Program

Biochar: Production, Characterization and Applications

August 20-25, 2017
Hotel Calissano
Alba, Italy

Conference Co-Chairs:

Franco Berruti
Western University, London, Canada

Ondrej Masek
University of Edinburgh, Edinburgh, UK

Raffaella Ocone
Heriot-Watt University, Edinburgh, UK

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ISTITUTO ITALIANO DI TECNOLOGIA

OCONE 1910

BAVA PIEMONTE

TERRE DEI SANTI
Sunday, August 20, 2017

16:00 – 18:00  Registration
17:00 – 18:00  Organizing Committee Meeting
18:00 – 19:30  Welcome Reception
20:00 – 21:30  Dinner

NOTES

- Technical and poster sessions will be in Luigi Calissano.
- All speakers should also bring a poster presentation of their talk that will be displayed the same day as the talk.
- Audiotaping, videotaping and photography of presentations are all prohibited.
- Speakers – Please have your presentation loaded onto the conference computer prior to the session start (preferably the day before).
- Speakers – Please leave at least 3 minutes for questions. Extended discussion will take place at the poster session
- Please do not smoke at any conference functions.
- Turn your cellular telephones to vibrate or off during technical sessions.
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<td>07:30 – 08:30</td>
<td>Breakfast</td>
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<tr>
<td>08:30 – 08:45</td>
<td>Welcome and Conference Overview</td>
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<tr>
<td>08:45 – 09:20</td>
<td>PLENARY</td>
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<tr>
<td></td>
<td><strong>Biochar: From ligno-cellulosic materials to engineered products for environmental services</strong></td>
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<td>Manuel Garcia-Perez, Washington State University, USA</td>
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<tr>
<td>09:20 – 09:40</td>
<td>Thermocatalytic-Reforming (TCR®) and TCR®-biochar properties</td>
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<td>Markus Heberlein, Fraunhofer Institute for Environmental, Safety, and Energy Technology UMSICHT, Germany</td>
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<tr>
<td>09:40 – 10:00</td>
<td>Autothermal biochar production and characterization at pilot scale</td>
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<td>Andrea M. Rizzo, RE-CORD, Italy</td>
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<tr>
<td>10:00 – 10:20</td>
<td>Woody and agricultural biomass diversity in torrefaction: A complete study in solid conversion and volatiles formation on TGA-GCMS</td>
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<td>María González Martínez, CEA Grenoble, LGC - INP Toulouse, France</td>
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<td>10:20 – 10:50</td>
<td>Coffee Break</td>
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<tr>
<td>10:50 – 11:10</td>
<td>Production and characterization of slow pyrolysis biochar from lignin-rich digested stillage from 2nd generation bioethanol production</td>
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<td>Frederik Ronsse, Ghent University, Belgium</td>
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<td>11:10 – 11:30</td>
<td>A three-stage thermochemical conversion process for the production of biochar</td>
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<td>Alessandro Scova, Sea Marconi Technologies, Italy</td>
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<tr>
<td>11:30 – 11:50</td>
<td>Biochar from microwave pyrolysis of selected feedstocks</td>
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<td>Muhammad Afzal, University of New Brunswick, Canada</td>
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<td>11:50 – 12:10</td>
<td>Biochar production through slow pyrolysis of different biomass materials: Seeking the best operating conditions</td>
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<td>Joan J. Manya, University of Zaragoza, Spain</td>
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<td>12:10 – 12:30</td>
<td>Investigation of innovative and conventional pyrolysis of ligneous and herbaceous biomasses for biochar production</td>
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<td>Silvia Fiore, Politecnico di Torino, Italy</td>
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<td>12:30 – 12:50</td>
<td>Pyrolysis of residues from well-established biochemical processes for the production of biochar</td>
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<td>Devon Barry, ICFAR, The University of Western Ontario, Canada</td>
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<td>12:50 – 13:10</td>
<td>Biochar production through hydrothermal carbonization: Energy efficiency and cost analysis of an industrial-scale plant</td>
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<td>Fabio Merzari, Universita’ di Trento, Italy</td>
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<td>13:10 – 14:10</td>
<td>Lunch</td>
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<td>14:10 – 17:00</td>
<td>Networking/ad hoc sessions</td>
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<td>17:00 – 17:20</td>
<td>Afternoon Refreshments</td>
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<td>17:20 – 17:40</td>
<td><strong>Production of activated carbon from barley biochar precursor</strong></td>
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<td>17:40 – 18:00</td>
<td><strong>Activation and mild oxidation of vacuum pyrolysis biochar</strong></td>
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<td>18:00 – 18:20</td>
<td><strong>Modeling of radical structures in biochar using DFT calculations</strong></td>
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<td>18:20 – 18:40</td>
<td><strong>BiocharFX: Production with carbonFX technology, characterization and applications in potting soil related to plant production</strong></td>
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<td>18:40 – 19:00</td>
<td><strong>Biochar production and application in the Intermountain West</strong></td>
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<td>19:00 – 19:20</td>
<td><strong>Biochar: Product development in remote regions from mixed residues</strong></td>
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<td>19:30 – 21:00</td>
<td><strong>Dinner</strong></td>
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<td>21:00 – 22:30</td>
<td><strong>Poster Session with Social Hour</strong></td>
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Tuesday, August 22, 2017

07:30 – 08:30  Breakfast

08:30 – 09:05  PLENARY
Biochar characterization: Standard biochar and the Charchive
Ondrej Masek, University of Edinburgh, United Kingdom

09:05 – 09:25  How to produce a potential high value bio-char from the worst invasive plant in Canada
Chiara Barbiero, ICFAR, The University of Western Ontario, Canada

09:25 – 09:45  Characterization of biochar pore structure with X-ray tomography
Jari Hyväluoma, Natural Resources Institute Finland (Luke), Finland

09:45 – 10:05  Novel bio-char characterization strategies and their use to study the chemical and morphological evolution of material derived from xylan, cellulose and lignin
Manuel Garcia-Perez, Washington State University, USA

10:05 – 10:25  Production of biochar and development of predictive methods for determining performance in value-added composite materials
Douglas Matthew Cuthbertson, ICFAR, Western University, Canada

10:25 – 10:55  Coffee Break

10:55 – 11:15  Off-gassing of charred pellets during storage
Sudhagar Mani, University of Georgia, USA

11:15 – 11:35  Changes in carbon structure distribution and nanostructure of functionalized biochars
Elsa Weiss-Hortala, Rapsodee UMR CNRS, France

11:35 – 11:55  Biochar from gasification in cultivated soils and riparian buffer zones: Chemical characterization
Ivano Vassura, University of Bologna, Italy

11:55 – 12:15  Biochar characterization and EU27 law harmonization: REFERTIL results
Massimo Pugliese, University of Torino, Italy

12:15 – 12:35  Hydrothermal carbonization of sewage sludge: Char characterization and reference to international legislations
Fabio Merzari, University of Trento, Italy

12:35 – 12:55  Hydrous pyrolysis of digestate as alternative to post composting in a biowaste anaerobic digestion facility
Maria Laura Mastellone, Universita’ della Campania Luigi Vanvitelli, Italy

13:00 – 14:00  Lunch

14:00 – 17:00  Networking /ad hoc sessions

17:00 – 17:20  Afternoon Refreshments

17:20 – 17:40  Mobile organic compounds in biochar. Relationships with carbonization degree and bio-oil composition
Daniele Fabbri, University of Bologna, Italy
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<th>Time</th>
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<tr>
<td>17:40 – 18:00</td>
<td>Lab-scale pyrolysis and hydrothermal carbonization of biomass digestate: Characterization of solid products</td>
<td>David Chiaramonti, RE-CORD/CREAR, University of Florence, Italy</td>
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<td>18:00 – 18:20</td>
<td>Physical properties of charred pellets after two months of storage</td>
<td>Sudhagar Mani, University of Georgia, USA</td>
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<td>18:20 – 18:40</td>
<td>Analysis of product distribution and characteristics of bio-oil and bio-char from fast pyrolysis of date palm tree waste</td>
<td>Yassir Makkawi, Department of Chemical Engineering, American University of Sharjah, United Arab Emirates</td>
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<td>18:40 – 19:00</td>
<td>Pyrolysis of cotton stalks and utilization of pyrolysis char for sustainable soil enhancement and carbon storage</td>
<td>Sebastian Schaffer, University of Natural Resources and Life Sciences, Vienna, Austria</td>
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<td>19:00 – 19:20</td>
<td>Multi-technique characterization of biochar formation</td>
<td>Anthony Dufour, CNRS Nancy, France</td>
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<td>19:20 – 19:40</td>
<td>Biochar quality management</td>
<td>Fabian Stenzel, Fraunhofer UMSICHT, Institute Branch Sulzbach-Rosenberg, Germany</td>
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<td>20:00 – 21:15</td>
<td>Dinner</td>
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<td>21:15 – 22:30</td>
<td>Poster Session with Social Hour</td>
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<td>07:30 – 08:30</td>
<td>Breakfast</td>
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<td>08:30 – 09:05</td>
<td><strong>PLENARY</strong>&lt;br&gt;Which policy for biochar deployment in Southern EU? An integrated approach is possible&lt;br&gt;David Chiaramonti, RE-CORD/CREAR, University of Florence, Italy</td>
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<td>09:05 – 09:25</td>
<td><strong>Biochar for remediating contaminated soils: Outdoor experiments in Wales, UK</strong>&lt;br&gt;F. Alayne Street-Perrott, Swansea University, United Kingdom</td>
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<td>09:25 – 09:45</td>
<td><strong>Monolithic biochar as electrode in supercapacitor</strong>&lt;br&gt;Charles Q. Jia, University of Toronto, Canada</td>
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<td>09:45 – 10:05</td>
<td><strong>Biochar for pollutant removal from aqueous solutions</strong>&lt;br&gt;Raffaella Ocone, Heriot-Watt University, United Kingdom</td>
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<td>10:05 – 10:25</td>
<td><strong>Biochar and ash amendment effects on mine reclamation in the boreal forest</strong>&lt;br&gt;Jillian M.H. Bieser, University of Toronto, Canada</td>
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<td>10:25 – 10:55</td>
<td>Coffee Break</td>
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<td>10:55 – 11:15</td>
<td><strong>Agronomic benefits and detriments of using biochar</strong>&lt;br&gt;Carlo Grignani, University of Turin, Italy</td>
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<td>11:15 – 11:35</td>
<td><strong>Evaluating the potential of biochar for reducing bioavailable heavy metal fractions in polluted soil</strong>&lt;br&gt;Rosa Soria Penafiel, University of Sheffield, United Kingdom</td>
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<td>11:35 – 11:55</td>
<td><strong>Carbon sequestration using bio-refinery residues</strong>&lt;br&gt;Ondrej Masek, University of Edinburgh, United Kingdom</td>
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<td>11:55 – 12:15</td>
<td><strong>Biochar addition in the anaerobic digestion of the organic fraction of municipal solid waste for biogas production</strong>&lt;br&gt;Paola Giudicianni, CNR-IRC, Italy</td>
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<td>12:15 – 12:35</td>
<td><strong>Evaluation of the environmental benefits of biochar addition into concrete-based composites</strong>&lt;br.Mauro Giorcelli, Politecnico di Torino, Italy</td>
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<td>12:35 – 12:55</td>
<td><strong>The role of bio-char as an agro-environmental tool: Formation mechanism and potential for control water release, bacterial retention and greenhouse gas emissions</strong>&lt;br&gt;Manuel Garcia-Perez, Washington State University, USA</td>
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<td>17:20 – 17:40</td>
<td><strong>Developing biosensors as monitoring tools to assess the performance of biochar amended contaminated soil</strong>&lt;br&gt;Bastian Saputra, University of Sheffield, United Kingdom</td>
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| 17:40 – 18:00 | Bio char as cheap and environmental friendly filler able to improve polymer mechanical properties  
Alberto Tagliaferro, Politecnico di Torino, Italy |
| 18:00 – 18:20 | A novel solution for utilizing liquid fractions from slow pyrolysis and hydrothermal carbonization - Acidification of animal slurry  
Kimmo Rasa, Natural Resources Institute Finland, Finland |
| 18:20 – 18:40 | Biochar-ammonium phosphate as an uncoated-slow release fertilizer in sandy soil  
Haytham Elsharkawi, CLAC - Agricultural Research Center (ARC), Egypt |
| 18:40 – 19:00 | Microwave characterization and shielding properties of biochar based polymers and cements  
Patrizia Savi, Politecnico di Torino, Italy |
| 19:00 – 20:15 | International Biochar Initiative (IBI) Webinar: Past, present and future of IBI and the biochar industry  
Tom Miles, T.R. Miles Technical Consultants, USA and Kathleen Draper, Ithaca Institute for Carbon Intelligence, USA |
| 20:15 – 21:30 | Dinner                                                                                     |
| 21:30 – 22:45 | Poster Session with Social Hour                                                              |
07:30 – 08:30  Breakfast

08:30 – 08:50  The effects of biochar as a soil amendment on soil quality and plant growth
Ok-Youn Yu, Appalachian State University, USA

08:50 – 09:10  Adsorption of Ammonium (NH4+) Ions onto various Vietnamese biomass residue-derived biochars (wood, rice husk and bamboo)
Hien Nguyen, University of Birmingham, United Kingdom

09:10 – 09:30  Effect of biochar addition on carbon dioxide and nitrous oxide emissions from a temperate agricultural soil
Maren Oelbermann, University of Waterloo, Canada

09:30 – 09:50  Arsenic removal from drinking water by means of low cost biochars derived from miscanthus and coconut shell
Silvia Fiore, Politecnico di Torino, Italy

09:50 – 10:10  Characteristic studies on the waste biomass-based biochars produced by fast pyrolysis
Ajay K. Dalai, University of Saskatchewan, Canada

10:10 – 10:30  The influence of biochar on soil characteristics in a temperate agroecosystem
Maren Oelbermann, University of Waterloo, Canada

10:30 – 11:00  Coffee Break

11:00 – 11:20  Can biochar link forest restoration with commercial agriculture?
Kristin Trippe - Oregon State University, USA

11:20 – 11:40  Thermal evolution of biochar and its physicochemical properties during hydrothermal gasification
Ajay Dalai, University of Saskatchewan, Canada

11:40 – 12:00  Pyrolytic temperature evaluation of macauba biochar for uranium adsorption from aqueous solutions
Ondrej Masek - University of Edinburgh, United Kingdom

12:00 – 13:00  Lunch

13:00 – 18:30 Excursion by bus: Visit to the Castle of Grinzane Cavour and museum (http://www.castellogrinzane.com/en/homepage); the town of Barolo with the Castle and the wine museum (http://www.cellartours.com/italy/italian-cities/barolo.html); the Castle of Guarene (http://www.castellodiguarene.com/) site of the conference banquet.

20:00 – 22:30  Banquet at the Castle of Guarene
Friday, August 25, 2017

07:30 – 08:30  Breakfast

08:30 – 09:05  PLENARY
Overview of biochar for electrochemistry applications
Capucine Dupont, CEA – Grenoble, France

Maren Oelbermann, University of Waterloo, Canada

09:25 – 09:45  Developing a method of accounting for the material use of biomass/biochar and its positive side benefits within the company carbon footprint: A case study at Hochschule Geisenheim University
Georg Ardissone, Hochschule Geisenheim University, Germany

09:45 – 10:05  Biochar economics and the competition for feedstock
Jude Huggan, IBioIC, United Kingdom

10:05 – 10:25  Life cycle assessment of biochar production from southern pine
Sudhagar Mani, University of Georgia, USA

10:25 – 10:45  Behavioral factors affecting the adoption of biochar of farmers in Canada
Maren Oelbermann, University of Waterloo, Canada

10:45 – 11:05  NewCarbon innovation for sustainable agriculture, soil remediation and water / effluent purification
Kristin Trippe - Oregon State University, USA

11:05 – 11:25  Biochars from various biomass types as anodes for sodium-ion batteries
Capucine Dupont, CEA, France

11:25 – 12:30  Coffee Break and Poster Session for Thursday and Friday

12:30  Lunch and Departure
Poster Presentations

1. Biofuel production via dry and wet torrefaction of agro-industrial waste: A comparative study
   Fabio Merzari, University of Trento, Italy

2. Three-dimensional rendering of biochar surfaces from their FESEM images
   Mauro Giorcelli, Politecnico di Torino, DISAT, Italy

3. Production, characterization and application of activated biochar from wood residues
   Flavia Lega Braghiroli, Technology Center for Industrial Waste (CTRI); Research Forest Institute (RFI), University of Québec in Abitibi-Témiscamingue (UQAT), Canada

4. Analysis of total organic carbon in soil-biochar systems
   Daniele Fabbri, University of Bologna, Italy

5. Microwave characterization and shielding properties of biochar based polymers and cements
   Mauro Giorcelli, Politecnico di Torino, Italy

6. Adsorption isotherm determination and heavy metal removal by acid-washed softwood biochar
   Raisa Tjarinto, The University of Sheffield, United Kingdom

7. Biochar for gas sensors devices
   Mauro Giorcelli, Politecnico di Torino, Italy

8. Modifying effect of biochar by mixing it with digestate
   Helena Dvořáčková, Mendel University in Brno, Czech Republic

9. Effect of sulfuric acid pre-treatment on the pyrolysis of sewage sludge
   Nadia Ruiz-Gomez, University of Zaragoza, Spain

10. Preparation of biochar and activated carbon from cocoa pod husk by using microwave as ammonium carrier in urea-based fertilizer
    Fisal Ahmad, Malaysian Cocoa Board, Malaysia

11. The use of a sustainable biochar compost for stabilizing and revegetating metal-mine tailings heaps
    Alayne Street-Perrott, Swansea University, United Kingdom

12. Characterization of biochar from Peko Pe gasifier cookstoves
    Henrik Kofoed Nielsen, University of Agder, Norway

13. Biochar: Soil amendment for the future of tree survival?
    Emma Amber Schaffert, University of Reading, Bartlett Tree Expert Co Ltd, United Kingdom

14. Solar assisted pyrolysis for biochar production
    Paola Giudicianni, Istituto di Ricerche sulla Combustione – CNR, Italy

15. Perspectives in the use of biochars as low-cost CO2 adsorbents
    Paola Giudicianni, Istituto di Ricerche sulla Combustione – CNR, Italy

16. Biochar fracture resistance
    Anthony Dufour, CNRS Nancy, France