

第一届生物炭研究与应用国际研讨会

September 20-23, 2019 Shenyang Liaoning China

## **ABSTRACT**









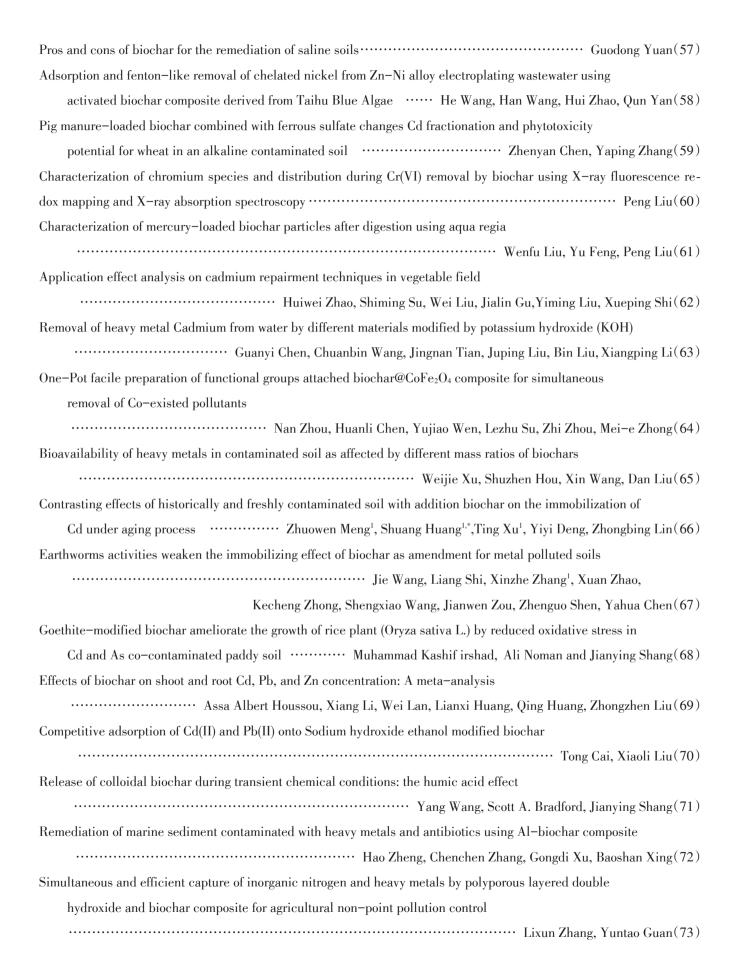


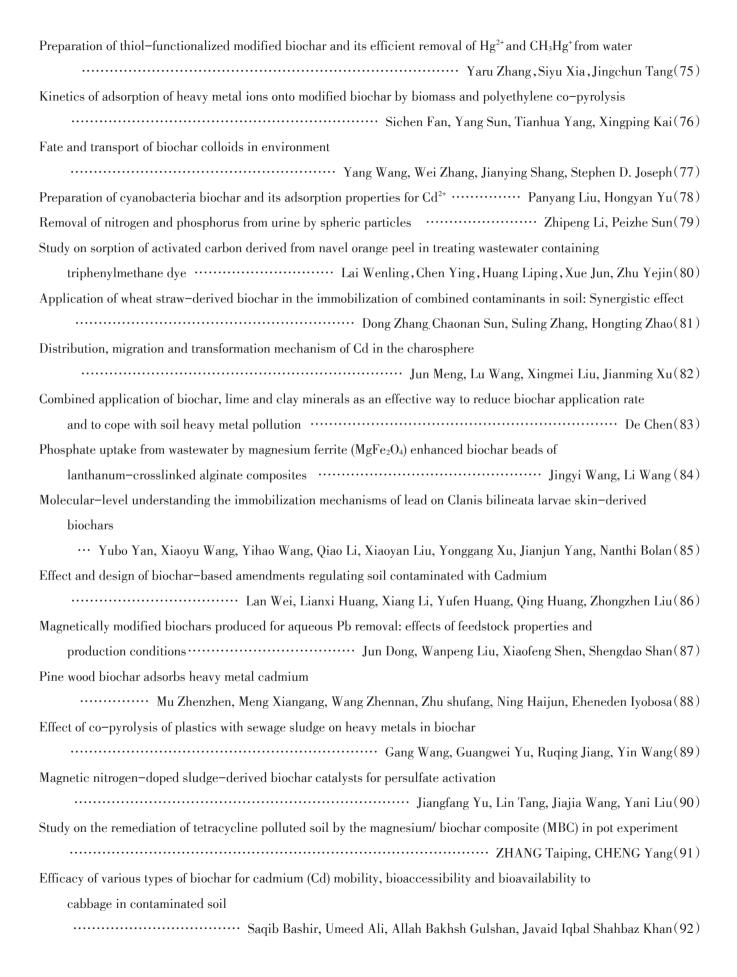
## **CONTENTS**

Hydrochar preparation from biomass waste and its application
Shicheng Zhang (1)
Sustainable functionalization of biochar catalysts for biomass valorization Daniel C.W. Tsang(2)
Preparation of blooming cyanobacteria-plastic composite carbon material by dry process
Lixin Li, Jie Wang, Taojie Liang(3)
Effect of pyrolysis temperature on the physicochemical properties and nutrient characteristics of wheat straw biochar
Guiying Lin, Xianhua Wang, Xuguang Ge, Lezhi Wu, Jingai Shao, Hanping Chen (4)
Preparation and processing of biochar for water pollution control: thermal air oxidized char and torrefaction char
Lichun Dai, Qian Lu, Mei Yang(5)
Removal of phloridzin by chitosan modified biochar prepared from apple branches
Biochar-based catalysts synthesis and application in biorefining
Evaluation of natural building materials with pyrolyzed agricultural by-products for carbon reduction and
energy saving Sungwoong Yang, Sumin Kim(8)
Novel phosphorus recovery from sewage sludge through calcium oxide-enhanced pyrolysis technique
Characterization of tobacco stem biochar produced under varying temperature and retention time
Pyrolysis temperature can affect the efficiency of anaerobic digestion improved by cow manure biochar
Jiangang Pan Yuanyuan Xie, Narisu Ao, Aiai Zhang (11)
Vermiculite modification and carbonization temperature induce changes in stability of biochar derived from rice straw
The potential of preparation and application of Solidago Canadensis Lderived biochar to remediation of
saline-alkali soil
Preparation of biomass carbon composites and it's detection performance of heavy metal ions in soil
Lin chong, Lv he, Zhang zhi, Li li, Shi keying (14)
Characteristics and environmental applications of hydrochars with environmental persistent free radicals



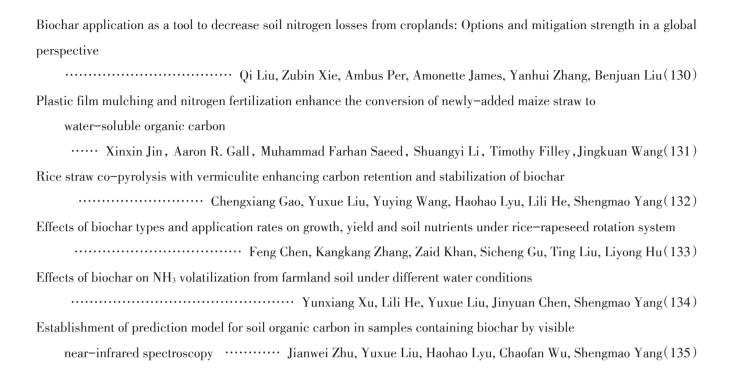






```
Effect of rice straw, biochar and calcite on maize plant and Ni bio-availability in acid Ni contaminated soil of China
    ··· Umeed Ali, Muhammad Shaaban, Saqib Bashir, Qingling Fu, Jun Zhu, Md Shoffikul Islam, Hongqing Hu(93)
Biochar affects the dissolved and colloidal concentrations of As, Cd, Co, Cu, Mo, Ni, and Zn and their
   phytoavailability and potential mobility in a mining soil under dynamic redox-conditions
    ...... Sabry M. Shaheen, A. El-Naggar, and Y. S. Ok, and J. Rinklebe (94)
High-efficiency removal capacities and quantitative sorption mechanisms of Pb by oxidized rape straw biochars
     Effect of organic acid on the stability of heavy metal in biochar passivated soil
    ...... Jiaqing Tang, Jiayu Gao, Ruili Gao, Hongqing Hu(97)
The in-situ remediation of Cadmium and Zinc polluted soil by clay modified biochar
   ..... Lingcong You, Yuying Wang, Yuxue Liu, Hao-Hao Lyu, Jinyuan Chen, Shengmao Yang (98)
Modified composite biochars prepared by co-pyrolysis of corn straw and activated sludge for adsorption of
   methylene blue from aqueous solutions
   ...... Jing Xiang Ying Mi Bin Tian Shuangjiao Gong Yingru Zhou Taowu Ma(99)
Adsorption of organic contaminants by giant reed-derived biochars from aqueous solution
   ····· Guocheng Liu, Chunshu Wang, Yanjun Xin(100)
Hydrothermal conversion of bamboo shoot shell to biochar:
    adsorption equilibrium and kinetics for rhodamine B removal ...... Gege Huang, Yanrui Hou, Jinjun Cai (101)
Potassium-rich biochar as regenerable adsorbent for efficient removal of Thallium(I) from wastewater
    ······ Huosheng Li, Hongguo Zhang, Gaosheng Zhang, Tangfu Xiao (102)
Morphology induced nanotoxicity of ball milled biochar as compared with graphene oxide and
   Effects of glufosinate ammonium on soil respiration under different biochar application
    ····· JIANG Jingbai-lun, MA Wen-qi, LI Dian-peng, JIA Hong-tao (104)
Research on the alkali-acid modified magnetic biochar derived from rice straw and its application in remove
   Biochar accelerates the removal of tetracyclines and their intermediates by altering soil properties
    ····· Yan Yue, Congcong Shen, Yuan Ge(107)
Removal of sulfamethoxazole and metabolite from synthetic hydrolyzed urine by biochar/peroxydisulfate
     ····· Yaxiu Li, Peizhe Sun, Zijiang Wang, Tan Meng, Jingchen Li, Xu Zhang, Ruochun Zhang, Huixin Ma(108)
An old story with new insights into an ignored issue of metabolite in biochar–amended soil: effect of biochars
   on dissipation of cyazofamid as an example ...... Fan Tang, Zhenlan Xu, Guangming Tian(109)
Combination of rhamnolipid and biochar in assisting phytoremediation of petroleum hydrocarbon contaminated
```

Toxicity/bioavailability assessment of pesticide contaminated sediments amended with carbonized sugar beet
pulp and miscanthus ····· Snežana Maletić, Marko Grgić,
Marijana Kragulj Isakovski, Marija Mihajlović, Jelena Petrović, Tijana Zeremski, Srđan Ronćević (113)
Hybrid materials of zerovalent iron nanoparticles-embedded pomelo peel-derived biochar for catalytic
degradation of p-nitrophenol Peng Zhang, Bing Xue, Lujuan Min, Yueli Hao, HongwenSun(114)
Biochar-amendment reduced cotransport of graphene oxide nanoparticles and dimethyl phthalate in
saturated porous media····· Lun Lu, Baoliang Chen(115)
Remediation of organic halogen- contaminated wetland soils using biochar
Liqiang Cui, Chuntao Yin, Guixiang Quan, James A. Ippolito, Jinlong Yan, Cheng Ding(116)
Synthesis of metal-free biochar-based K-doped graphitic carbon nitride composites for the photocatalytic
degradation of polycyclic aromatic hydrocarbon ······ Fayun Li, Meixia Lin(117)
Biochar stability and interactive carbon priming in soil: implications for climate change mitigation
Bhupinder Pal Singh, Yunying Fang, Lukas Van Zwieten (118)
Remediation of petroleum-contaminated soil using biochar immobilized microorganisms
······ Yanjie Wang, Fayun Li, Jiabo Chen(119)
Effects of biochar and calcium peroxide on the emissions of CH <sub>4</sub> , CO <sub>2</sub> and N <sub>2</sub> O in upland red soil
······ Yinghong Yuan, Shaoyun Rui, Ji-hai Zhou, Houbao Fan(120)
Effects of biochar amendment on soil quality, crop yield and greenhouse gas emissions from a rice paddy from
cold region, China ······ Wenjun Dong, Yongcai Lai, Ying Meng, Ao Tang, Xijuan Zhang, Youhong Liu(121)
Biochar as soil amendment and carbon sequestration tool in forests
Marjo Palviainen, Frank Berninger, Kajar Köster, Viktor Bruckman, Jukka Pumpanen (122)
Response of carbon sequestration and microbial community to biochar-amended soils planted with tobacco
······ Jianzhong Cheng, Yuan Tang, Weichang Gao, Yi Chen, Wenjie Pan, Xinqing Lee, Qinghai Zhang (123)
Integrated combination of biochar, inorganic fertilizer, manure and microbial agent variably alters soil
nitrogen fractions ······ Muhammed Mustapha Ibrahim,
Chenxiao Tong, Kun Hu, Qiaolian Zhu, Shihe Xing, Xiaopeng Wang, Yanling Mao (124)
Linking biological fixed nitrogen by groundnut from long term biochar-amended soil to the diversity of
microbial nitrogen fixation
Soil organic carbon associated with aggregate-size and density fractions in a mollisol amended with charred
and uncharred maize straw Song Guan, Sijia Liu, Riyue Liu, Jinjing Zhang, Jun Ren, Hongguang Cai(126)
Effects of straw and biochar returning on soil aggregates distribution and organic carbon content
Effects of corn straw biochar on autotrophic $N_2$ -fixation in calcareous purple soil
··· Junwen Zhao, Qi Tao, Bing Li, Qiquan Li, Qiang Xu, Huanxiu Li, Bin Li, Yulan Chen, Changquan Wang (128)
Biochar effects on native soil carbon stocks five years after application
Xinliang Dong, Bhupinder Pal Singh, Guitong Li, Qimei Lin, Xiaorong Zhao (129)



## Toxicity/bioavailability assessment of pesticide contaminated sediments amended with carbonized sugar beet pulp and miscanthus

Snežana Maletić<sup>1\*</sup>, Marko Grgić<sup>1</sup>, Marijana Kragulj Isakovski<sup>1</sup>, Marija Mihajlović<sup>2</sup>, Jelena Petrović<sup>2</sup>, Tijana Zeremski<sup>3</sup>, Srđan Ronćević<sup>1</sup>

## **Abstract**

Aquatic sediment represents a sink for toxic and persistent chemicals such as hexachlorobenzene (HCB) and lindane  $(\gamma - HCH)$ . This paper investigates the possibility of reducing the environmental risks associated with the presence of these pollutants in sediments by amending the sediment with carbonized waste biomass to sequester the contaminants and render them biologically unavailable. Sugar beet pulp (SB) and miscanthus (M) waste biomass were converted by thermochemical methods: (1) hydrochar (HTC) - hydrothermal carbonation at three temperatures (180°C, 200°C, 220°C) and (2) biochar (BC) - slow pyrolysis up to 400°C. The effects of the dose and contact time between the sediment and the carbon-rich amendments on the effectiveness of the imobilization are estimated. Three doses of carbonized biomass (1%, 5% and 10%), and three equilibration contact times (14, 90 and 180 days) were investigated. Results have shown that the bioavailable fraction of  $\gamma$ -HCH and HCB decreased significantly in comparison to the unamended sediment (from 66.4% for y-HCH, and 74.6% for HCB, to <2% for both compounds). The sequestration potential of amended sediment increases in the sequence HTC\_SB <HTC\_M <BC\_SB <BC\_M. Additionally, the increase in the HTC preparation temperature further increases sequestration potential and reduction of bioavailable fractions both compounds in sediment. The increase in the applied dose and the aging time of the prepared mixtures further reduce the bioavailable fraction, compared to the untreated sediment. Toxicity of amended sediment assessed by Vibrio fishery luminescence inhibition test and by measuring Zea mays germination and biomass yield was significantly reduced in the BC amended sediment and increased in the HTC amended sediment.  $\gamma$ -HCH and HCB accumulation in the Zea mays biomass in the unamended sediment were significantly higher than in the all HTC and BC amended sediment. The obtained results showed that the remediation potential of the produced biochars and hydrochars significantly depends on (1) the feedstock characteristics, (2) the process conditions for the conversion of biomass, and (3) the physicochemical properties of the pollutants.

Keywords: Remediation; Hydrochar; Biochar; Sediment; Hexachlorobenzene; Lindane

**Acknowledgement:** The authors acknowledge the financial support of the Ministry of Education, Science and Technological Development of the Republic of Serbia, in the frame of projects: TR37004 and III43005.

<sup>&</sup>lt;sup>1</sup>University of Novi Sad, Faculty of Sciences

<sup>&</sup>lt;sup>2</sup>Institute for Technology of Nuclear and other Mineral Raw Materials

<sup>&</sup>lt;sup>3</sup>Institute of Field and Vegetable Crops

<sup>\*</sup> Corresponding author. E-mail: snezana.maletic@dh.uns.ac.rs