

***Program***

***Biochar II:***

***Production, Characterization and Applications***

September 15-20, 2019  
Grand Hotel San Michele  
Cetraro (Calabria), Italy

**Conference Co-Chairs:**

**Franco Berruti**, ICFAR, Western University, Canada  
**David Chiaramonti**, RE-CORD, University of Firenze, Italy  
**Ondrej Masek**, University of Edinburgh, Edinburgh, UK  
**Manuel Garcia-Perez**, Washington State University, USA



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**Previous conference in this series**

***Biochar: Production, Characterization and Applications***

**August 20-25, 2017**

**Alba, Italy**

*Conference Chairs:*

Franco Berruti, Western University, London, Ontario, Canada

Raffaella Ocone, Heriot-Watt University, Edinburgh, UK

Ondrej Masek, University of Edinburgh, Edinburgh, UK

## **Sunday, September 15, 2019**

17:00 – 18:30	Conference check-in
18:00 – 19:00	Organizing Committee Meeting
19:00 – 20:00	Welcome Reception
20:00 – 21:30	Dinner

### **Notes**

- Audio, still photo and video recording by any device (e.g., cameras, cell phones, laptops, PDAs, watches) is strictly prohibited during the technical sessions, unless the author and ECI have granted prior permission.
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**Monday, September 16, 2019**

- 07:30 – 08:45 Breakfast
- 08:45 – 09:00 Welcome and Conference Overview
- 09:00 – 09:30 **Plenary 1**  
**Biochar beyond carbon sequestration: Life-cycle emission reductions, nutrient recycling and food security**  
Johannes Lehmann, Cornell University, USA
- 09:30 – 09:45 **Experimental design and testing in a pilot-scale rotary kiln for the torrefaction of beech wood under system restrictions**  
Jorge López-Ordovás, European Bioenergy Research Institute (EBRI), Aston University, United Kingdom
- 09:45 – 10:00 **Farm and laboratory size biochar and heat coproduction in reducing atmosphere compact autothermal pyrolysis reactor**  
Dušan Klinar, Scientific Research Centre Bistra Ptuj, Slovenia
- 10:00 – 10:15 **Small-scale biochar production on Swedish farms**  
Elias Azzi, Environmental Engineering and Sciences (SEED), KTH Royal Institute of Technology, Sweden
- 10:15 – 10:30 **Optimum biochar application rate for improving soil moisture characteristics**  
Ifeoma Edeh, University of Edinburgh, United Kingdom
- 10:30 – 11:00 Coffee Break
- 11:00 – 11:15 **Flame cap kilns for hazardous fuels reduction and biochar application in the western United States**  
Darren McAvoy, Utah State University Forestry Extension, USA
- 11:15 – 11:30 **Influence of feedstock and operational conditions on bio-chars derived from the pyrolysis of selected biomasses**  
David Chiaramonti, RE-CORD and Department of Industrial Engineering, University of Florence, Italy
- 11:30 – 11:45 **Influence of heating rate on the solid yield of biomass pyrolysis**  
Markus Lang, RWTH Aachen University, Unit of Technology of Fuels, Germany
- 11:45 – 12:00 **Effect of pyrolysis conditions on sewage sludge derived biochars for high value composites applications**  
Paola Giudicianni, CNR-IRC Naples, Italy
- 12:00 – 12:15 **Influence of hydrothermal pretreatment on the pyrolysis of spent grains**  
Maciej P. Olszewski, University of Hohenheim, Germany
- 13:00 – 14:30 Lunch
- 14:30 – 18:00 Networking / *ad hoc* sessions
- 18:00 – 18:15 Afternoon Refreshments

**Monday, September 16, 2019 (continued)**

- 18:15 – 18:30      **What if electricity from wood costs two-euro cents / kWh and produces high quality charcoal?**  
Benjamin Hupfauf, Management Center Innsbruck, Austria
- 18:30 – 18:45      **Crab body pyrolysis: Characterization and applications of crab biochar: "A crabby solution"**  
Stephanie MacQuarrie, Cape Breton University, Canada
- 18:45 – 19:00      **Biochar production through combined solar drying & single chamber pyrolysis**  
Dirk J. Weichgrebe, Leibniz Universität Hannover, Institute of Sanitary Engineering and Waste Management (ISAH), Germany
- 19:00 – 19:15      **The Hammenhög biochar plant – residues and by-products to produce biochar and residential heating**  
Ann-Mari Fransson, Swedish Agricultural University; Landscape Architecture, Planning and Management, Sweden
- 19:30 – 21:00      Dinner
- 21:00 – 22:30      Poster Session with Social Hour



**Tuesday, September 17, 2019**

- 07:30 – 08:45 Breakfast
- 08:45 – 09:00 Announcements
- 09:00 – 09:30 **Plenary 2**  
**Biochar - just a black matter is not enough!**  
Andreas Hornung, Institute branch Fraunhofer Umsicht, Germany
- 09:30 – 09:45 **Minerals-carbon interaction during biomass pyrolysis: Implications to biochar carbon sequestration and bioenergy**  
Ling Zhao, Shanghai Jiao Tong University, China
- 09:45 – 10:00 **Sludge transforms into biochar: Doping calcium induces phosphorus transforming into a plant-available speciation**  
Hongyan Nan, Shanghai Jiao Tong University, China
- 10:00 – 10:15 **Mechanism of hydrochar formation from black liquor**  
Elsa Weiss-Hortala, IMT Mines Albi / RAPSODEE UMR CNRS 5302, France
- 10:15 – 10:30 **Characteristic studies on the biochars produced by hydro-thermal and steam gasification of canola hull and canola meal fuel pellets**  
Franco Berruti, ICFAR - Western University, Canada
- 10:30 – 11:00 Coffee Break
- 11:00 – 11:15 **Preliminary study on the influence of pyrolysis process conditions on the textural properties of activated carbons from wheat straw-derived biochars**  
Joan J. Manyà, University of Zaragoza, Spain
- 11:15 – 11:30 **Cultivating Camelina for sustainable aviation fuels in EU med marginal land recovered with co-composted biochar and digestate: Preliminary results**  
David Casini, RE-CORD, Florence, Italy
- 11:30 – 11:45 **Activation of biochar from olive residues: A predictive model for yield and surface area**  
Franco Berruti, ICFAR - Western University, Canada
- 11:45 – 12:00 **Validation and application of a multiparameter model for the densification of biochar**  
Lorenzo Riva, University of Agder, Norway
- 12:00 – 12:15 **NewCarbon Innovation for the production and application of biochar, wood vinegar and energy**  
Marius van der Merwe, NewCarbon (Pty) Ltd., South Africa
- 13:00 – 14:30 Lunch
- 14:30 – 18:00 Networking / *ad hoc* sessions
- 18:00 – 18:15 Afternoon Refreshments

**Tuesday, September 17, 2019 (continued)**

- 18:15 – 18:30      **Biochar in residual ash from gasifier cookstoves**  
Henrik Kofoed Nielsen, University of Agder, Norway
- 18:30 – 18:45      **Production and characterization of HTC solids from lignin-rich biomass  
and downstream application in anaerobic digestion**  
Mingyu Hu, University of Edinburgh, UKBRC, United Kingdom
- 18:45 – 19:00      **Nanoindentation characterization of microwave-pyrolysis biochar**  
Muhammad T. Afzal, University of New Brunswick, Canada
- 19:00 – 19:15      **Changes in pore size distribution with pyrolysis temperature, particle  
aspect ratio and pretreatment by leaching of large beech wood particles**  
Przemyslaw Maziarka, University of Ghent, Belgium
- 19:30 – 21:00      Dinner
- 21:00 – 22:30      Poster Session with Social Hour

**Wednesday, September 18, 2019**

- 07:30 – 08:45 Breakfast
- 08:45 – 09:00 Announcements
- 09:00 – 09:30 **Plenary 3**  
**Commercializing biocarbon and building markets**  
Jamie Bakos, Titan Clean Energy Corp., Canada
- 09:30 – 09:45 **Pyrolysis of organic side stream materials for the production of biochar as an amendment in green roofs: Characterization and field experiments**  
Tom Haeldermans, Hasselt University, Act&Sorb, Belgium
- 09:45 – 10:00 **Core level binding energy for nitrogen doped char: XPS deconvolution analysis from first principles**  
Manuel Garcia-Perez, Washington State University, USA
- 10:00 – 10:15 **Comparative analysis of low nitrogen emissions fertilizers based on activated carbon from residual materials**  
Javier Pallarés Ranz, University of Zaragoza, CIRCE Research Institute, Spain
- 10:15 – 10:30 **Biochar characterization of raw versus spent common ivy: Inorganic nutrient behavior**  
Willem Vercruyssen, Applied and Analytical Chemistry, Hasselt University, Belgium
- 10:30 – 11:00 Coffee Break
- 11:00 – 11:15 **The role of feedstock for biochar and energy in reducing the carbon footprint of bioenergy projects — A case study in North Europe**  
Lydia Fryda, TNO, Netherlands
- 11:15 – 11:30 **UKBRC standard biochar and its use by the global scientific community in its first 5 years of existence**  
Ondrej Masek, University of Edinburgh, United Kingdom
- 11:30 – 11:45 **Artisanal and industrial biochar production and co-composting for acidic mine waste reclamation**  
Gustavo Adolfo Gutiérrez Fernández, Universidad Nacional Autónoma de México, Mexico
- 11:45 – 12:00 **Analysis of peat-based biochar as an additive to control greenhouse gas emissions in manure management systems**  
Josephine Getz, Technological University Dublin, Ireland
- 12:00 – 12:15 **Biochar-mortar composite: manufacturing, evaluation of physical properties and economic viability**  
Harn Wei Kua, National University of Singapore, Singapore
- 12:15 – 12:30 **Biochar based silicon composites for sensors applications**  
Mauro Giorcelli, Politecnico di Torino – DISAT, Italy
- 13:00 – 14:30 Lunch
- 14:30 – 18:00 Networking / *ad hoc* sessions

**Wednesday, September 18, 2019 (continued)**

- 18:00 – 18:15            Afternoon Refreshments
- 18:15 – 18:30            **Post-processing of biochars to enhance plant growth responses: a review and meta-analysis**  
Sean Thomas, University of Toronto, Canada
- 18:30 – 18:45            **Biocidal activity in soils by biochar from pyrolysis biorefinery process**  
Akwasi Boateng, USDA-ARS, USA
- 18:45 – 19:00            **Synergistic effects between nitrogen functionalities and metals content on the removal of phosphate ions**  
Manuel Garcia-Perez, Washington State University, USA
- 19:00 – 19:15            **Assessment of the effect of pyrolysis operating conditions on phytotoxicity and potential as carrier for AM fungi of vine shoots-derived biochar**  
Joan J. Manyà, University of Zaragoza, Spain
- 19:15 – 19:30            **Multi-physical model for describing self-healing mortar containing biochar-immobilized bacteria**  
Harn Wei Kua, National University of Singapore, Singapore
- 19:30 – 21:00            Dinner
- 21:00 – 22:30            Poster Session with Social Hour

**Thursday, September 19, 2019**

- 07:30 – 08:45 Breakfast
- 08:45 – 09:00 Announcements
- 09:00 – 09:30 **Plenary 4**  
**N doped and N-Metal doped biochar catalysis**  
Manuel Garcia-Perez, Washington State University, USA
- 09:30 – 09:45 **Biochar as potting soil constituent and as carrier of Bacillus in the cultivation of Cyclamen**  
Rian Visser, Energy Research Centre of the Netherlands, Netherlands
- 09:45 – 10:00 **Designing activated mineral biochar composites for the adsorption and degradation of emerging contaminants**  
Christian Wurzer, University of Edinburgh, United Kingdom
- 10:00 – 10:15 **Review of biochar application in anaerobic digestion processes**  
Marco Chiappero, Politecnico di Torino, Italy
- 10:15 – 10:30 **Biochar and organic matter co-composting: a critical review**  
David Chiaramonti, RE-CORD and Department of Industrial Engineering, University of Florence, Italy
- 10:30 – 11:00 Coffee Break
- 11:00 – 11:15 **Adsorption of Pb<sup>2+</sup> on magnetic modified hemp biochar prepared using microwave-assisted pyrolysis**  
Muhammad T. Afzal, University of New Brunswick, Canada
- 11:15 – 11:30 **Effect of co-composted charcoal from gasifier plants on plant growth, nutrient uptake and soil fertility**  
Thomas Hämmerle, Management Center Innsbruck, Austria
- 11:30 – 11:45 **Effect of operating conditions on hydrochar production from digestate**  
Lucio Zaccariello, University of Campania "Luigi Vanvitelli", Italy
- 11:45 – 12:00 **Hydrothermal carbonization coupled with ultrasound assisted extraction for recovery of phenolic compounds**  
Pablo J. Arauzo, University of Hohenheim, Germany
- 12:00 – 12:15 **A circular economy approach by co-gasification of water hyacinth and algae bloom for high-quality biochar production**  
Fanghua Li, NUS, Singapore
- 13:00 – 14:30 Lunch
- 14:30 – 18:00 Networking / *ad hoc* sessions
- 18:00 – 19:30 Poster Session and Aperitif
- 19:30 – 22:30 Conference Banquet

**Friday, September 20, 2019**

- 07:30 – 08:45            Breakfast
- 08:45 – 09:00            Announcements and Final Remarks
- 09:00 – 09:15            **Immobilization of heavy metal in contaminated mine technosols using biochar: A phytomanagement strategy**  
Domenico Morabito, Université d'Orléans - LBLGC – INRA, France
- 09:15 – 09:30            **Toxicity screening of different modified biochars on the germination and early seedling growth**  
Muhammad Khalid Rafiq, University of Edinburgh, United Kingdom
- 09:30 – 09:45            **Household biochar production and use by smallholder farmers in Kenya**  
Cecilia Sundberg, KTH Royal Institute of Technology, Swedish University of Agricultural Sciences, Sweden
- 09:45 – 10:00            **Structural and chemical developments of biochar used in horticultural trials for various periods of time**  
Rian Visser, Energy Research Centre of the Netherlands, Netherlands
- 10:00 – 10:15            **Biochar in urban applications**  
Ann-Mari Fransson, Swedish Agricultural University; Landscape Architecture, Planning and Management, Sweden
- 10:15 – 11:30            Coffee Break and Poster Session
- 12:00                        Lunch and Departures

## *Posters*

# ***Biochar II: Production, Characterization and Applications***

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Grand Hotel San Michele  
Cetraro (Calabria), Italy



**Engineering Conferences International**

## Poster Presentations

1. **Biochar micronization and material applications**  
Eveliina Kuokkanen, South-Eastern Finland University of Applied Sciences, Finland
2. **The potential for biochar to mitigate the impact of climate change**  
Naeema Al Nofeli, Durham University, United Kingdom
3. **Effect of biochar addition to metal-contaminated soil on *Phaseolus vulgaris***  
Stéphanie Vandionant, UHasselt, Belgium
4. **Effect of biochar amendment on nutrient fluxes during manure fermentation**  
Oldrich Latal, Agrovyzkum Rapotin Ltd., Czech Republic
5. **Testing biochar as sorbent to decrease samarium mobility in contaminated areas**  
Anna Rigol, Universitat de Barcelona, Spain
6. **Factors affecting the sorption of perfluoroalkyl substances in biochars and other carbon-rich byproducts**  
Anna Rigol, Universitat de Barcelona, Spain
7. **Characterization of tree bark biochar and evaluation of its potential to use in horticultural growing mediums**  
Dilani Rathnayake, Ghent University, Belgium
8. **Chemical stabilization of Cd contaminated soil using fresh and aged wheat straw biochar**  
Dilani Rathnayake, Ghent University, Belgium
9. **Production and characterization of biochar produced from co-pyrolysis of lignocellulosic biomass and plastic mulching sheets**  
Dilani Rathnayake, Ghent University, Belgium
10. **Practical assessment of biochar stability indicators: Sensitivity to feedstock type and production conditions**  
Dilani Rathnayake, Ghent University, Belgium
11. **Point of Zero Charge determination of ten standard biochars for the removal of methylene blue from aqueous solutions**  
Ondrej Masek, The University of Edinburgh, United Kingdom
12. **Biochar activated by nutrient- and microorganisms-enriched liquids as a soil amendment**  
Oldrich Latal, Agrovyzkum Rapotin Ltd., Czech Republic
13. **Green and non-mechanical method for production of colloidal-size biochar from agriculture waste**  
Jiri Holatko, Mendel University in Brno, Czech Republic
14. **Immobilization of heavy metals by microwave torrefaction of sewage sludge with additives**  
Jiri Holatko, Mendel University in Brno, Czech Republic