VENICE 2024

SYMPOSIUM PROGRAMME
(UPDATED TO 25/10/2024)

FOCUS SESSION I / / 25th November 2024 11:00 -12:30
ARTIFICIAL INTELLIGENCE AND WASTE-TO-ENERGY

Moderator: Rainer Stegmann, *Hamburg University of Technology (DE)*

Artificial Intelligence (AI) conquers all sectors of our private and business life. Important questions are: how do we deal with this situation, in how far can we control AI or will it control us.

Also, in the waste management sector AI is already used, in the operation of plants but also in education. What can we do to avoid misuse and unconditional trust. Does AI make mistakes that we might not realize on first sight?

In this **interactive Focus Session** we will try to find out how knowledgeable is AI in our field. The idea is to **ask "Prof. Arti Intel" questions from the area of Waste to Energy**. The answers we receive will be discussed by the invited expert group on stage and the audience.
Questions will be asked by the moderator, the experts in the round and the audience. Such questions shall become more and more difficult in order to find out the limits of Prof Arti Intel's knowledge.

This is an experiment with an open outcome and we all are very excited to see how this session will go.

SESSION A1 / / 25th November 2024 15:00 -16:00
ENVIRONMENTAL AND PLANNING ISSUES
Chair / *Presidente*: To be defined

L. Acampora, G. Costa, S. Malvezzi, B. Papa, C. Mensi (IT)
Evaluation of emission factors for waste-to-energy plants based on experimental measurements and plant specific data

H. Gohar, G. Beggio, M.C. Lavagnolo (IT)
Air-polluting emissions from pyrolysis of biomass and waste

Y. Yoshida, Y. Hirai, J. Yano (JP)
Optimal location of incineration facilities considering multiple periods: a case study of Kyoto City

K. Kawai, H. Hirai, K. Ishiketa, T. Kobayashi, H. Kuramochi, M. Osako (JP)
Biomethanation of biomass waste and its demand for the products by province in Japan

SESSION B1 / / 25th November 2024 15:00 -16:00
BIOREFINERY
Chair / *Presidente*: To be defined

S. Ajdari, A.S. Salim (SE)
Transforming waste into value: sustainable production of platform chemicals in Sweden

E. Sventzouri, K. Pispas, G. Manthos, M. Kornaros (GR)
Selecting and cultivating photosynthetic microorganisms in anaerobic digestion effluent from agricultural waste for bioplastic production

F. Khodaparastan, S. Ashok, E. De-Oliveira, C. Switzer, G.P. Grant, M. Zanoni, J. Bowen, T. Rashwan (GB)
Exploring biomass valorisation in applied smouldering systems

A.H. Al-Muhtaseb (OM)
Novel organometallic catalyst for efficient valorization of lipids extracted from prunus domestica kernel shell in sustainable fuel production

A.P.C. Ribeiro, A.O. Figueiras, L.M.D.R.S. Martins (PT)
Extraction of Chitin from Tenebrio Molitor

SESSION C1 / / 25th November 2024 15:00 -16:00
WORKSHOP: GENERATION OF ENERGY FROM MICROBIAL FUEL CELLS
Chair / *Presidente*: To be defined

F. Borja-Maldonado, M. Á. López Zavala (MX)
Improving the efficiency of medium-scale dual-chamber microbial fuel cells by using innovative electrode materials and appropriate selection of external resistance

F. Borja-Maldonado, M. Á. López Zavala (MX)
Contribution of electrode and membrane materials, configurations, electron transfer mechanisms, and cost of components on the current and future development of microbial fuel cells

FOCUS SESSION II / / 25th November 2024 16:30 -18:00
BIOGENIC WASTE INCINERATION PLANTS: NONSENSE OR PART OF SUSTAINABLE WASTE TREATMENT?

Moderator: Michael Nelles, *University of Rostock (DE)*

Waste incineration is a central component of sustainable waste management concepts and is intended to dispose of non-recyclable waste in an environmentally friendly manner. In practice, also biogenic waste such as waste wood, paper, cardboard, kitchen and garden waste is treated in WtE plants. For example, the biogenic share in the input of waste incineration plants in Germany is approx. 50% and also around 50 % of the CO2-emission are "green". This raises the fundamental question of whether and when the use of biogenic waste in WtE plants is ecologically sensible, technically feasible and economically viable. Since the practice of incinerating biogenic waste in WtE plants varies greatly internationally and the current situation will be discussed with experts from Europe, Asia and America. The following questions will then be discussed with the experts:

- Which biogenic waste should be used in WtE plants from an ecological point of view and which should not?
- Do we need different solutions in the countries?
- Which incineration technologies are suitable for the incineration of biogenic waste?
- How should biobased emissions be assessed (green CO2, CCS, CCU, negative emissions)?

SESSION A2 / / 26th November 2024 09:00 -10:00
BIOMASS AND WASTE DERIVED FUEL
Chair / *Presidente*: To be defined

B.N. López Niño, M. Buryi, A. Mašlani (CZ)
Solid product as possible elemental pollutants reservoir after Refused Derived Fuel (RDF) thermal plasma treatment

H. Sherif, M. Salah, M.S. Sadek, R.M. Sayed, S. Saeed (EG)
Refused derived fuel (RDF) bio-drying by using composting turning machine in a full-scale Egyptian facilities

H. Sherif, M.S. Sadek, R.M. Sayed, S. Saeed (EG)
Biomass Derived Fuel (BDF) production in Egypt: current status and future prospects

SESSION B2 / / 26th November 2024 09:00 -10:00
AEROBIC DIGESTION
Chair / *Presidente*: To be defined

K.O.F. Al-Twal, G. Beggio, V. Grossule, A. Sandon, M. Schiavon, M.C. Lavagnolo (IT)
Characterization of feedstocks for the optimization of energy recovery from composting: a review for the TEAPOTS project

H. Jalalipour, S. Nakhaei, G. Morschek, M. Nelles (DE)
Comparative analysis of biogas and compost plants for source-separated biowaste treatment

S. Stegenta-Dabrowska, J. Rosik, K. Swiechowski (PL)
Optimizing dairy sewage sludge and green waste composting: laboratory-scale study

W. Chen, Y. He, L. Xie (CN)
Achieving rapid stabilisation of aerobic composting by the construction of oxygen transport channels

R. Burch, D.K. Cha, M.J. Chajes (US)
On-site aerobic bio-digester for resource recovery from food waste

SESSION C2 / / 26th November 2024 09:00 -10:00
SEWAGE SLUDGE TO ENERGY
Chair / *Presidente*: To be defined

L. Ekpeni, K. Benyounis, J. Stokes (IE)
Sludge effectiveness in the disruptive process of a biomass substrate for improved energy yield

B.-K. Ahn, Y.-M. Yun (KR)
Impact of primary and secondary pretreatment on anaerobic digestion of waste activated sludge

E. Fersini, A. Giuliano, F. Todaro, A. Violante, C. Wieth, M. Notarnicola (IT)
Evaluation of sewage sludge treatment by pilot pyrolysis plant and laboratory analysis

K. Swiechowski, K. Zasanska, J. Rosik, M. Bednik, S. Stegenta-Dabrowska (PL)
Pyrolysis of dairy sewage sludge, energy and environmental aspects of biochar

D. Panepinto, B. Ruffino, S. Frisario, M. Urciuolo, A. de Folly d'Auris, G. Premoli, M. Zanetti (IT)
Analysis of the PFAS treatment, regulation and experimental investigation

SESSION A3 / / 26th November 2024 10:30 -11:30
COMBUSTION PROCESS
Chair / *Presidente*: To be defined

S. Park, H. Kim, H. Jo, D. Shin, J. Lee, J. Son, Y. Yun, C. Ryu (KR)
Forecasting operational performance of a waste incinerator using AI-based models

A. Ise, C. Nishihara, Y. Onuki, G. Matsumoto, S. Motoyama, S. Shigemasa (JP)
Multiple AI models for improving combustion stability of waste-to-energy plants

S. Ozgen, A. Wu, F. Ruiz (IT)
Modelling approaches for model-based predictive control of acid gases in waste-to-energy plants

T. Shinohara, H. Harada, K. Shiota, M. Takaoka (JP)
Evaluation of corrosion of superheater tubes under CO2-rich environment in waste to energy plant

SESSION B3 / / 26th November 2024 10:30 -11:30
BIOFUELS
Chair / *Presidente*: To be defined

B.A. Simmons (US)
Flying the future: advances in sustainable aviation fuels at the Joint BioEnergy Institute (JBEI)

H. Tang, D. Chen, Y. Feng (CN)
Production of iso-alkanes in aviation fuel from catalytic pyrolysis of low-density polyethylene

L. Lombard, A. Polettini, R. Pomi, A. Rossi, T. Zonfa, M. Wilk (IT)
Combining dark fermentation, hydrothermal carbonization and anaerobic digestion for producing biofuels

SESSION C3 / / 26th November 2024 10:30 -11:30
WORKSHOP: ADVANCES IN BIOWASTE FERMENTATION
Chair / *Presidente*: U. Theilen, H. Weigand, F. Brück (DE)

This workshop will showcase significant advancements in the field of biowaste fermentation, using the RegBioFerm project as a starting point to explore broader applications. The focus will be on scaling innovative anaerobic digestion processes to large-scale, multi-input demonstration plants (TRL 8) and implementing highly efficient cascaded energetic and material valorization of biogenic wastes. Additionally, the session will delve into how these technologies can be integrated into rural regional value networks to foster a sustainable circular bioeconomy, thereby enhancing the efficiency of renewable energy production and reducing dependency on fossil fuels.

- Opening Remarks and Introduction
- *Felix Brück (DE)*
  Experimental research in biowaste processing
- *Andrzej Bialowiec, Marvin Valentin (PL)*
  Modeling inoculum and substrate dynamics in continuous flow anaerobic reactors
- *Hannah-Sophie Tscherney, Holger Rohn (DE)*
  Life Cycle Assessment of biowaste fermentation to ensure sustainability
- Discussion and Q&A
- Closing Remarks

SESSION A4 / / 26th November 2024 11:45 -12:45
WASTE PYROLYSIS
Chair / *Presidente*: To be defined

W. Zhao, H. Harada, S. Oleszek, K. Shiota, Y. Sakurai, K. Oshita, M. Takaoka (JP)
Study of pyrolysis characteristics of actual refuse to establish a pyrolysis gasification process for Municipal solid waste (MSW)

P. Ma, J. Yan, Z. Ma, A. Cao, S. Ling, Y. Zhang (CN)
Study on catalytic pyrolysis characteristics of waste plastics in medical waste

J. Zhang, Y. Guo, Z. Zhang, Z. Zhang, T. Zhang (CN)
Sulfur and Chlorine releasing and migration during pyrolysis of anaerobic digestate derived from kitchen waste

A. Zhang, Y. Qiu, Y. Feng (CN)
The effect of pre-pyrolysis on structure and properties of hard carbon for sodium battery

E. Sygula, J. Lyczko, A. Bialowiec (PL)
Furfural emission from biochar derived from lignin, cellulose, and hemicellulose: industrial benefits and environmental risks

SESSION B4 / / 26th November 2024 11:45 -12:45
LIFECYCLE THINKING AND ASSESSMENT
Chair / *Presidente*: To be defined

A. Masi, G. Costa, L. Lombardi (IT)
Comparative LCA of carbonation-based treatments for valorising Alkaline residues and storing CO2 within a biorefinery process

F. Gievers, A. Loewen, M. Nelles (DE)
Energy or material use of biochar and hydrochar produced from sewage sludge? A life cycle assessment approach

H.-S. Tscherney, H. Rohn (DE)
Towards the life cycle assessment of a rural value network centered on the energetic and material utilization of biowaste

L. Lombardi, G. Arcese, G.C. Elmo, B. Mendecka, S. Sobek, K. Pikon, A. Kuzior, K. Moustakas, M. Kyriazi, M. Horttanainen, K. Grönman, M. Abdulkareem, M. Khan, A. Woszczek (IT)
LIFE-C: promoting life cycle thinking in higher education

SESSION C4 / / 26th November 2024 11:45 -12:45
WORKSHOP: PRODUCTION AND RECYCLING OF WASTE FROM RENEWABLE ENERGY PRODUCTION
Chair / *Presidente*: To be defined

D. Trento, F. Faleschini, V. Revilla-Cuesta, V. Ortega-López (IT)
Raw-crushed wind-turbine blade as an effective addition to enhance recycled concrete properties

F. Pagnanelli, P. Altimari, P.G. Schiavi, E. Moscardini, L. Toro (IT)
Recycling of photovoltaic panels: process development and technology transfer during the last ten years

A. Becci, A. Amato, M. D'Arcangelo, F. Beolchini (IT)
Flexible hydrometallurgical process for metal recovery from new generation photovoltaic panels

SESSION A5 / / 26th November 2024 15:00 -16:00
GASIFICATION
Chair / *Presidente*: To be defined

S.-H. Song, J.-K. Kim, J.-W. Kim, C.-W. Park, J.-S. Kim (KR)
Steam gasification of wood using a two-stage gasification process: How to avoid bed agglomeration and tar problems simultaneously in a fluidized bed gasification.

N. Tanigaki, N. Fukuda, J. Takada, T. Izumiya (JP)
Development of an advanced shaft furnace gasification technology for municipal solid waste in a commercial scale plant

R. Zhang, K. Oshita, T. Shida, K. Nakajima, H. Toshioka, M. Takaoka (JP)
Steam gasification as a sustainable strategy for automotive wire harness treatment and syngas production

V. Arconati, C. Boccia, F. Parrillo, F. Ardolino, G. Ruoppolo, U, Arena (IT)
Hot syngas clean-up by catalytic cracking of tars: the effect of main parameters

SESSION B5 / / 26th November 2024 15:00 -16:00
NATIONAL STRATEGIES AND CASE STUDIES
Chair / *Presidente*: To be defined

G.J. Gaogane, P. Sekoai, C. Trois (ZA)
Innovative bioenergy solutions for developing nations: dark fermentation and anaerobic digestion of abattoir waste

Q. Thabit, V. Ekanthalu, Z. Asiedu, S. Narra, M. Nelles (DE)
Gaps and challenges of the waste management sector in Senegal

J. Faitli, C. Leitol, C. Ágoston (HU)
The evolution of the Hungarian MSW sampling methodology from Pierre Gy's MODECOM to sophistcated EPR and DRS based one

A.C. Gutierrez-Gomez, V.P. Garcilasso, M.M. dos Santos, J.R. Meneghini, K.L. Mascarenhas, M.S. Buckeridge, S. Coelho (BR)
Perspectives for production and use of renewable hydrogen from biomass residues and waste in Brazil

S. Rohit, M.K. Chandel (IN)
Assessment of integration of solar dryer, incinerator, and anaerobic digester for enhanced energy recovery from the municipal solid waste

SESSION C5 / / 26th November 2024 15:00 -16:00
WORKSHOP: FROM WASTE TO WEALTH: EXPLORING THE POWER OF AGRO-INDUSTRIAL WASTE
Chair / *Presidente*: S. Bertolini, S. Silvestri (IT)

The management of biowaste and agro-industrial waste is gaining attention due to them disposal costs and environmental issues. Biorefineries are a promising solution since they combine waste utilization with the production of value-added products, including organic fertilizers.

The most crucial component for adding nutrients to the soil and promoting soil fertility and plant growth is fertilizer. Continuous and excessive use of chemical fertilizers to boost agricultural yields causes soil damage in terms of nutrient loss, groundwater and surface water contamination, soil acidity or basicity and microbial population decline. On the other hand, organic fertilizer improves soil fertility, physical and chemical characteristics, water retention capacity, soil pH and soil enzyme activity. In a circular economy framework, the use of organic fractions of municipal waste, agri-based feedstock and byproducts from agro-industrial activities has drawn much attention in terms of environmental sustainability and technological innovation. Such feedstocks can be converted into a spectrum of valuable products like biofuels, biofertilizers and biomolecules for green chemistry using a variety of technologies, including consolidated process like composting and anaerobic digestion and other more innovative like hydrothermal carbonization. The economic and ecological effects of these techniques have been largely documented in the literature and can contribute to many integrated pathways, such as energy production, greenhouse gas emission reduction and byproducts valorization.

Given the background, the main task of the workshop will be to discuss and analyze the opportunities and the limits related to biomass valorization in terms of energy, organic substances, nutrients and other molecules recovery minimizing environmental impact.

Agenda:

- *Sara Bertolini - Fondazione Edmund Mach (IT)*
  SMS-Green" project: from apple pomace to soil amendments

- *Luca Fiori - University of Trento (IT)*
  Agro-industrial waste and circular economy: R&D projects based on hydrothermal, biochemical and extraction processes by the Green Processes Engineering group at the University of Trento

- *Tania Sinicco - CREA, Viticulture and Enology Research Centre (IT)*
  RUSTICA project: converting fruit and vegetable residues into novel bio-based fertilisers

FOCUS SESSION III / / 26th November 2024 16:30 -18:00
ENERGY AND CIRCULAR ECONOMY

Moderators: Dezhen Chen, *Tongji University (CN)* / Jianhua Yan, *Zhejiang University (CN)*

*Circular Economy (**CE**)* refers to all the activities of reduce, reuse and recycle (3R) in production, circulation, and consumption. It is an important route to achieving a resource-saving and environment-friendly society. Waste to energy or energy products contributes greatly to *CE.* How to choose energy or proper energy products strategically to achieve both environmentally and economically satisfied ***CE***? Some scientists performed LCA or LCO (Life cycle optimization) on different energy products to develop sustainable business model for choosing proper energy products. Presently, WtE plants are widely available. However, the income or subsidies of WtE plants have been declining; while the energy products other than heat and electric power are very few, except for some limited experiences on producing oil from homogeneous wastes such as waste plastics and tires. This raises the question of what kind of energy products should be focused in future. The following questions will be discussed with experts from Asia, Europe, America and other areas:

- What kind of energy products should be recovered from waste treatment from both ecological and economic point of views?
- What are the barriers for recovering value-added energy products from wastes?
- Syngas, H2, oil, CH4, SAF, methanol etc., which are the proper energy products to achieve satisfied **CE** from waste management?
- The tools to decide the proper **CE** mode (resources or energy recovery) for a specified scenario?

SESSION A6 / / 27th November 2024 09:00 -10:00
CARBON CAPTURE
Chair / *Presidente*: To be defined

T.F. Astrup, D Kuri, J. Haukohl, S. Halevi, M. van Brunt (DK)
Energy-from-waste – What is the potential to provide net-negative carbon emissions?

R. Salvador, R.-A. Doong (TW)
Carbon sequestration potential within solid waste management

L. Cretarola, F. Viganò (IT)
Review of BECCS technologies with a specific focus on combustion-based processes

L. Cretarola, F. Viganò (IT)
Performance comparison of various BECCS options

M. Spinelli, C. Artini, M. Gatti, M.C. Romano, S. Consonni (IT)
WTE with negative CO2 emissions via CaLooping: the Horizon Europe HERCCULES project

SESSION B6 / / 27th November 2024 09:00 -10:00
ANAEROBIC DIGESTION: REACTOR DESIGN AND CONTROL
Chair / *Presidente*: To be defined

D. Krahe, J. Herfurtner, F. Brück, U. Theilen, H. Weigand, S. Annas (DE)
Mixing in a model rotating drum AD reactor characterized by particle tracking and computational fluid dynamics

W. Chung, S. Chang, D. Bang, G. Lim, M. Kim, J.T. Kim, S. Yang (KR)
Application of lab-scale anaerobic digestion with AI (Artificial Intelligence) model

D. Bona, L. Grandi, S. Bertolini, D. Scrinzi, S. Silvestri, M. Zorzi (IT)
Monitoring seasonal efficiency of dry anaerobic digestion plant

S. Choi, S. Hwang (KR)
Transformer-based anaerobic digestion time series forecasting model: inference to interpretation

M.T. Valentin, A. Bialowiec (PL)
The Proof-of-Concept: the modelling of the evolution of inoculum and substrate inside a continuous flow anaerobic reactor

SESSION C6 / / 27th November 2024 09:00 -10:00
WORKSHOP: KNOWLEDGE GAPS ON PFAS THERMAL DEGRADATION
Chair / *Presidente*: T. Rashwan (UK)

Per- and polyfluoroalkyl substances (PFAS) have been central compounds used in a range of modern materials – everything from fire-fighting foams to cosmetics. Altogether, there are thousands of synthetic compounds within the PFAS classification. It is now widely understood that PFAS contamination poses severe environmental risks. Due to PFAS' toxic and persistent properties, small concentrations can bioaccumulate in the food chain, affecting human and environmental health. Activated carbon or ion exchange resin have been used to remove PFAS from drinking water. Anesthetic gases such as isoflurane, desflurane, and sevoflurane have been widely used in medical applications; these gases are trapped in activated carbon after use for disposal. Other PFAS-contaminated materials (e.g., municipal solid wastes, sewage sludge, and hazardous wastes) necessitate active treatment.
Thermal treatment methods have shown strong promise in breaking PFAS down at high-temperature conditions (e.g., above 850°C). However, there many research gaps regarding the fate of PFAS in these thermal systems, which are critical to solve now because even small concentrations of PFAS – e.g., from incomplete destruction – can pose long-lasting and challenging environmental risks for future generations.

This workshop will focus on the research needs in addressing PFAS fate in thermal waste systems, including:

- Characterizing products of incomplete combustion from PFAS thermal treatment in gaseous systems
- Challenges associated with closing the fluorine balance
- The role of temperatures, residence times, mixing, and water vapor in full PFAS destruction to HF
- The role of fluorine mineralization (e.g., to CaF2)
- Need for comparisons between lab- and full-scale results

SESSION A7 / / 27th November 2024 10:30 -11:30
RESOURCES RECOVERY FROM INDUSTRIAL AND COMMERCIAL WASTE
Chair / *Presidente*: To be defined

P.T. Triwigati, S. Noh, S. Moon, E. Kim, Y. Park (KR)
Waste to Resource: feasibility study on ligand-based pH swing process for selective recovery of manganese and calcium carbonate from steel slag

K. Shu, C. Chuaicham, K. Sasaki (JP)
Photocatlytic H2 evolution on Tio2/Fe-doped hydroxyapatite derived from converter slag

H.N. Ly, W.R. Lee, S. Kim (KR)
Advanced indoor air treatment: tungsten-doped titanium dioxide nanohybrids for photocatalytic toluene removal

X. Lü, T. Lu (FI)
Waste heat potentials from liquid cooled data centres for sustainable building heating solutions

SESSION B7 / / 27th November 2024 10:30 -11:30
ANAEROBIC DIGESTION: PROCESS ENHANCEMENT
Chair / *Presidente*: To be defined

J.W.C. Wong, L. Luo (HK)
Regulation of acidogenic fermentation through exogenous additives for promoting carbon conversion of food waste in two-phase anaerobic system

J.H. Lee, J.Y. Choi, J.H. Lee, D.Y. Kim, E. Lee, K.Y. Park (KR)
Impact of sonication pretreatment on phosphorus release and adsorption from livestock manure anaerobic digestate

J. Kim, J. Y. Kim (KR)
Mitigating calcium inhibition in organic sludge digestion through CO2 injection

Z. Shi, P. He, J. Guo, W. Peng, H. Zhang, F. Lü (CN)
The impact of mechanical pretreatment system on carbon reduction: A field study of an industrial-scale biogas plant in China

SESSION C7 / / 27th November 2024 10:30 -11:30
WORKSHOP: LOW TEMPERATURE THERMAL CONVERSION
Chair / *Presidente*: To be defined

Y. Ryckmans (BE)
Hydrothermal carbonisation of organic waste for thermal energy generation

J.-W. Kim, C.-W. Park, J.-Si.Kim (KR)
Treatment of a waste polyvinyl chloride with a new type of 3-stage thermochemical conversion process

SESSION A8 / / 27th November 2024 11:45 -12:45
COMBUSTION RESIDUES
Chair / *Presidente*: To be defined

G. Dodbiba, X. Zhang, T. Fujita (JP)
Novel approach for efficient removal of Chloride ions from incinerator bottom ash using Acetic acid and CO2 micro-bubbling

C. Lanzerstorfer (AT)
Differences in the composition of fine cyclone fly ash and ESP fly ash from woody biomass combustion

Z. Liu, Y. Xia, L. Wang, J. Yan (CN)
Recycling waste incineration fly ash and red mud into novel geopolymer

F. Lapp, F. Schmutzler, F. Brück, T. Liebich, M. Lang, U. Theilen, H. Weigand (DE)
Potential of pelletized bottom and fly ashes from wood combustion for sustainable H2S removal from biogas

C. Owusu Prempeh, A.J. Babafemi, I. Hartmann, M. Nelles (DE)
Post-treatment of sugarcane bagasse ash: a comparative analysis of acid treatment and sol-gel process

SESSION B8 / / 27th November 2024 11:45 -12:45
ALGAL BIOMASS FOR ENERGY APPLICATION
Chair / *Presidente*: To be defined

E. Pozzuoli, M. Iovinella, C. Auciello, S. Papa, M.R. di Cicco, C. Lubritto, C. Ciniglia (IT)
Industry of the Algae Production in Europe - The future and possible application in a circular and eco-friendly bioeconomy

F.G. Torres, A. Urtecho (PE)
Algae biomass for energy applications

H. Velten, N. Hasport, D. Reinecke, U. Theilen (DE)
Biogas yield of microalgae biomass harvested from two different algae-based wastewater treatment systems

G. Lim, W. Chung, S. Chang, M. Park, S. Hong, B. Jeon, S. Choi (KR)
Research on eco-friendly biofuel production technology using microalgae: Hydrothermal Liquefaction (HTL)

SESSION C8 / / 27th November 2024 11:45 -12:45
FEEDSTOCK
Chair / *Presidente*: To be defined

O.P. Troncoso, F.G. Torres, V. Delgado (PE)
The potential of native starch biomass to produce materials for energy applications

E. Sygula, A. Bialowiec (PL)
Application of the fractal dimension analysis of the chromatograms for profiling the volatile organic compounds release from lignocellulosic biomass

J. Darmey, S. Narra, O.-W. Achaw, J.C. Ahiekpor, B.A. N'guessan Cougouais (DE)
Comparative analysis of lignocellulosic composition characteristics of organic municipal solid wastes: insights from Kumasi and global cities for biogas feedstock

L.M.D.R.S. Martins, A.P.C. Ribeiro, M.J.O. Martins, A. Figueiras, I.A.S. Matias (PT)
Innovation in insect biomass valorization: towards a sustainable future

J. Qiu, F. Lü, H. Zhang, P.-J. He (CN)
Molecular insights into the biological treatment process of waste leachate

SESSION A9 / / 27th November 2024 15:00 -16:00
HYDROGEN PRODUCTION AND UTILIZATION
Chair / *Presidente*: To be defined

E.K. Byeon, H.-I. Kim (KR)
Sustainable hydrogen production via electrolysis of ammonia in landfill leachate

D. Cuesta-Mota, L. Canals Casals, V. López-Grimau (ES)
Hydrogen production during the electrochemical treatment of textile dyeing concentrates rejected from nanofiltration

G.S. Ganesh, S. Dasappa, B. Patil, A.M. Shivapuji (IN)
Comparative economic and environmental performance assessment of biomass gasification pathway for green H2 production

F. Ardolino, F. Parrillo, U. Arena (IT)
Environmental performance of a regional railway transportation fueled by hydrogen from waste

SESSION B9 / / 27th November 2024 15:00 -16:00
FATE AND DEGRADATION OF BIOPLASTICS IN ANAEROBIC DIGESTION
Chair / *Presidente*: To be defined

F. Marchelli, L. Fiori (IT)
Waste bioplastics in anaerobic digestion: challenges and hydrothermal solutions

Y. Ahn, M. Lee, S. Kim, E. Choi, J. Park (KR)
Bacterial and archaeal population dynamics in thermophilic hydrogenotrophic methanogenic microbial communities degrading PLA bioplastics

W. Peng, Z.Y. Su, F. Lü, H. Zhang, P.J. He (CN)
Enhanced bioenergy recovery through co-digestion of biodegradable packaging materials with food waste

SESSION C9 / / 27th November 2024 15:00 -16:00
WASTE MANAGEMENT OPTIMIZATION FOR RESOURCES RECOVERY
Chair / *Presidente*: To be defined

H. Zou, P. He, H. Zhang (CN)
Machine learning-aided rapid identification of municipal solid waste using optical reflectance spectra

W. Bauer, B. Lipowsky, K. Löber (DE)
Benchmarking Municipal WEEE Collection in Germany as a tool to prevent fires when collecting old appliances

K. Silvennoinen, E. Lehtonen, X. Liu, V. Lampi, S. Nisonen (FI)
The food waste model for food services: focus on the Helsinki Metropolitan Area

S.R. Kong, G. Sim, Y. Park (KR)
Two-step leaching process for resource recovery: recovery copper and gold from the end-of-life LEDs with volatile fatty acids

M. Freiberger, S. Rivic, O. Cencic, A. Prskawetz, H. Rechberger, C. Scharff (AT)
Understanding the limitations of recycling and utilization rate targets for circular plastics management: a general economic equilibrium model including material flow analysis

FOCUS SESSION IV / / 27th November 2024 16:30 -18:00
CARBON CAPTURE: A WAY TO DECARBONISE THE WASTE SYSTEM?

Moderator: Thomas Astrup, *Ramboll Denmark (DK)*

Carbon emissions from biomass and waste-to-energy facilities represent one of the main challenges for these technologies in a climate perspective. While still a new technology, carbon capture (CC) has the potential to limit direct carbon emissions from both biomass and waste-to-energy facilities. The captured carbon could be stored in subsurface deposits (CCS), or potentially utilised e.g. for fuel production (CCU) in combination with use of green electricity. Carbon capture can be seen as a practical way to decarbonise the waste system, create net-negative emissions, and/or capture biogenic CO2 for biofuel production. But the approach may also be found to legitimise potential carbon emissions that could otherwise be avoided. What are heads and tails in this? This focus session discusses key questions in relation to carbon capture:

- With carbon capture (CC) available as an emission control technology, should CC be considered best-available-technology on waste and biomass combustion facilities in the future?
- How important is CC for the overall carbon balance of biomass and waste-to-energy?
- Should we focus on carbon storage (CCS) or carbon utilisation (CCU)?
- Could biogenic carbon removal certificates be important in the future?

POSTER PRESENTATIONS

S. Li, A. Ding, Z. Bian, Y. Xuan (CN)
Design and application of Vanadium-based composite catalysts in biogas cracking for hydrogen production in new energy conversion

S. Lee, W. Cho, H. Park, M. Seo, J.-Y. Lee (KR)
The evaluation of the bio-drying through mixing of sewage sludge and herbal medicine by-products

A.B. López, C.J. Cobo-Ceacero, M.T. Cotes-Palomino, A. Dubbelman-Vizcaíno, F.J. Iglesias-Godino, C. Martínez-García, A.C. Revelo-Rodríguez, F.J. Troyano-Pérez, F. Torres-Fernández (ES)
Cost analysis of firing process variables for life cycle costing of sustainable ceramic materials made from waste

F. Torres-Fernández, C. J. Cobo-Ceacero, M.T. Cotes-Palomino, A. Dubbelman-Vizcaíno, F. J. Iglesias-Godino, C. Martínez-García, A. C. Revelo-Rodríguez, F. J. Troyano-Pérez, A. B. López (ES)
Preliminary development of circularity indicators in the Construction and Demolition Waste (CDW) sector

I.S. Cho, S. Mishra, S. Lim (KR)
Identifying the sources of black carbon in PM2.5 using a tricolor absorption photometer at an urban site in Daejeon during 2024

L.F. Pereira Marcilio, A.M. Sampaio Pereira, N.R. Marcilio, A.C. de Azevedo (BR)
Produced water on offshore oil platforms in Brazil: characterization, monitoring and environmental impact

C. Lee, Y.-C. Jang (KR)
Consumption and carbon footprints of single-use plastic cups in South Korea

D. Bang, J. Shim, B. Jeon, S. Chang, W. Chung (KR)
Metataxonomic characterization and analysis of temperature effects on organic waste biomass composting processes

K. Chamrádová, J. Pavlíková, P. Basinas, M. Vráblová, K. Smutná, B. Tenklová, J. Rusín, D. Vrábl, R. Chalupa, I. Koutník (CZ)
Full-scale co-composting of sewage sludge and waste materials at various mixing proportions and aeriation conditions to produce stabilized compost

A.K. Wejlah (CN)
CO2 dynamics and sorption potential in modified rudiments from silica gel and activated carbon: molecular dynamics simulation

W. Jeong, G. Lee, K. Baek (KR)
Assessment of plant growth and translocation of endogenous heavy metals from swine manure biochar under elevated CO2 condition

S. Jung, S.E. Kim, C. Rhee, S.G. Shin, J. Lee (KR)
Effect of magnetite particles on anaerobic digestion of phenolic wastewater under increasing ammonia loads

F. de Aguiar de Linhares, P. Juarez Melo, N.R. Marcilio (BR)
Evaluation of atmospheric emissions and ash generated from co-firing of mineral coal with biomass waste

S. Kim, J. Kim, J.Y. Kim (KR)
Silica recovery from residues of anaerobic digestion of rice husk and rice straw

Y. Ahn, S. Kim, H. Shin (KR)
A study on the method of identifying animal species of crushed recycled leather fiber

E.C. Rada, L. Adami, A. Castellucci, V. Torretta, M. Ragazzi (IT)
Modular gasification of waste

T. Younas, F. Vegliò, M. Prisciandaro, V. Innocenzi (IT)
Assessing risks and safety protocols in the dismantling of lithium-ion batteries

A.L.V. Cubas, S.S.H. Dias (BR)
Energy production from wastewater treatment sludge: a case study of Casan in Santa Catarina, Brazil

S.-J. Lee, S.-U. Jeong, T.-Y. Ryu, J.-Young Lee (KR)
Recirculation of process water in the hydrothermal carbonization of wood waste: a sustainable and carbon neutral strategy

S.M. Yoon, H. Jo, D. Tokmurzin, M.W. Seo, T.-Y. Mun, J.H. Moon, S.J. Park, S.J. Yoon, J.G. Lee, K. Lee, H.W. Ra (KR)
A study on syngas production from low-grade waste plastic pyrolysis oil via oxygen/steam gasification using entrained flow gasifier

S.-Y. Park, H.-T. Kim, J.-Y. Lee (KR)
Emissions trading and carbon removal certification methodologies for biochar

J. Chang, J.-Y. Lee (KR)
Development of machine learning model for predicting the adsorption characteristics of biochar by waste wood

G. Markou, D. Arapoglou, C. Eliopoulos, I. Langousi, E. Kougia, A. Liatiri (GR)
Biogas production from prickly pears cladodes as a sole substrate

T. Kim, S. Kim, J. Kim, J.Y. Kim (KR)
Analysis of sieving and thermo-alkali pretreatment for enhancing methane production from cow manure

P. Basinas, K. Chamrádová, Z. Rybková, J. Rusín, K. Malachová (CZ)
Investigation on the potential of a biological treatment with P. Ostreatus to convert a spent solid anaerobic digestion effluent into a new substrate with significant methane generation capacity

A. Kawamura, M. Akahori, T. Ida (JP)
Continuous production of small-sized bio-coke from adzuki bean harvest residue and its co-firing characteristics with wood pellets

Q. Thabit, V. Ekanthalu, Z. Asiedu, S. Narra (DE)
Aspects and facts of the waste management sector in Ivory Coast

J. Havranová, P. Midula, S. Cernanský (SK)
The potential of autochthonous plants for lanthanoid extraction from mining waste