

19th

INTERNATIONAL CONFERENCE OF

INTERNATIONAL HUMIC SUBSTANCES SOCIETY

Humic Substances and
Their Contribution to the
Climate Change Mitigation



NATURAL
ORGANIC
MATTER
RESEARCH

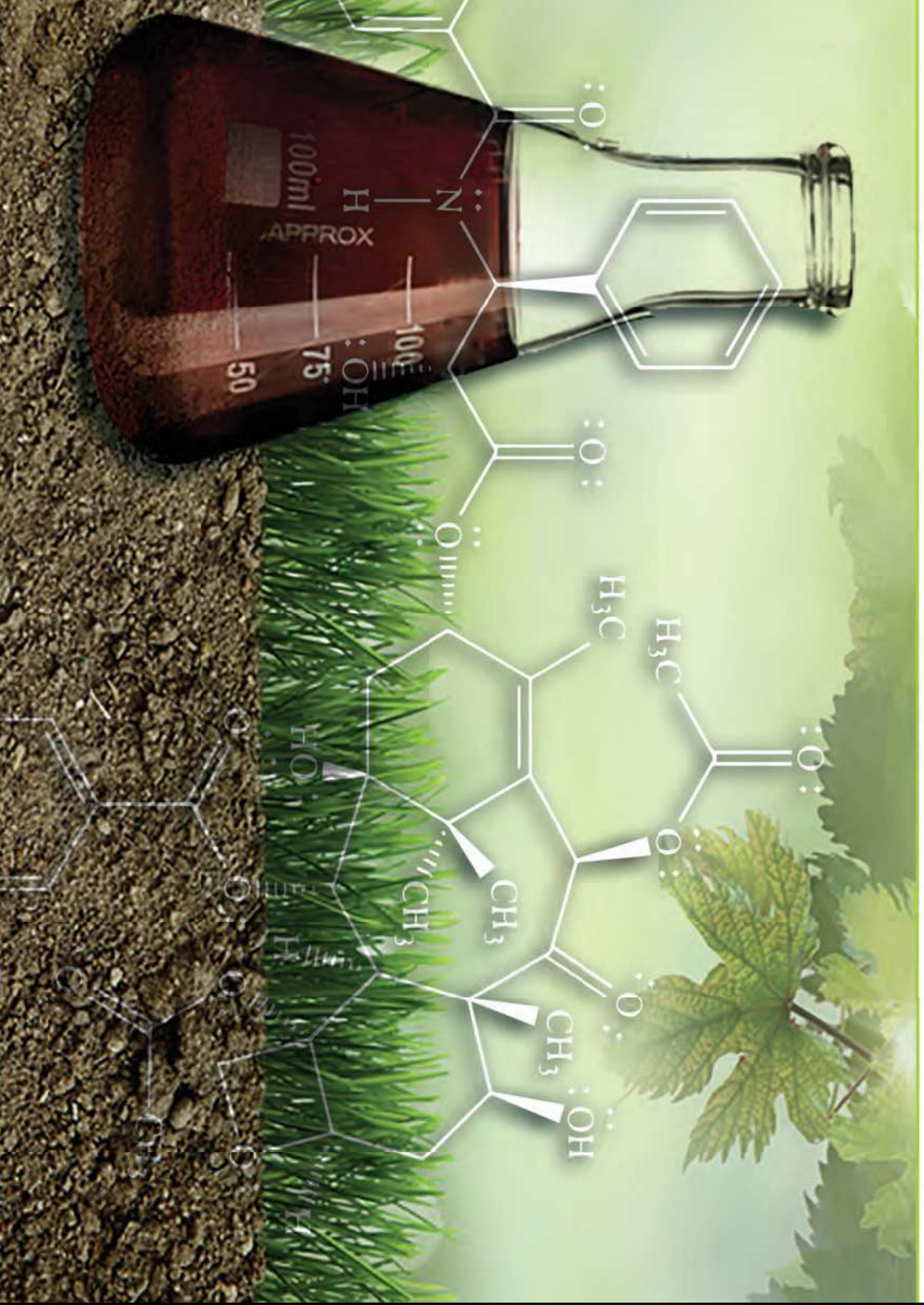


16-21

September

2018

Albena Resort
Bulgaria



BOOK OF ABSTRACTS

BOOK OF ABSTRACTS

19th International Conference

of

**Humic Substances and
their Contribution
to the Climate Change Mitigation**

16–21 September 2018

Albena Resort, Bulgaria

Bulgarian Humic Substances Society
Sofia, 2018



NATURAL
ORGANIC
MATTER
RESEARCH



Editors

Prof. Dr. Ekaterina Filcheva

Members:

Prof. Dr. Maya Stefanova

Prof. Dr. Venera Tsoleva

Assoc. Prof. Mariana Hristova

Assoc. Prof. Rossitza Ilieva

ISBN 978-619-90189-3-4

Bulgarian Humic Substances Society

Sofia, 2018

International Organizing Committee

Chair

Ekaterina FILCHEVA
(Bulgaria)

Vice Chair

Konstantin CHAKALOV
(Bulgaria)

Members

Gudrun ABBT-BRAUN (Germany)	Raymond HOZALSKI (USA)
Paul R. BLOOM (USA)	Heike KNICKER (Spain)
Claudio CIAVATTA (Italy)	Ladislau MARTIN-NETO (Brazil)
Yiannis DELIGIANNAKIS (Greece)	Teodoro MIANO (Italy)
Deborah DICK PINHEIRO (Brazil)	Irina PERMINOVA (Russia)
Fritz H. FRIMMEL (Germany)	Jerzy WEBER (Poland)

National Organizing Committee

Presidents

Ekaterina Filcheva
President of the BHSS

Konstantin Chakalov
Balkan Plant Sciences

Members

Vasil Nikolov	President of Academy of Agriculture, Sofia
Svetla Rousseva	Director of ISSAPP "N. Poushkarov", Sofia
Miglena Zhiyanski	Director of Institute of Forestry, BAS, Sofia
Ilia Iliev	Director of Dobrudja Agricultural Institute, General Toshevo
Ivan Iliev	Rector of University of Forestry, Sofia
Hristina Yancheva	Rector of Agricultural University, Plovdiv
Ivan Pachev	Director of "Institute of Viticulture and Enology", Pleven
Margarita Nankova	Dobrudja Agricultural Institute, General Toshevo
Metodi Teoharov	President of the Bulgarian Soil Science Society, Sofia
Rossitza Ilieva	University of Forestry, Sofia
Maya Stefanova	Institute of Organic Chemistry with Centre of Phytochemistry, BAS, Sofia
Venera Tsoleva	ISSAPP "N. Poushkarov", Sofia
Mariana Hristova	ISSAPP "N. Poushkarov", Sofia
Nikolay Dinev	ISSAPP "N. Poushkarov", Sofia
Tsvetan Kotsev	National Institute of Geophysics, Geodesy and Geography, Sofia
Veselin Koutev	University of Forestry, Sofia
Dilyana Nikolova	Biological Faculty of Sofia University "St. Kliment Ohridski", Sofia
Biser Hristov	ISSAPP "N. Poushkarov", Sofia
Ivona Nikova	ISSAPP "N. Poushkarov", Sofia

International Scientific Committee

Gudrun ABBT-BRAUN (Germany)	Heike KNICKER (Spain)	Toma SHISHKOV (Bulgaria)
Hamada ABDELRAHMAN (Egypt)	Vesselin KOUTEV (Bulgaria)	Donald L. SPARKS (USA)
Irena ATANASSOVA (Bulgaria)	Ladislau MARTIN-NETO (Brazil)	Siobhan STAUNTON (France)
Roberto BAIGORRI (Spain)	Teodoro MIANO (Italy)	Maya STEFANOVA (Bulgaria)
Paul R. BLOOM (USA)	Stéphane MOUNIER (France)	Roger SWIFT (Australia)
Yona CHEN (Israel)	Margarita NANKOVA (Bulgaria)	Caixian TANG (Australia)
Yiannis DELIGIANNAKIS (Greece)	Miroslav PEKAR (Czech Republic)	Etelka TOMBÁ CZ (Hungary)
Maria DE NOBILI (Italy)	Michael E. PERDUE (USA)	Christos TSADILAS (Greece)
Deborah DICK PINHEIRO (Brazil)	Irina PERMINOVA (Russia)	Venera TSOLOVA (Bulgaria)
Ekaterina FILCHEVA (Bulgaria)	Alessandro PICCOLO (Italy)	Ahmet TUTAR (Turkey)
José Antonio GONZÁLEZ-PÉREZ (Spain)	Michael SANDER (Switzerland)	Jerzy WEBER (Poland)
Rossitza ILIEVA (Bulgaria)	Nagao SEIYA (Japan)	Jianming XU (China)
Lyudmila KABAIVANOVA (Bulgaria)	Nikola SENESI (Italy)	Claudio ZACCONE (Italy)

The Organizing Committee expresses its gratitude to the reviewers:

Atanassova Irena
Filcheva Ekaterina
Grudev Stoyan
Hristov Biser
Hristova Mariana
Ilieva Rossitza
Kabaivanova Ludmila
Koutev Veselin
Nankova Margarita

Petkova Galina
Petkova Zdravka
Stefanova Maya
Senesi Nikola
Shishkov Toma
Tsolova Venera
Velizarova Emilia
Zhiyanski Miglena



Dear participants, friends and explorers of humic substances, guests,

On behalf of the Bulgarian Humic Substances Society and the Organizing Committee it is my pleasure to welcome all participants in the 19th IHSS conference. I cordially thank our sponsors and supporters without whom this conference would not be organized in this attractive and memorable way.

This conference will again draw attention of the world scientific community on humic substances and their immense significance for life of the Earth. Today, in the time of climate change, we will also focus our attention on their role in mitigating the negative consequences of human activity. All of us know of the indisputable evidence of phenomena (cataclysms) that have never been observed in the Earth's history, such as the rise in the temperature of the earth and the oceans, the rapid melting of the ice and the subsequent increase in the level of the water basins, their acidification and the extreme climatic storms that affecting all ecosystems and fresh water supplies. Despite a growing number of climate change mitigation policies, annual GHG emissions grew on average by 1.0 gigatonne carbon dioxide equivalent (GtCO₂eq) (2.2%) per year from 2000 to 2010 compared to 0.4 GtCO₂eq (1.3%) per year from 1970 to 2000. Agriculture, Forestry and Other Land Use systems emit for about a quarter (~10–12 GtCO₂eq/yr) of net anthropogenic GHG emissions mainly from deforestation, nitrogen management and livestock (Intergovernmental Panel on Climate Change, 2017).

In the coming days, we will hear many new facts about humic substances and their modern role in preserving life on Earth, and we will be convinced of the ability of science to solve global problems.

I hope this conference to allow the participant to share ideas and experience, to facilitate establishment of new teams for investigation of humic substances and the application of new knowledge in practice.

I wish you a successful work and a pleasant stay in Bulgaria.

Presidents of the Organizing Committee and the Bulgarian Humic Substances Society

Prof. Dr. Ekaterina Filcheva

TABLE OF CONTENTS

PLENARY LECTURES

Bulgarian Humic Substances Society and an overview on humic substances research in Bulgaria.....	17
EKATERINA GEORGIEVA FILCHEVA	
Can humic products substantially improve ecosystem quality and economic yield?	34
D. C. OLK, DANA L. DINNES, J. RENE SCORESBY, CHAD R. CALLAWAY, JERALD W. DARLINGTON	
Humic Substances-Versatile Natural Products: Properties & Applications	44
MD ZAHĪDUL ISLAM, MŪMĪN DIZMAN, OMER FARUK TUTAR, AHMET TUTAR	
Determination of humification degree in peat profiles	53
C. ZACCONE, C. PLAZA, C. CIAVATTA, T. M. MIANO, W. SHOTYK	
Effects of elevated atmospheric CO₂ on soil organic matter: no changes in pools, but increased fluxes and accelerated cycles.....	55
YAKOV KUZYAKOV	

TOPIC 1. “ENVIRONMENTAL CHEMISTRY – DYNAMICS - ROLE OF HUMIC SUBSTANCES AND NATURAL ORGANIC MATTER”

Characterization of soil humic acids, extracted from soil of the Gronfjord area, Svalbard archipelago, by ¹³C NMR spectroscopy	59
E. ABAKUMOV	
Spatial variability of humic acids in agricultural soils and Implications on soil management and carbon sequestration	61
H. ABDELRAHMAN, C. COCOZZA, A. CASTRIGNANÒ, T. MIANO	
Fourier transform infrared spectroscopy analysis of urea intercalated biochar	63
O. O. ADESANWO, J. A. FAGBENRO, M. O. AZEEZ, O. J. OLUBISI	
Separation of the constituents of fulvic acids by HILIC and RP-HPLC	65
M. AOYAMA, D. SAWAME	
Characterization of soil organic matter and PAHs concentration of antarctic soils	67
D. APOSTOLOVA, E. FILCHEVA, A. BECHTEL, K. MARKOVA, I. KOSTOVA	
Influence of the soil type and land use on the amount and quality of soil organic matter	69
G. BARANČÍKOVÁ, J. HALAS, E. TOBIAŠOVÁ, E. GÖMÖRYOVÁ, J. MAKOVNÍKOVÁ, Š. KOCO, R. SKALSKÝ	
The effect of storage time on the aggregation processes of humic acids	71
R. BEJGER, J. CIEŚLA, M. SIENKIEWICZ, A. BIEGANOWSKI, D. GOŁĘBIOWSKA, P. NICIA, R. MATUSZAK-SLAMANI, A. GAWLIK	
Humus content in Chernozems and Kastanozems (chestnut soils) from specially protected areas in Rostov region, Russia.....	73
O. BEZUGLOVA, O. CHERNOVA	
Molecular characterization of cloud water samples collected at the puy de Dôme (France) by Fourier Transform Ion Cyclotron Resonance Mass Spectrometry	75
A. BIANCO, M. VAITILINGOM, E. NICOL, N. CHAUMERLIAC, L. DEGUILLAUME, M. BRIDOUX	
Application of the coupled techniques in thermal analysis (thermogravimetry-mass spectrometry-infrared spectroscopy) to study the structure and thermal properties of humic and fulvic acids.....	77
P. BOGUTA, Z. SOKOŁOWSKA, K. SKIC, K. SZEWCZUK-KARPISZ, M. CYBULAK, A. TOMCZYK	

Interaction between Quantum Dots (CdTe) and humic substances	79
W. G. BOTERO, A. M. B. SILVA, J. C. C. SANTOS, A. D. M. CAVAGIS, L. C. OLIVEIRA, K. R. COSTA	
Electrochemical and structural effects of microbial reduction on peat humic acids in the solid state.....	81
C. BRAVO, R. TONIOLO, M. CONTIN, M. DE NOBILI	
The estimation of changes on carbon stocks in lime applicated maize cultivation upland soil by using net ecosystem carbon budget analysis.....	83
S. R. CHO, J. G. LEE, J. S. TAK, J. Y. LIM, P. J. KIM	
Interaction of humic acid and wheat-straw-biochar native radicals with pesticides	85
I. ĆWIELĄG-PIASECKA, M. JERZYKIEWICZ, A. MEDYŃSKA-JURASZEK, E. JAMROZ	
Humic acids as markers of soil organic matter quality in fire affected soils subjected to a mulching treatment ..	87
J. M. DE LA ROSA, J. J. KEIZER, N. T. JIMÉNEZ-MORILLO, J. A. GONZÁLEZ-PÉREZ, G. ALMENDROS, F. J. GONZÁLEZ-VILA, D. VIEIRA, H. KNICKER	
Quantitative relationships of humic acids parameters and climate of local scales	89
M. DERGACHEVA, N. BAZHINA, O. NEKRASOVA	
Structural features of humic acids extracted from layers of peat stratigraphic column from the West Siberian Marsh according to IR-Expert analytical system data	91
YU. DERYABINA, V. TIKHOVA, T. KORNAKOVA, M. SARTAKOV, E. OSNITSKY	
Soil organic matter and exchange cations composition of clayey soil from Southeastern part of the Sofia valley	93
E. DIMITROV, M. KERCHEVA, T. SHISHKOV, E. FILCHEVA, R. SECHKOVA	
Spectroscopic characterization of fulvic acids isolated from Czech soil and peat	95
V. ENEV, J. RYBÁRIK, L. DOSKOČIL, Š. SOVOVÁ, L. KUBÍKOVÁ, M. KLUČÁKOVÁ	
Chemometrics analysis of different fractions of soil organic matter.....	97
A. P. FERNANDES, M. C. TAVARES, W. G. BOTERO, A. D. M. CAVAGIS, L. C. OLIVEIRA	
Organic matter content and quality of Bulgarian soils	99
E. FILCHEVA	
Quantitative and qualitative characterisation of humic products with spectral parameters	101
E. FILCHEVA, M. HRISTOVA, P. NIKOLOVA, T. POPOVA, K. CHAKALOV, V. SAVOV	
Variability of soil carbon and nitrogen content and quality of humic substances in Norway spruce stands at two contrasting altitudes	103
E. GÖMÖRYOVÁ, G. BARANČÍKOVÁ, E. TOBIAŠOVÁ, D. GÖMÖRY	
Isolation of humic and fulvic acids from the Suwannee river: A report on the 2016 IHSS-sponsored Expedition	105
R. M. HOZALSKI, P. BLOOM, M. PERDUE	
Variability of soil chemical properties in the lands of Chavdar village, Bulgaria	107
B. HRISTOV, N. DINEV, I. NIKOVA, M. HRISTOVA	
The role of organic matter to retention uranium in soils and sediments	109
M. HRISTOVA, R. LAZAROVA, D. STANEVA, I. YORDANOVA	
Micromorphology of toplayer in Bulgarian Anthrosols.....	111
R. ILIEVA, M. ZHIYANKI, B. BANUSHEV	
Comparison of size and molecular mass distributions of humic acids originating from different source matrices	112
M. KALINA, M. DROSSOS, D. SIRUCEK, S. SOVOVA, A. PICCOLO, M. PEKAR	
Thermal properties of clay soils with different humus content from Sofia field.....	114
M. KERCHEVA, K. DONEVA, E. DIMITROV, ST. STOINOV, T. SHISHKOV	
Peat humic substances: composition and influencing factors of their formation.....	116
M. KLAVINS, O. PURMALIS	

Spatial distribution of soil organic carbon after patchy applications of farmyard manure and its changes over time	118
V. KOUTEV, M. VENELINOV, M. NENOV, M. HIMMELBAUER	
The role of lignin phenols in organic-mineral interactions in soils.....	120
I. V. KOVALEV, N. O. KOVALEVA	
Transformation of humic acids by two domain laccase of <i>Streptomyces anulatus</i> at alkaline pH	122
A. LISOV, L. TRUBITSINA, A. ZAVARZINA, Z. LISOVA, I. TRUBITSIN, A. LEONTIEVSKY	
Preliminary investigation into the stimulation of plant growth promoting bacteria (PGPB) by soil amendment with a commercial humic acid	124
K. LITTLE, H. M. GAN, M. ROSE, W. R. JACKSON, T. CAVAGNARO, A. PATTI ¹	
Properties of fulvic acids extracted by two different methods.....	126
D. ŁOMIŃSKA-PLATEK, A. M. ANIELAK	
Soil organic matter management in a tropical low carbon agriculture: Data review and current challenges.....	128
L. MARTIN-NETO, D. M. B. P. MILORI, A. M. TADINI, A. BERNARDI, P. VILLAS-BOAS	
Fluorescence properties of humic substances from Podzols affected by alkali fly-ash blown out from the dumping site of the power plant	130
L. MIELNIK, J. WEBER, M. PODLASIŃSKI, A. KOCOWICZ	
Mudstone and dump organic matter estimate by rock-eval pyrolysis	132
Z. MILAKOVSKA, M. STEFANOVA, G. VLADISLAVOV, K. MARKOVA	
Topsoil alterations influence the genesis and composition of unusual organic-rich speleothems in volcanic caves from the Canary Islands	134
A. Z. MILLER, J. M. DE LA ROSA, M. F. C. PEREIRA, J. A. GONZÁLEZ-PÉREZ, H. KNICKER, C. SAIZ-JIMENE	
Using natural organic matter (NOM) to synthesize magnetic materials applicable for removal of polycyclic aromatic hydrocarbons (PAHs) from seawater and produced water	136
R. V. M. OLIVEIRA, G. C. DA CUNHA, L. P. C. ROMÃO	
Optimized scheme for group analysis and fractionation of peat organic matters	138
S. SELYANINA, O. YARIGINA, T. PONOMAREVA, M. TRUFANOVA, V. TATARINTSEVA	
Mobil components of soil humus on the Barents Sea coast.....	140
E. SHAMRIKOVA, S. DENEVA, O. KUBIK	
Development of the theory of humic substances optical properties formation	142
E. SHIRSHIN, A. ZHEREBKER, S. SHAKIROV	
Trace elements and organic matter composition in leached cinnamonic forest soil from Pernic region in western Bulgaria.....	144
T. SHISHKOV, E. FILCHEVA	
Humic substances and physicochemical characteristic of leached chernozems from the region of Kavarna town in Northeastern Bulgaria.....	146
T. SHISHKOV, E. FILCHEVA, E. DIMITROV	
Study on barrier and transport properties of humic substances towards ionic compounds.....	148
J. SMILEK, P. SEDLACEK, M. KALINA, M. KLUCAKOVA	
Maritsa East lignite humus matter study through AP-TPR-GC/MS.....	150
M. STEFANOVA, S. P. MARINOV, J. CZECH, R. CARLEER, J. YPERMAN	
The existence and importance of humic substances and of humin.....	152
R. S. SWIFT, M. H. B. HAYES	
Humic substances and water-resistant macro-aggregates	154
E. TOBIAŠOVÁ, G. BARANČIKOVÁ, E. GÖMÖRYOVÁ, Š. KOCO, J. HALAS, R. SKALSKÝ, J. MAKOVNÍKOVÁ	

Electrophoresis of soil humic acids – what are electrophoretic zones presents itself?	156
O. TRUBETSKOJ, O. TRUBETSKAYA	
Main chemical and diagnostic features of organic matter in soils from green urban areas of Sofia (Bulgaria) ..	158
V. TSOLOVA, P. TOMOV, G. PETKOVA, I. NIKOVA	
Geospatial distribution of soil organic matter in Bulgaria. I. The Northwest region	160
V. TSOLOVA, V. KRASTEVA, M. BANOVA, V. KOLCHAKOV, N. MITEVA	
Geospatial distribution of soil organic matter in Bulgaria. II. The North Central region	162
V. KRASTEVA, M. BANOVA, V. KOLCHAKOV, V. TSOLOVA, N. MITEVA	
Geospatial distribution of soil organic matter in Bulgaria Part III. The Northeast region	164
M. BANOVA, V. TSOLOVA, V. KOLCHAKOV, V. KRASTEVA, N. MITEVA	
The effect of organic matter composition on PAHs accumulation in soils.....	166
A. UKALSKA-JARUGA, B. SMRECZAK	
Effect of land use on organic matter composition in soil.....	168
A. UKALSKA-JARUGA, B. SMRECZAK	
Molecular composition of humic substances from permafrost peats of European North of Russia as climate change markers.....	170
R. VASILEVICH, E. LODYGIN	
Computational modelling of metal binding by complex organic systems – humic substance models.....	172
E. A. VIALYKH, R. L. COOK, C. H. LANGFORD, D. SALAHUB, G. ACHARI	
The fate of terrigenous organic matter from the Mississippi river delta to the Canyon of the Continental Shelf, Gulf of Mexico	174
S. WARE, D. WAGGONER, P. HATCHER	
Chemical characterization of dissolved organic matter from oilfield produced brines in the western Qaidam Basin, China.....	176
Y. ZHANG, K. YANG, Y. DONG, Z. NIE, W. LI	
Structural investigation of humic substances and natural organic matter using 2D NMR, FTICR MS and optical spectroscopy.....	178
A. ZHEREBKER, Y. KOSTYUKEVICH, E. SHIRSHIN, O. KHARYBIN, A. KONONIKIN, I. V. PERMINOVA, E. NIKOLAEV	

TOPIC 2. “BIOTIC INTERACTIONS – TOXICITY – ROLE OF HUMIC SUBSTANCES AND NATURAL ORGANIC MATTER”

Conformational and structural changes caused by Laccase-enzyme modify the bioactivity of a sedimentary humic acid	183
J. ARANAZ, D. DE HITA, O. URRUTIA, M. FUENTES, G. MONREAL, R. BAIGORRI, J. M. GARCÍA-MINA	
The effect of organic carbon content on mobility and potential bioavailability of trace elements in bottom sediments.....	185
A. BARAN, M. SZARA, M. TARNAWSKI, T. KONIARZ, M. MIERZWA-HERSZTEK, K. GONDEK	
The role of organic matter on pollution content and ecotoxicity of bottom sediments.....	186
A. BARAN, M. MIERZWA-HERSZTEK, K. GONDEK, M. SZARA, M. TARNAWSKI, T. KONIARZ	
Effect of sugars on the structure and morphological features of mixed biofilms.....	187
I. GANCHEV	
Role of biosurfactants of Bacillus subtilis 170 and 168 on mixed biofilm formation	189
I. GANCHEV	

Step-by-step formation of humic-like biologically active substances in the technological process of Lignohumate® synthesis	191
O. GLADKOV, O. YAKIMENKO, O. OSIPOVA, R. POLOSKIN, A. STEPANOV	
Molecular and structural changes in dissolved organic matter in the Critical Zone	193
G. GLEIXNER	
The effect of humic preparation on the microbiological activity of the soil in the case of herbicide application .	195
A. GOROVTSOV, E. POLIENKO, O. BEZUGLOVA, V. LYHMAN, A. DEMIDOV	
Application of activated persulfate for improving alum coagulation performance to remove natural organic matter	197
E. N. HIDAYAH, O. H. CAHYONUGROHO	
Integrity of the use of humic substances (HS) as tracers of biological transformation during storage of treated sludge	199
A. KHAKBAZ, C. BRAVO, M. CONTIN, D. GOI, M. DE NOBILI	
Both (root ABA-Lpr)- and (root IAA-PM H+ATPase)- signalling pathways are crucial in the plant growth promoting action of rhizospheric humic acids	201
M. OLAETXEA, R. BAIGORRI, M. FUENTES, V. MORA, M. GARNICA, L. SPICHAL, A. M. ZAMARREÑO, JM GARCIA-MINA	
Effects of microbial activity and cations on association of selenium with humic substances in deep groundwater	203
M. TERASHIMA, Y. AMANO	
Modification of iron oxide nanoparticles bioactivity by humic acids	205
V. TEREKHOVA, N. CHISTYAKOVA, L. KULIABKO, P. UCHANOV, K. KYDRALIEVA	
The influence of three polyphenols at different pH on the abiotic formation of humic polycondensations	207
J. ZOU, D. YUE	

TOPIC 3. “WATER QUALITY - DRINKING WATER – SURFACE WATERS”

The application of natural organic matter characterization techniques to an Australian drinking water catchment	211
A. AGOSTINO, S. MORADI, H. BUSTAMANTE, R. K. HENDERSON, G. LESLIE	
Antioxidant properties of humic acids in aquatic environments - a thermodynamic study	213
E. BLETSA, Y. DELIGIANNAKIS	
Vermicomposted tannery wastes in the organic cultivation of sweet pepper: growth, nutritive value and production	215
R. M. BONTEMPI, T. S. OLIVEIRA, M. O. O. REZENDE, R. R. NUNES	
Measurement of CDOM distribution in two northern ecoregions by satellite imagery	217
P. L. BREZONIK, R. M. HOZALSKI, L. G. OLMANSON, J. C. FINLAY, C. G. GRIFFIN, M. E. BAUER	
Characteristics and effect of the photo-dissolved organic matter from suspended soil organic matter	219
H. S. LEE, J. HUR, H. S. SHIN	
Removal of metals from seawater using a magnetic hybrid matrix synthesized with natural organic matter (NOM)	221
J. R. A. LIMA, I. A. A. SILVA, G. C. DA CUNHA, L. P. C. ROMÃO	
Thermodynamic study of antioxidant properties of humic acids-nano hybrids in aquatic environments	223
M. LOULUDI, E. BLETSA, Y. DELIGIANNAKIS	
Molecular components related electron donating capacities of Humic substances	225
J. T. LV, S. Z. ZHANG	

Molecular fractionation of dissolved organic matter induced by adsorption on soil mineral.....	227
J. LV, S. ZHANG	
Analysis of the parameters of agricultural viability and environmental impacts in an aquaponic system at farm São João – São Carlos, SP	229
A. A. MALHEIROS, G. RIBEIRO, M. O. O. REZENDE	
Using water hyacinth (<i>Eichhornia crassipes</i>) biochar to remove chromium ions from tannery effluent.....	231
T. H. S. MENEZES, I. A. A. SILVA, J. R. A. LIMA, G. C. DA CUNHA, L. P. C. ROMÃO	
Application of natural organic residues as adsorbents to remove lead from waters	233
L. C. OLIVEIRA, T. S. FARIAS, W. G. BOTERO, A. D. M. CAVAGIS, T. A. CACURO, W. R. WALDMAN	
Protein-like fluorescence of water NOM – the key role of free aromatic amino acids	235
O. TRUBETSKAYA, C. RICHARD, O. TRUBETSKOJ	
Effects of photo-oxidation on dissolved natural organic matter.....	237
R. D. VOGT, J. RAJAKUMAR, E. FÆRGESTAD MOSLETH	
Installation of an injection permeable reaction barrier with the use of silanol derivatives of humic substances for the purification of groundwater.	239
A. VOLIKOV, A. ZHIRKOVA, S. PONOMARENKO, I. V. PERMINOVA	
Dissolution of silver nanoparticles in the environment: interactions with natural organic matter in aquatic systems	241
C. H. WATANABE, R. F. DOMINGOS, M. BENEDETTI, A. H. ROSA	
Seasonal changes of iron in rivers and relation to structural features of humic acids in their sediments of the northwest of Hokkaido, Japan	243
M. YAMAMOTO, H. IWAI, A. YAMAGUCHI, D. LIU	
Assessing the impact of wildfires on the solubility of soil organic matter and formation of disinfection byproducts.....	245
Y. YU, A. RETUTA, F. ROSARIO-ORTIZ	
Assessment of humification indices by monitoring humic products changes using UV-VIS, 2D-FTIR.....	247
Y. ZHANG, D. YUE, W. SONG	

TOPIC 4.
“SOIL PHYSICAL CHEMISTRY –
SOIL FERTILITY”

Subsoil incorporation of crop residues enhances humic acid accumulation and its carbohydrates enrichment .	251
H. ABDELRAHMAN, D. OLK, D. DINNES	
Calcium improve Humic Acid adsorption by soil minerals	253
M. BARRETO, M. RAMLOGAN, A. ROUFF, E. ELZINGA, L. R. F. ALLEONI	
Eco-friendly iron-humic nano-fertilizers tested with ⁵⁷Fe in calcareous soil.....	255
M. T. CIESCHI, A. YU. POLYAKOV, D. S. VOLKOV, V. A. LEBEDEV, D. A. PANKRATOV, I. V. PERMINOVA, J. J. LUCENA	
Labile carbon of manure-based biochar accelerates soil denitrification process and increases N₂O emission	257
Z. DAI, Y. LI, J. XU	
Molecular changes of SOM due to cropping system as revealed by humeomics.....	259
M. DROSOS, A. PICCOLO	
Physico-chemical characterization of commercial lignohumate.....	261
V. ENEV, J. KROUSKÁ, M. PEKAŘ	
Content and composition of SOM after long year’s field experiment at organic vs mineral fertilization	263
M. HRISTOVA, I. MITOVA, N. DINEV	

Application of biological activators and organic fertilizers in a pot experiment with marigold (<i>Calendula officinalis</i> L.)	265
D. IVANOVA, Z. PETKOVA	
Fraction composition of humus compounds and optical properties of humic acids as indicator of quality of soil with biochar amendment	267
M. MIERZWA-HERSZTEK, K. GONDEK, A. BARAN	
Long-term low-input nutrition regime of haplic chernozems and its influence on the productivity of <i>T. AESTIVUM</i> L. cultivars	269
M. NANKOVA, V. SAVOV, K. CHAKALOV, E. FILCHEVA	
Detritus role in soil organic matter formation	271
I. PACHEV	
Test of organic foliar fertilizer made from composted plant residues with manure	273
Z. PETKOVA, D. IVANOVA	
Sequestration of organic carbon (OC) in three agricultural soils by <i>in situ</i> photo-polymerization of humic molecules under biomimetic catalysis	275
A. PICCOLO, R. SPACCINI	
Study of the influence of peat pre-processing on hydrodynamic characteristics of peat humates	277
S. SELYANINA, A. ORLOV, I. ZUBOV, O. YARYGINA, V. TATARINTSEVA	
The effect of organic sludge application on the elemental composition and spectroscopic parameters of soil humic acids	279
K. SKIC, P. BOGUTA, Z. SOKOŁOWSKA, K. SZEWCZUK-KARPISZ	
Decomposition of green and rooibos tea in different soil types investigated by high-resolution NMR and FT-ICR-MS	281
Y. ZHU, A. SMITH, W. BEISHUIZEN, K. CHEN, D. FORSTER, Y. JI, L. KNOX, N. G. A. BELL	

TOPIC 5. “HUMIC BASED TECHNOLOGIES – CROP PRODUCTION”

Effects of percolate recirculation frequency on the organic matter composition after solid-state anaerobic digestion of straw and pig slurry	285
O. CAVALLO, J. M. DE LA ROSA, J. A. GONZÁLEZ-PÉREZ, C. ZACCONE, D. PEZZOLLA, G. GIGLIOTTI, H. KNICKER, M. R. PROVENZANO	
Influence of bio humates on some physiological answer of poinsettia	287
K. CHAKALOV, T. POPOVA, V. SAVOV, G. DELEVA, C. METODIEVA	
Growth and nutritional quality of lettuce plants as affected by humic conditioners	289
D. P. DICK, A. C. BENDER, D. HANKE, E. L. S. DE SÁ	
Soil organic matter under different managements of eucalyptus harvest residues	291
D. DICK, J. MARTINS, C. BAYER, J. SÃO JOSÉ, E. ARAÚJO	
Improvement of ecological condition of soil by natural materials of sorption character	293
L. EPRIKASHVILI, M. ZAUTASHVILI, T. KORDZAKHIA, M. DZAGANIA, N. PIRTSKHALAVA	
Enhancement of the reductive Fe elution from Fe₂O₃ in a seawater-like medium using ascorbic acid with humic acids	295
H. IWAI	
Trade-off of compost utilization on greenhouse gas emission and soil carbon sequestration in whole rice cropping system	297
S. T. JEONG, G. W. KIM, H. Y. HWANG, P. J. KIM	
Changes of soil organic matter caused by EDTA soil washing treatment on PTM contaminated soils	299
E. JEZ, D. LESTAN, C. BRAVO, M. DE NOBILI, M. CONTIN	

The dynamic of change some physical and physico-chemical properties during composting of municipal solid wastes and biomass of energetic plants.....	301
A. KALUŽA-HALADYN, E. JAMROZ, J. BEKIER	
Composite materials for controlled release of nutrients	303
M. KLUCAKOVA, R. KRATOCHVILOVA, P. SEDLACEK	
Application of humic acid in a Malaysian supper large scale field experiment	305
O. KOSTOV, N. T. YE, V. VASILEVA	
Effect of K-Humat (Tki- Hümas) and phosphorus application on maize growth.....	307
A. MOHAMEDELNOUR, E. GÜNERİ	
Three dimensional excitation emission matrix (3D-EEM) fluorescence spectroscopy for soil powder samples without extraction.....	309
Y. NAKAYA, S. NAKASHIMA, M. MORIIZUMI, M. OGUCHI, S. KASHIWAGI, N. NAKA	
Changes in the soil fertility down the profile of Haplic Chernozems as a result from 50-years mineral fertilization	311
M. NANKOVA	
Influence of fulvic acid-containing products on the mineral nutrition and yield of sunflower plants	313
T. POPOVA, R. VASSYLEVSKA, K. CHAKALOV, V. SAVOV	
Effect of humified organo-mineral fertilisers on nitrogen in a soil-plant agroecosystem-A ¹⁵N study.....	315
B. K. SAHA, M. T. ROSE, V. WONG, T. R. CAVAGNARO, A. F. PATTI	
Effect of humic substances on bacterial growth of rhizosphere <i>Pseudomonas</i> strains and their impact on plants	317
V. SAVOV, T. GEORGIEVA, Y. EVSTATIEVA, D. NIKOLOVA	
Reuse of fish farming water for the irrigation of plants with economic interest: a project to recycling organic matter in favor of social development in the Brazilian Northeast	319
A. V. T. SILVA, H. B. MAIA, R. A. S. MENDES, L. P. C. ROMÃO, M. O. O. REZENDE, R. R. NUNES	
Evolution of maize residues into SOM in a study of two years incubation.....	321
G. X. SONG, E. H. NOVOTNY, M. H. B. HAYES	
Humic products in agriculture and remediation technologies: chemical properties, biological activity and affectivity in laboratory and field experiments	323
O. YAKIMENKO, V. TEREKHOVA, M. PUKALCHIK, A. STEPANOV	
Effect of aluminum complexation on degradation of humic acid by humus-decolorizing fungus and H₂O₂.....	325
Y. YANAGI, K. YOSHIDA, N. MATSUO	
Extraction of fulvic-acid-like compounds from mushroom (<i>Lentinus Edodes</i>) bed waste and their effect on plant growth.....	327
S. YOSHIZAWA, Y. HASHIKAWA, H. YAJIMA, R. TOMOI, Y. HIDAWA	

WINNERS OF TRAVEL AWARDS

Molecular evolution of ageing dissolved organic matter in forest soils.....	331
S. BENK, Y. LI, V. ROTH, G. GLEIXNER	
Evaluation of humic substances from hydrochar and of Anthrosols profile (Amazonian Black Earth) by spectroscopic techniques.....	333
L. R. BENTO, C. A. MELO, A. B. MOREIRA, O. P. FERREIRA, M. C. BISINOTI	
Effect of temperature and humic substances on initial bacterial adhesion to reverse osmosis membranes.....	335
S. BINAHMED, S. R. CASTRILLÓN, R. HOZALSKI	
Lability and spectroscopic characteristics of dissolved organic matter from Amazonian rivers	337
I. C. CONSTANTINO, A. M. TADINI, S. MOUNIER, A. B. MOREIRA, M. C. BISINOTI	

Production of hydroxylating species from DOM model sensitizers	339
K. D. COUCH, G. MCKAY, F. L. ROSARIO-ORTIZ	
Use of iron mining waste and natural organic matter (NOM) in the synthesis of magnetic hybrids for remediation of chromium and nitrophenol	341
D. CRUZ, B. SANTOS, I. SILVA, G. CUNHA, L. ROMAO	
The specific role of endophytic microbiome in the mechanism of action of humic substances as plant growth promoters	343
D. DE HITTA, M. FUENTES, J. M. GARCÍA-MINA	
Influence of feed additives of humic nature on coagulation disorders in laboratory rats after combined stress.....	345
L. M. DIACHENKO, L. M. STEPCHENKO	
Hydrochar and process water from hydrothermal carbonization of sugarcane industry by-products: germination studies and humic substances characterization.....	347
L. G. FREGOLENTE, F. S. MAZATTI, J. V. DOS SANTOS, A. B. MOREIRA, O. P. FERREIRA, M. C. BISINOTI	
The molecular composition of humic acids, as reflected by FTICR-MS, varies systematically in terms of the total C storage of the corresponding soils	349
M. A. JIMÉNEZ-GONZÁLEZ, D. WAGGONER, A. M. ÁLVAREZ, F. J. GONZÁLEZ-VILA, P. HATCHER, G. ALMENDROS	
Dissolved organic matter diversity in Antarctic lakes and streams (Soya Coast, East Dronning Maud Land)...	351
M. KIDA, T. KOJIMA, Y. TANABE, K. HAYASHI, S. KUDOH, N. MAIE, N. FUJITAKE	
Low molecular weight organic acids of peat permafrost-affected soils	353
O. S. KUBIK, E. V. SHAMRIKOVA, D. A. KAVERIN, A. V. PASTUKHOV, V. V. PUNEGOV	
Upgrading from the lab to a pilot plant and an industrial bath process in the production of biochar from three types of Brazilian biomasses residues.	355
T. T. S. MATOS, J. SHULTZ, E. M. C. CARDOSO, M. R. FORNARI, L. P. C. ROMÃO, R. O. C. RIBEIRO, A. S. MANGRICH	
Thermally treated sewage sludge: a humic substance precursor with the potential to serve as phosphate fertilizer?	357
M. PANEQUE, J. M. DE LA ROSA, J. KERN, H. KNICKER	
A cost effective and slow release humified organo-mineral fertilisers for increasing nitrogen use efficiency and crop yield	359
B. K. SAHA, M. T. ROSE, V. WONG, T. R. CAVAGNARO, A. F. PATTI	
Supramolecular organic matter assembly in light of multidetector data analyses	361
U. J. WÜNSCH, E. ACAR, K. R. MURPHY, C. A. STEDMON	
POSTER PRESENTATIONS.....	363
AUTHORS INDEX.....	369