, and high porosity. RCHs exhibit distinct landforms identifiable by high-resolution Digital Elevation Models (DEMs), enabling mapping from site to landscape scale and providing a basis for RCH classification. In sloped terrain, RCHs often manifest multiple technogenic layers, influencing water infiltration patterns, rates, retention, and heat transfer. Topsoil horizons beneath RCHs undergo variable modifications,

dependent on site type and terrain position. Urgent steps are required for interdisciplinary research to advance understanding and classification of RCHs.

Ribechini, Erika

Department of Chemistry and Industrial Chemistry, University of Pisa

Plant resins, pitch, and tar in archaeological records: revealing ancient knowledge through chromatography and mass spectrometry

This keynote will delve into the chemical complexities of plant-derived substances, specifically resins, pitch, and tar, which have served as versatile materials in ancient civilizations for adhesives, waterproofing, and a myriad of other applications. The focus will be on the insights offered by analytical methods based on chromatography and mass spectrometry in unraveling the technological and cultural significance of these materials. Plant resins, pitch, and tar have left an indelible mark on the archaeological record, representing the ingenuity of past societies in crafting adhesives, waterproofing solutions, and more. Through case studies and multidisciplinary research, the presentation will explore how chromatography and mass spectrometry enable the identification of specific compounds, elucidation of manufacturing processes, and understanding of the diverse applications of these materials in antiquity. Emphasis will be placed on their roles in artifact construction, preservation, and cultural practices, providing a comprehensive view of their significance in ancient societies.

Risbøl, Ole¹ – Andreas Hennius² – Jonas Svensson Hennius³

¹Department of Archaeology and Cultural History, NTNU University Museum, ²Upplandsmuseet, Uppsala, ³The Swedish Transport Administration

Iron Age wood tar production in Scandinavia

It has been known for a long time that wood tar was used in Scandinavian Iron Age on account of chemical analysis of wood from boats and other findings. On the other hand, how tar was produced in this period of time was unknown until the first funnel-shaped tar production pits started to turn up on Iron Age settlement excavations just after the turn of the millennium. The number has increased substantially over the years and with that our knowledge about tar production, the geographical distribution of this production, dating's, settlement context, organization, scale of production etc. The funnel-shaped production pits are similar to the ones known from the West Slavic region but pre-dates these. In this paper we will present the current state-of-the-art on Scandinavian Iron Age wood tar production.

Starlander, Jakob

Institute of History, Bern University

A sustainable balance – Lessons drawn from early modern peasant communities in their effort to achieve ecological, institutional, and economic sustainability

During the seventeenth century, the Swedish Kingdom was at its largest, encompassing today's Sweden, Finland, Latvia, Estonia, and parts of Northern Germany. The wealth of natural resources contained within its borders led to the expansion of its main industries, which were iron, copper, and tar, all widely exported throughout Western Europe during the period. The latter of these commodities was primarily produced in the forests of Northern Finland, to such an extent that it ultimately gave the

Swedish Kingdom a monopoly on the product. The forests in which this production took place were owned collectively by peasant communities as commons on village and parish level. With increased production followed increasing levels of forest exploitation which put pressure on the peasantry's institutional structure as well as the forests they owned collectively. This resulted in growing numbers of conflicts over matters related to the sustainability of their forests, their institutions, and their economic welfare. In this presentation, I will demonstrate how the changing importance of forests affected the institutional organisation of peasant communities with particular focus on the complexity of how forests and tar production was regulated within and between village and parish communities throughout the seventeenth century, but also on the lessons that can be drawn from this development in terms of sustainability. This was a process that actualised issues of how to achieve sustainable balance through an evolving structure of nested enterprises, where governance activities were organised at multiple levels. It furthermore seeks to clarify the roles of external actors and how they influence and become a part of this development, something which is important in the work of safeguarding the heritage of tar production.

Stuber, Martin

Institute of History, Bern University

Visual history of forest practices in the mirror of the present

This input proposes the dynamization of historical photographs of forest use through audiovisual sources of the present. On the one hand, I present my own experiences of realising this method, namely in the new permanent exhibition on forest history at the Ballenberg Open-Air Museum, as well as in the exhibition on the communal use of water and forest in the Val d'Anniviers, which is currently being created. Secondly, using the example of charcoal production, the possibilities for European comparative digital storytelling based on historical and contemporary photographs will be explored. The starting point for this is historical and current visual material on Swiss charcoal production.

Tikka, Katja

University of Helsinki

Tar and it's social environment in Sweden during the 17th century

In Sweden (inc. Finland) the worldwide tar production started up at the beginning of the seventeenth century. In the background was the commercial and governmental development, which took its first baby steps. Producing and selling the tar draw the attention of foreign countries, such as the Netherlands. The Netherlands was interested in Swedish tar production because it needed tar desperately to their emerging ship production, which was essential for the Dutch East India Company. In her presentation, Tikka shows the social effects of the suddenly fast grown tar production. The changes occurred for example in migration, trading partnerships and legislation. All this connected Sweden in Central Europe in a novel and revolutionary way.

Varga, Anna
Padon Foundation

Insights of PoTaRCh (potash, tar, resin and charcoal) productions and environmental history in Hungary

In Hungary, forest by-products are generally an under-researched topic and a historical use. Deciduous tree species characterize the forest cover of the country, and therefore, potash and charcoal production have predominated. Potash burning declined in the 19th century. Charcoal burning for economic purposes is practised in a few places. Both have recently been revived as a heritage practice, mainly for experimental purposes. In some regions, resin and tar extraction has also taken place. Compared to other European contexts, they have facilitated the rapid and spectacular exploitation of forest resources. But whether this has been the case requires evaluation of studies and future research. Processing existing resources also draws attention to the importance of being close to nature, community work, and the crucial role of children and women.

Woitsch, Jiří
Institute of Ethnology, Czech Academy of Sciences

Heritage: Contemporary approaches to an old concept

The term or rather the concept of heritage has been used in research and especially in developing and implementing policies for many decades. For a long time, heritage was thought and written about mainly in relation to tangible monuments. Later, however, its perception (especially in the UNESCO agenda) was extended to intangible cultural phenomena and processes. Today, heritage is being written about and researched as a multi-faceted process, and there are influential trends that are rejecting this concept altogether. In this paper, the possibilities of thinking about forest crafts as heritage in the broadest sense will be presented by reviewing the main contemporary theories of heritage.

Yanik, Jale – Gizem Balmuk – Halil Mutlubas – Gozde Duman – Atac Uzel
Faculty of Science, Ege University Izmir

Pine wood biochar for use as seed-coating material and seed priming agent

Biochar has received increasing attention as a soil amendment for crop yield improvement because of its distinctive properties. However, its bio toxicity to the ecosystem remains unclear. On the other hand, the use of biochar in seed priming is a very new approach. The use of biochar instead of chemicals is very important for sustainable agriculture. In our research we tested the biochars obtained from saw dust at different temperatures in priming of pepper seed. Priming performance of biochars were controlled by germination and seedling emergence tests. In addition, to determine whether or not biochars can serve as a suitable carrier for Gram(-) bacteria and Gram(+) bacteria storage time tests following cytotoxicity tests were performed.

Abstracts (posters), in alphabetical order

Czerwinska, Natalia – Chiara Giosue – Maria Letizia Ruello

Dipartimento di Scienze e Ingegneria della Materia, dell'Ambiente ed Urbanistica, Università Politecnica delle Marche

Fabrication of waste-derived activated carbon and its application in electrospun filters for indoor air quality improvement.

Air filters are crucial components of a building ventilation system and kitchen hoods that contribute to improving indoor air quality. Activated carbon, thanks to its high specific surface area, traps odor particles (Volatile Organic Compounds-VOCs) produced during cooking. Electrospinning, which is a very simple and low-cost method of synthesis of nanofibers, guarantees excellent filtering performance of the obtained membranes. Compared with conventional air filter media like glass fibers and melt-blown fibers, the electrospinning membranes, due to the smaller pores, are more efficient for capturing various pollutants, for example particulate matter (PM). In this paper, eco-friendly filters with waste-derived activated carbon (AC) were prepared via electrospinning to obtain a high-quality factor (QF) fibrous mat for aerosol particle filtration and VOCs adsorption. For this purpose, special attention was paid to the biodegradable and sustainable materials used to produce fine nanofibers. Two different methods of functionalization of the fibers with AC have been used. These methods are air spraying and electro-spraying. Several configurations of the final membranes have been investigated. Various process parameters such as spinning concentration, activated carbon loading, spinning volume of the membranes, voltage and flow rate were tested in terms of air filtration performance and fiber morphology. Physico-chemical properties and morphology of obtained filters were characterized by TG, SEM, FTIR, N₂ adsorption-desorption isotherm analysis. Filtering efficiency and adsorption properties were evaluated in real-scale rooms by measuring the filter penetration of newly synthesized and commercial filters, against neutralized aerosol particles (2% NaCl) and VOC (Methyl Ethyl Ketone). Regeneration methods were studied. Our results indicate that proposed hybrid membranes would be promising materials for highly efficient and sustainable air filters for home appliance systems.

Hazell, Zoe – Alastair Pearson

Investigative Science Team, Historic England

'Fuelling the Furness': an examination of the impact of charcoal production on the landscape of north-west England during the 18th century using archival material combined with remote mapping

The Southern Lakes' charcoal iron trade in Cumbria has left its marks on the landscape, from ore extraction, through the development of a transport infrastructure and the construction of furnaces, to the management of woodlands for charcoal production. The wealth of information held in the region's documentary archives – primarily as the iron production companies' account books and associated documents – includes extensive detail on the charcoal bought in; dates, quantities, woodland names, and individual producers. Using GIS, these sources have been examined in combination with remotely sensed data to provide new evidence of the impact of the iron trade on the woodlands of the Lake District. The results demonstrate that charcoal production was so vital to the iron industry that the woodlands were carefully and sustainably managed, the legacy of which we enjoy today.

Haugen, Lars Erik
National Trust of Norway

Practical approach to tar kiln and production: The Norwegian tar project

The National Trust of Norway started a new initiative in 2021 focused on kiln burned tar. The purpose is to increase the production of traditionally manufactured tar for the maintenance of stave churches and to systematize knowledge about the use of kiln burned tar and the durability of the surface treatment. For many years, The National Trust of Norway has operated a tar reception in the so-called Tar bank. In recent years, the availability of traditional kiln burned tar has decreased, while the need for maintenance has increased. The National Trust of Norway's mapping of environments for kiln burning shows that there are few active environments in Norway today. Since the people carrying this tradition are so few, the method is prone to disappear within a few years unless a concerted effort is made to keep the tradition alive. The National Trust of Norway recognizes the need for tar for both stave churches, wooden roofs on stone churches, and a larger number of other secular buildings from the Middle Ages. By preserving the knowledge of kiln burning, one also preserves the intangible cultural heritage associated with charcoal burning and the maintenance of these buildings. The National Trust of Norway aims to build a community of relatively young craftsmen who participate in kiln burning alongside older professionals. This way, knowledge about kiln burning tar is shared, and more communities across the country can produce kiln burned tar.

Jović-Jovičić, Nataša – Jugoslav Krstić – Zorica Mojović

Institute of Chemistry, Technology and Metallurgy, National Institute, Department for Catalysis and Chemical Engineering, University of Belgrade

Characterisation and adsorptive properties of charcoals obtained from hardwood and softwood from forests of "Fruška Gora"

As a porous carbon material, wood charcoal has been produced and used for various applications for centuries. The use of charcoal in various adsorption processes dates back to antiquity. In this work, charcoals were obtained in carbonization process from sawdust of hardwood and softwood from the forests of the mountain "Fruška Gora", Serbia. The obtained samples were characterized using FT-IR spectroscopy, while textural properties were calculated using adsorption-desorption isotherms of nitrogen at -196 °C. The charcoal samples were tested as adsorbents for the pharmaceutical ciprofloxacin. Different adsorption parameters were investigated (the effect of the initial concentration of ciprofloxacin and the effect of the pH of the initial solution). The experimental adsorption results were fitted with appropriate kinetic models and interpreted by selected adsorption isotherms.

Kozowyk, Paul – Liliana Baron – Geeske Langejans
Delft University of Technology

Identifying Palaeolithic birch tar production: challenges from a biomolecular approach

The production of birch bark tar by Neanderthals as early as 190,000 years ago is important for studying the evolution of technological complexity. However, research is hampered because it is currently unclear how Neanderthals were producing birch tar. Gas Chromatography-Mass Spectrometry has been used to identify Neolithic tar production methods. Here we test whether the same biomarkers can also differentiate Palaeolithic (aceramic) tar. Our results show that Palaeolithic tar cannot be reliably differentiated in the same way. More experiments are required to produce a larger reference library of different tars for statistically valid comparisons. To achieve this, datasets of experimental and

archaeological material must also be made publicly available. The open sharing of data will be essential in future endeavours to illuminate ancient methods of birch bark tar production.

Mencarelli, Alessio – Rosa Greco – Stefano Grigolato

TESAF department, Università degli Studi di Padova

Variability in the quality of charcoal-based products on the market and its implications for air quality and health

Charcoal-based products like lump charcoal or charcoal briquettes are popular fuels for barbecuing. It is important to note that the quality of charcoal is often overlooked, which can be concerning for consumers who might buy low-quality products. Moreover, the characteristics of charcoal can also impact the emission during grilling. Regrettably, different charcoal-based products available on the market do not meet the required standards for barbecue charcoal. Moreover, low-quality charcoal also increases the release of air pollutants, contributing to air pollution and posing potential health risks for charcoal users. Therefore, it is crucial to pay close attention to the quality of charcoal available on the market and ensure that it meets the necessary standards to avoid any potential risks.

Mojović, Zorica – Nataša Jović-Jovičić

Institute of Chemistry, Technology and Metallurgy, National Institute, Department for Catalysis and Chemical Engineering, University of Belgrade

Charcoal application in electrochemistry

Besides metal, charcoal was among the first materials used as an electrode material. Alessandro Volta's application of charcoal in 1792 as an electrode in a galvanic cell marked the beginning of carbon electrochemistry. Various types of carbon material have been used since then and have become an irreplaceable part of modern electrochemical devices. The need for more sustainable and green approaches led to the widespread investigation of carbon materials obtained from biological origin. Charcoal can be considered the first representative of this kind of material and is now being investigated as a part of fuel cells, supercapacitors, counter electrodes for water treatment, etc. The electrochemical characterization of charcoal obtained from hardwood and softwood was performed by cyclic voltammetry and electrochemical impedance spectroscopy.

Neubauer, Grit

Department of Forest Sciences, University of Technology Dresden

To reconstruct the historical forest in the Ore Mountains

The study area is in a former mining district and a currently spruce forest at an altitude of 900–950 m in the Ore Mountains (Germany). From five sites, historical charcoal was sampled, the tree species was determined, and with radiocarbon dating an age estimate for each kiln was set. At all sites, it was found that Norway spruce has been dominant also in the past, sometimes accompanied by larger proportions of European beech or silver fir. On the drier, warmer south-exposed slope, the proportion of beech is higher and it proves that this tree species grew at higher altitudes of the Ore Mountains during the 16th–18th century. The higher proportion of fir in the 17th–19th century on the more humid west-exposed slope in the eastern area, is an indication that it disappeared very recently from this region, almost certainly due to regulated forestry and acid rain during the last century.

Pereda, Ignacio García

Associação Portuguesa de Arqueologia Industrial

Resins and corporatism: Bureaucratic rule in authoritarian Portugal, 1936–1970

This poster examines institution building in the course of the regime of the New State (Estado Novo) in Portugal. The special interest of the Portuguese experience derives from the circumstance that forestry promotion and corporatism were shared under the same legal framework. The first part of the article reconstructs the historical path from the introduction of corporatism in the resins industry. Following is highlighted the development of 'bureaucratic corporatism' then appears as the historical consequence of the State's fixing of ambiguous policies, and the need to continue instruments for the consultation of interests.

Sprincean, Serghei

Institute of Legal, Political and Sociological Research, State University of Moldova

Bioethical and human security perspectives for more sustainable forest use

The imperative necessity of strengthening human security in conditions of degradation of environment, of the vegetation and forests, as well as of the level of social protection of human person, can be fulfilled through reconceptualization at local and regional scale, in methodological and bioethical perspectives, of the phenomenon of human security. Tangentially to bioethical and human security problematic, defending social equity, human rights or pleading for eliminations of human risks in the context of global environmental changes regarding the forest use, the problematic of promotion of nature interest encompasses the deepening of the elements of biological sovereignty of the nature in the frame of the complex processes in nature.

Stojanovski Vladimir

Hans Em Faculty of forest sciences, landscape architecture and environmental engineering

Barriers for entrepreneurship and innovation in non-wood forest sector in North Macedonia

The research explores the barriers to entrepreneurship and innovation in the non-wood forest sector, focusing on North Macedonia. The global demand for food and feed, coupled with importance of forests in achieving sustainable development goals, highlights the significance of non-wood forest products (NWFP) in providing alternative food resources and income opportunities in rural areas. The research analyses the challenges faces by NWFP sector actors, such as collectors, buyers, processors and exporters in North Macedonia. The research delves into the socio-economic profile of NWFP collectors, revealing that the majority are men living in rural areas, with NWFPs often serving as a crucial income source. The institutional framework governing NWFPs in North Macedonia is complex, with overlapping jurisdiction between environmental and forestry administrations, leading to confusion and potential policy implementation issues. The study further examines NWFPs enterprises, highlighting their historical development and challenges. The analysis indicates that many managers have roots in the pre-transition Yugoslavia system or inherited businesses, emphasizing the sector's dependence on weather conditions and the importance of processing activities. Policy issues, informal buyers and the need for strategic partnership are identified as impediments to NWFP business growth. The research concludes with a discussion on the importance of fostering innovation, reducing bureaucratic barriers and providing adequate support for NWFP enterprises. The low bargaining power of producers, absence of state support, and competition from substitute pose threats to the sector's

sustainability. The research suggests tailored strategies, including regularizing labour, implementing favourable tax regimes, and promoting business models that share income across the value chain, to enhance the resilience and profitability of NWFP enterprises in North Macedonia.

Ustaömer, Derya – Bilge Yılmaz – Hilal Fazlı. – İlhan Deniz

Department of Forest Industry Engineering, Karadeniz Technical University

Effect of modified and unmodified resins on some physical, mechanical and surface properties of MDF panels

In this study, natural pine resin (*Pinus maritima*) and pentaerythritol ester resin were used in the production of medium-density fiberboard (MDF). The modified and unmodified resins were incorporated into the adhesive with a powder form at the rate of 0.5-1.5 %. Also, both resins were added in a mixed form, for the investigation of synergistic effects of resins. Some physical, mechanical and surface properties were determined. The results were compared and explored the alternative use of bio-based, sustainable, and environmentally friendly resin and modified resin in MDF production.

Yaman, Barbaros – Halime Hüryılmaz

Bartın Faculty of Forestry, Bartın University

Wood charcoals from an early bronze age mound (yenibademli) in western Turkey

Taxonomic identification based on wood anatomy analysis reveals that a significant proportion (68.82%) of wood charcoals recovered from the Early Bronze Age Site at Yenibademli on Gökçeada Island (Imbros), situated in the Northern Aegean region of Turkey, can be attributed to the genus *Quercus*. Additionally, 15.88% correspond to *Pinus*, 13.51% to *Phillyrea*, 0.63% to *Arbutus*, 0.35% to *Ulmus*, and 0.23% to the *Rosaceae* family. These findings underscore the prevalence of oak (*Quercus* sp.) as the dominant tree genus, with 67.2% identified as deciduous oak and the remaining 1.62% as evergreen oak. The prevalence of *Quercus* and *Pinus* as the two most common genera within the taxonomic spectrum may suggest a correlation with the oak and pine stands on Gökçeada (Imbros) during the Early Bronze Age. Furthermore, the presence of evergreen *Quercus* (sec. *Ilex*) and the prominence of the genus *Phillyrea*, ranking third in the taxonomic spectrum, imply the coexistence of maquis and open vegetation during the Early Bronze Age on Gökçeada.

Yazici, Ahmet Erdem – Jakub Brózdowski – Monika Bartkowiak – Zbigniew Katolik – Grzegorz Cofta – Grażyna Dąbrowska – Magdalena Zborowska

Department of wood chemical technology, Poznan University of Life Sciences

Antioxidant properties of different tars

Tar is a product of dry distillation of wood or bark. Originally tar was produced in clay pots; nowadays, tar can be produced in a controlled environment of a laboratory oven. The product obtained, unlike the one produced in clay pots, divides, over time, into three fractions. Top fraction: a layer of light oils. Middle fraction: acetic acid, methanol, and phenols. Bottom fraction: dense oily fraction. In this work, tar was produced at various temperatures, ranging from 450 to 600°C, and three raw materials: pine wood, birch wood, and birch bark. The results of dry distillation were compared by measuring the antioxidant effect of the obtained tars, as well as the content of total phenolics and flavonoids. Results showed that bottom fraction had significantly better antioxidant properties and a higher content of phenolics. Tars made from wood had better properties compared to bark ones.

Yılmaz, Bilge – İlhan Deniz – Hilal Fazlı – Olcay Bekircan – Ergün Gültekin – Andrey Pranovich
Department of Forest Industry Engineering, Karadeniz Technical University

Development of Biobased, Sustainable and Environmentally Friendly Glycerol Ester Rosins for The Production of Thermoplastic Road Marking Paint

Sustainable natural glycerol ester rosins were assessed as biobased binders in the formulation of thermoplastic road marking paints (TRMPs), utilizing pine (GR), wood (WR), and tall oil (TOR) rosins, separately. Various analytical techniques, including Fourier Transform Infrared Spectroscopy (FT-IR), Thermogravimetric Analysis (TGA), Matrix-Assisted Laser Desorption/Ionization (MALDI-TOF-MS), and Gel Permeation Chromatography-High Pressure Liquid Chromatography (GPC-HPLC), were employed to analyse both natural and glycerol ester rosins. Moreover, standard tests, including acid number (mg KOH/g) ASTM D 465 - 05 and softening point (°C) per ASTM E 28 - 99, were conducted to the samples. Additionally, TRMPs were subjected to various tests. The results demonstrated the promising potential of evaluating glycerol ester rosins for producing TRMPs.

Zouari, Mariem
InnoRenew CoE

Biochar as an additive in coatings and composite materials

Current trends of sustainability push toward the exploitation of underutilized organic feedstocks. Forest industry by-products such as wood chips and bark represent an abundant resource being generated in large volumes. One way to valorize forest by-products is thermal conversion, specifically, slow pyrolysis. Slow pyrolysis consists of the decomposition of the biomass under high temperature and inert atmosphere leading to the generation of carbon-rich residue called biochar. The attractiveness of biochar lies in its superior characteristics (depending on pyrolysis conditions), such as electrical conductivity, large porosity, and presence of surface functional groups. These properties make biochar a promising material for different applications. Possibilities of using biochar in composite materials and in depolluting coatings for adsorption of indoor pollutants will be presented.

MS Teams links for hybrid participation

March 5

CG and MC meeting with keynotes (all day)

[Kliknutím sem se připojíte ke schůzce](#)

ID: 369 538 604 350

Access code: oHz7t8

March 6

WG1 parallel meeting (9.00–10.30)

[Kliknutím sem se připojíte ke schůzce](#)

ID: 380 473 642 846

Access code: jmQW7f

WG2 parallel meeting (9.00–10.30)

[Kliknutím sem se připojíte ke schůzce](#)

ID: 367 141 222 614

Access code: 4RpZsW

WG3 parallel meeting (9.00–10.30)

[Kliknutím sem se připojíte ke schůzce](#)

ID: 380 708 015 493

Access code: VWvPDH

WG4 parallel meeting (13.00–14.30)

[Kliknutím sem se připojíte ke schůzce](#)

ID: 380 473 642 846

Access code: jmQW7f

WG5 parallel meeting (13.00–14.30)

[Kliknutím sem se připojíte ke schůzce](#)

ID: 380 708 015 493

Access code: VWvPDH

WG1 + WG3 + WG4 joint meeting (11.00–12.00)

[Kliknutím sem se připojíte ke schůzce](#)

ID: 380 473 642 846

Access code: jmQW7f

WG2 + WG5 joint meeting (11.00–12.00)

[Kliknutím sem se připojíte ke schůzce](#)

ID: 367 141 222 614

Access code: 4RpZsW

Continue tasks and action plan WG1+WG3+WG4+WG2+WG5 (15.00–16.00)

[Kliknutím sem se připojíte ke schůzce](#)

ID: 380 473 642 846

Access code: jmQW7f

Feedback from working groups (16.00–17.30)

[Kliknutím sem se připojíte ke schůzce](#)

ID: 380 473 642 846

Access code: jmQW7f

Local organiser

Institute of Ethnology of the Academy of Sciences of the Czech Republic
<https://www.eu.avcr.cz/en/>

Local organising team

Jiří Woitsch

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The Institute of Ethnology of the Academy of Sciences of the Czech Republic