INTERNATIONAL HUMIC SUBSTANCES SOCIETY

NEWSLETTER

Number 58 4th Quarter 2019

Dear members of the IHSS, dear colleagues and friends:

It is my pleasure to send you our 58th Newsletter, and to share new information about recent and upcoming events and other important issues.

This year, the younger IHSS members had the possibility to apply for training awards. The IHSS has supported 9 young researchers to accomplish training visit in host labs. Almost all of them have accomplished their training and visits abroad, and of the reports are given in this and the forthcoming newsletter.

This year, IHSS has been involved and has participated in several international meetings with special sessions and contributions. It is our aim to increase the visibility of the IHSS and to attract researchers to join our society. Many thanks to our members who organized national and international conferences.

The good functioning of a society depends on its officers and the members.

We will start the collection of the dues for the upcoming year 2020 on January 1st, 2020. By this, you will receive a letter via email with all the details for renewal. We urgently ask you to renew for the year 2020, and to contact us, if there are any problems with registration or with payment. Please notice that, you can take advantage from the multiyear membership option. This multiyear membership allows IHSS to consolidate the members interest and design the supporting actions for your researchers and conferences.

In February, you will have the possibility to vote new Members of the Board. The positions of the Vice President, of one Board Member and the Secretary of the Society have to be renewed. The list of the candidates and the candidates' statements are attached to this Newsletter. The Election Nomination Committee is chaired by Professor Seiya Nagao (Japan) including additional 3 members: Prof. Mónica P. Antilén (Chile), Prof. Patrick Brezonik (USA), Prof. Elsbieta Jamroz (Poland). As done during the last years, online voting will be performed. On the following pages you can read further details for the election process.

Save the date for the upcoming 20th International Meeting in 2020, which will be organized by our USA colleagues, led by the local chairperson Professor Fernando Rosario-Otriz and Professor Ray Hozalski, from August 16 - 21, 2020. The meeting will take place in the Estes Park at Boulder Colorado. You will find detailed information of the meeting "20th Conference of International Humic Substances Society" on the conference webpage **https://ihss2020.org/** and in this newsletter.

As done in the years before, the IHSS will fund travel support awards for students to attend the 20th IHSS conference. We invite all interested young scientists to have a look at the announcement, which is published at our webpage. The deadline is January, 31st, 2020. The applications have to be sent to the Vice President Jose-Mari Garcia Mina.

I wish you a peaceful and happy New Year 2020

Yiannis Deligiannakis
President of the IHSS

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BOARD ACTIVITIES

Board Meeting in Maceio, Brazil

The Board of Directors of IHSS held a board meeting during October 24 - 26, 2019 in Maceió, Brazil, where several pending issues were discussed.

The Board of Directors at work

The Board of Directors during a break

Membership report

Compared to 2018, the overall membership numbers did not change. However, those numbers derive from members who paid until December 2019, many of those have not paid for 2020, yet. Reminder letters will be send, since membership is a requirement to be eligible for participating in the 2020 election. In addition, the Board of Directors decided that for administrative reasons, national chapters will be maintained only if their member numbers are 5 and larger.

Sponsoring meetings and symposia

Since the Board meeting in 2018, 4 meetings or symposia were sponsored by the IHSS. The Board of Directors recognizes the positive impact of this IHSS sponsorships and suggested to encourage organizers of meetings related to the subjects of IHSS to ask for

sponsorship or special IHSS sessions. Some reports of the meetings and the symposia are given within this NL 58.

Report on the Young Investigator Research Grant

In 2018, two IHSS Young Investigator Research Grants were awarded for the first time. After the initial phase, during which the Board of Directors collected experiences, it was decided that the IHSS will continue with **one call every two years**. The call will be launched after the international meetings. Thus, the next call will be after the 20th IHSS meeting in Estes Park in 2020.

IHSS and the definition of humic material in the SSSA glossary

The Soil Science Society of America Glossary provides definitions of humic substances, which had to be approved by Board of Directors. The following definitions were chosen:

Humic substances are complex and heterogeneous mixtures of polydispersed materials formed by biochemical and chemical reactions during the decay and transformation of plant and microbial remains (a process called humification). Plant lignin and its transformation products, as well as polysaccharides, melanin, cutin, proteins, lipids, nucleic acids, fine char particles, etc., are important components taking part in this process. These materials are distinctive to soil environments in that they are dissimilar to the biopolymers of microorganisms and higher plants (including lignin). See also humic acid, fulvic acid, and humin.

Fulvic acid is the hydrophobic resin-adsorbable fraction of the organic material that remains in solution after removal of humic acid from a dilute alkaline soil extract by acidification.

Humic acid is the dark-colored organic material that can be extracted from soil with dilute alkali and other reagents and that is precipitated by acidification to pH 1 to 2.

Humin is the fraction of the soil organic matter that cannot be extracted from soil with dilute alkali.

The text of our **webpage** and in **Wikipedia** will be changed accordingly.

Special IHSS webpage with references of publications related to humic substances

The Board of Directors decided to create a special webpage with links to literature related to humic substances. A topic list will be prepared and included in a call, encouraging IHSS members to suggest references according to this topic list. The references (not the total article) will be send to the secretary and after approval by the Board of Directors the reference will be available at the IHSS webpage.

Sampling collection, increase of the costs for samples for non-members

Paul Bloom, chairman of the Collection Committee, presented a detailed report concerning annual sales for the year 2020. In the first 9 months of 2019, the sales have dropped off, mainly due to the decrease in sales of soil HA and FA. Our humic products were sent to 29 different countries with China (including Hong Kong). The US and China account for almost 2/3 sales. As in past years, the size of orders from Asia were typically larger than those from Europe and North America.

In order to make it more attractive to become member of the IHSS, the Board of Directors decided to increase the price of the IHSS samples by 10% for non-members. Technically, the membership shall be proven by providing a screenshot of the membership. The buyer can already indicate during the buying process his eligibility for reduced prizes, but in order to validate the order, the membership has to be proven by providing a screenshot of the member-webpage. The screenshot may be mailed by email within a certain time. Of course this change will be indicated at the selling webpage.

There were several request from clients for updated analytical data of the samples from the collection. Therefore, the Board of Directors plans to coordinate new analyses which shall be made available to the public.

Financial report

The treasurer presented the financial report for 2018 and 2019. Even with the additional expenses of the two YI-grants, the society still has a good financial standing. The Board of Directors approved the financial report.

Heike Knicker
IHSS Secretary

IHSS TRAINING AWARDS 2019

Report on the IHSS Training Awards 2019

This year, IHSS could award 9 young researches out of 21 applicants with the IHSS Training Award which started in 2005 and is announced each second year.

In total, 21 applications were submitted from 12 countries:

Brazil (4), Chile, Colombia, China (2), Israel, Italy (2), Nigeria (4), Russia, Spain (2), Sweden, Tunisia, and USA. Applications were given a score by each member of the evaluation-committee according to the following general guidelines:

a) proposal quality (0 to 12),
b) IHSS membership of the applicant, home supervisor and host supervisor (0 to 3).

After evaluation and discussion, the IHSS Board of Directors agreed to give funding to 9 applicants (further details in the Table, hereafter). The 21 applicants had a score between 7.5 and 13.7 (max. 15). The 9 awardees had a score between 12.0 and 13.7 (max. 15). The 9 awardees were funded by a total about 38 000 USD.

We will keep you informed about the ongoing work of the young researches in the next newsletters. Therefore, the winners of the training award have been asked to submit a technical short report suitable for publication in this and forthcoming IHSS Newsletters.

Many thanks to the Training Awards Committee-2019, consisting of Deborah Dick, Jose-Maria Garcia Mina and Maria Jerzykiewitz and which was chaired by the IHSS President Yiannis Deligiannakis for the reviewing work.

Yiannis Deligiannakis
President of the IHSS

Winners of the Training Award 2019

IHSS Training Award 2019 winners	***Name of Home Institution***	***Name of Supervisor***	***Name of Host Institution***	***Name of Host***
Adejumo Gbenga	Obafemi Awolowo University, Nigeria	O. O. Adesanwo	Department of Chemistry, Moscow Stat Univ, Russia	Irina V. Perminova
Bravo Carlo	Dep Agricultural, Food, Environmental and Animal Sciences, Univ. Udine Italy	Maria de Nobili	Embrapa Instrumentation Center, Sao Carlos, Brazil	Ladislau Martin-Neto
Campos Díaz de Mayorga Paloma	Instituto de Recursos Naturales y Agrobiología de Sevilla Spain	José María de la Rosa	Università degli Studi di Bari “Aldo Moro”. Italy	Teodoro Miano
dos Anjos Leal Otávio	Catarinense Federal Institute of Technology, Science Education, Brazil	Deborah Pinheiro Dick	Instituto de Recursos Naturales y Agrobiología de Sevilla, Spain	Heike Knicker
Giannetta Beatrice	University of Foggia, Italy	Claudio Zaccone	Institute of Agricultural Sciences, Spain	César Plaza
Kulyabko Lyubov	Moscow Aviation Institute, Faculty of General Engineering, Russia	Kamila Kydralieva	University of Szeged, Dep Colloid Chemistry, Hungary	Etelka Tombácz
Olubilisi Oluwasegun	Obafemi Awolowo University, Nigeria	O. O. Adesanwo	UFRGS - Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil	Deborah Pinheiro Dick
Paneque Carmona Marina Concepción	Instituto de Recursos Naturales y Agrobiología de Sevilla Spain	Heike Knicker	UMR CNRS Biogéosciences. Dijon, France	Olivier Mathieu
Pereira de Morais Carla	EMBRAPA Instrumentation centrer, Sao Carlos, Brazil	Débora M.B.Pereira Milor	Université de Toulon, France	Jean Louis Stéphane Mounier

Yiannis Deligiannakis

President of the IHSS

CALL FOR IHSS TRAVEL SUPPORT AWARD FOR THE 20TH IHSS MEETING IN ESTES PARK, COLORADO

Aim

The aim of the IHSS Travel Support Award is to allow graduate students to present their work and participate in the 20th biennial International IHSS Meeting.

Since IHSS began to support student travel to its meetings in 1996, 6 to 20 students *per meeting* have received Travel Support Awards. Those students represent universities from more than 30 countries. A list of past recipients is maintained on the IHSS website *(http://humic-substances.org/wp-content/uploads/Recipients-of-Travel-Awards.pdf).*

Conditions

IHSS Travel Support Awards will be granted only to graduate students, who are members of IHSS and have not previously received this award. Investigators who have completed their PhD degrees before submitting this application are not eligible. **Priority is given to candidates whose supervisor is an active member of IHSS.**

The award covers the conference fee (including excursion and banquet). In addition, the recipients will receive a fixed stipend for accommodation, and other costs, and a fixed sum to cover travel costs (economy ticket). The IHSS Treasurer will make payment directly to the Conference Organizing Committee for the awardee's conference fee, excursion and banquet. The stipend and the fixed sum for travel costs are refunded before the conference (receipts are required).

Recipients of IHSS Travel Support Awards will be honored at the conference banquet, where they will receive certificates and one-year memberships in IHSS. They have the possibility to present their research as oral and as poster presentation.

Evaluation Process

Applications will be evaluated and ranked by the IHSS Travel Support Award Committee, considering primarily the quality and originality of the scientific content of the manuscript and the applicant's record of scientific achievement. The application should demonstrate that the student has had a major part in designing and conducting the research and wishes to pursue a career in a field in which humic substances science is important. The recipients of Travel Support Awards will be notified well in advance of the conference registration deadline.

Malcolm Award

The most outstanding applicant for a Travel Support Award, as determined by the IHSS Travel Support Award Committee, will also receive the Malcolm Award, which is given in memory of Dr. Ronald Malcolm – the first president of IHSS. The Malcolm Award includes a certificate and a check for 250 US$.

How to apply

An application for a Travel Support Award must include:

1. The application form for IHSS Travel Support Awards (http://humic-substances.org/awards/)
   (an example is available at http://humic-substances.org/wp-content/uploads/Travel-Award-example.pdf),
2. a one-page curriculum vitae (see the application form for details),
3. a letter of evaluation and a signed approval for the proposal including the budget from the applicant's main supervisor,
4. an abstract of the paper to be presented (maximum of 2 pages),
5. an itinerary and estimate of travel costs to attend the meeting (short table for the travel schedule, and copies from a travel/airline website or travel agency).

The entire application must be submitted in a single pdf-file by January 31st, 2020

to the Vice President of IHSS

Dr. José María Garcia-Mina (jgmina@unav.es)

UPCOMING ELECTIONS IN 2020

According to the IHSS-Bylaws (Article VI, Nomination and Elections) the next elections will be held within January and February of 2020. Note that you are only eligible to vote if you are IHSS member. Thus, it is strongly recommended to renew your membership in time (see below).

The positions to be elected are:

Vice President (term 2020 - 2022)
Board Member (term 2020 - 2024)
Secretary (term 2020 - 2024)

They will start their position at the upcoming international meeting of the IHSS 2020. After completion of two years of service, the Vice President will continue as President for two years. After that, the President shall continue to serve on the Board for two additional years as Past President.

The President has appointed the new election Nominations Committee. Members of the Committee are:

- **Seiya Nagao,** Institute of Nature and Environmental Technology, Kanazawa University, Japan
- **Monica Antilen,** Inorganic Chemistry Department, Pontificia Universidad Católica de Chile, Chile
- **Patrick Brezonik,** Civil, Environmental, and Geo Engineering, University of Minnesota, MN, USA
- **Elsbieta Jamroz**, Wroclaw University of Environmental and Life Sciences, Institute of Soil Science and Environmental Protection, Wrocław, Poland

Seiya Nagao acts as chairperson of the Nominations Committee, Heike Knicker (secretary of IHSS) is the designed officer of the Board.

Members have been invited to send candidate names to the committee through their chapter coordinators or directly to the committee until November 31st 2019. Finally, the committee presented a list of candidates. The nominated candidates are listed below.

Candidates for Vice President

- **Etelvino Novotny, Brazil**
- **Irina Perminova, Russia**

Candidates for Board Member

- **Fernando Rosario-Ortiz, USA**
- **Claudio Zaccone, Italy**

Candidates for Secretary

- **Hamada Abdelrahman, Egypt**
- **Marios Drosos, China**

The candidates' statements and CV's are attached to this NL.

You will have one vote for the position "Vice President", one vote for the position "Board Member", and one vote for the position "Secretary".

For the election, the Society offers you the convenience of on-line balloting. You will receive an email, that balloting is open until midnight on February 29, 2020.
Instructions are on the first page, and you can download or print the instructions, election information, and ballot for study and consideration before voting online. To vote you will need your:

- Username (the e-mail address we have for you) and your password (member ID).

Yiannis Deligiannakis
President of IHSS

MEMBERSHIP RENEWAL FOR 2019

The time has come to renew your membership in the International Humic Substances Society. This membership renewal serves a dual purpose:

[i] to update your support to our Society's actions in the forthcoming years,

[ii] to entitle you with all the benefits stemming from this membership.

***The renewal process is quite simple and fast*:** To renew online you need a username (your email address) and your password (your IHSS member ID or your individual password).

Use this link http://www.humic-substances.org and go to "login". You have to enter your username and password into the Login window. **If you do not remember your password (ID) you will be able to update your password with "Reset Password".**

Once entered your personal web space, click on "Subscriptions" and then on "Renew". As you ll see from 2019-on there is a **multiyear membership payment option**. This is an update of our online payment system aiming to facilitate the membership payment process. Since the membership fee is rather symbolic, your multiyear membership registration will save you time, bank-transfer costs and –most importantly- will consolidate your IHSS membership.

After payment of the dues for 2020 you will have full access to all functions and tools of the platform. Please remind to correct and update your address and professional affiliation, etc., if needed. We urge you to renew online, but if you do not have access to a credit card you should pay your dues to your chapter coordinator, go to http://humic-substances.org/ihss-chapter-coordinators/ to find where to send your dues.

Please encourage your students and colleagues to go to http://humic-substances.org/login/ and become a members (at "Register" first).

Yiannis Deligiannakis
President of the IHSS

CALL FOR MEMBERSHIP AWARD 2020

Coordinators of Regional and National Chapters demonstrating **increasing membership** numbers for two or more years are encouraged to apply **for consideration of an award** of **one registration fee** that can be awarded to one member from their chapter to attend **the next international IHSS** meeting. **Applications shall be sent to the IHSS president**

Yiannis Deligiannakis (ideligia@cc.uoi.gr).

And in copy to the secretary:

Heike Knicker (knicker@irnase.csic.es)

The applicant should provide **a description of activities** resulting in the increased membership. The decision will be made by the board of directors.

PAST MEETINGS

17th International Conference on Chemistry and the Environment in Thessaloniki, Greece, June 16-20, 2019

The ICCE conferences take place every second year; in 2017, it took place in Oslo. The ICCE meetings address scientists in the academia, industry and in governmental institutions. This year about 500 participants from more than 70 countries joined the meeting in Greece. Professor Ioannis Katsoyiannis holds the Chair of ICCE 2019.

Five plenary and 29 keynote lectures as well as five satellite events were part of the conference. As started during the meeting in 2017, IHSS could also take part in the meeting of Thessaloniki with a special session on “Humic Substances”.

The meetings had several sessions, among them “Innovation in drinking water treatment”, and “Oxidation and advanced oxidation processes in water and wastewater treatment”, which also included topics of the technological and engineering issues of humic substances and NOM.

Yiannis Deligiannakis and Gudrun Abbt-Braun have been the Conveners of the Session „Humic Substances: environmental dynamics and impact on water quality “. In our session, we had two keynote contributions from Gudrun Abbt-Braun and Norbert Hertkorn, and seven oral presentations. The session was attended by about 50 participants, and the discussions showed that the interest in humics is very broad.

Yiannis Deligiannakis introduced the IHSS and gave a brief overview of the aims of the society and the possibilities for young scientists with the different IHSS awards.

The programe of our session: “Humic Substances: environmental dynamics and impact on water quality”:

Keynote talk - *Humic substances in the environment: Implication on water quality,* ***Abbt-Braun G****.,* Karlsruher Institute for Technology (KIT), Engler-Bunte-Institut, Water Chemistry and Water Technology, Germany

Photochemical production of sulfate and methane sulfonic acid from dissolved organic sulfur: occurrence and mechanistic insights, **Ossola R. et al.,** Institute of Biogeochemistry and Pollutant Dynamics (IBP), ETH Zürich, Switzerland

Fractionation of humic acids on bacterial surfaces, **Tikhonov V. et al.,** Lomonosov Moscow State University, Russia

Spectroscopic, photochemical and photo inactivating properties of dissolved organic matter in a constructed polishing wetland, **Wenk J.,** University of Bath, Department of Chemical Engineering, Water Innovation and Research Centre, UK

Toward a better knowledge of domestic sewage fluorescent dissolved organic matter: a study of its biological and physicochemical properties, **Goffin A. et al.,** LEESU, Université Paris-Est (UMR MA 102), UPEC, Ecole des Ponts ParisTech, AgroParisTech, France

Diel monitoring of dissolved organic matter in the Deûle River, **Superville P.-J. et al.,** LASIR CNRS UMR 8516, Université de Lille, France

Keynote talk - Pelagic Sargassum brown algae release significant proportions of phlorotannins into the oceans, L**. Powers[a], N. Hertkorn[b] et a**l., [a]University of Maryland Center for Environmental Science, Chesapeake Biological Laboratory, USA, [b]German Research Center for Environmental Health, Helmholtz Zentrum Munich, Germany

Antioxidant properties of humic acids extracted from saltmarsh soils (Marano and Grado Lagoon, northern Adriatic Sea), **Bravo C. et al.,** Department of Agricultural Food Environmental and Animal Sciences, University of Udine, Italy

A NMR perspective on the effects of drinking water treatment on the structure and composition of dissolved organic matter (DOM), **Norbert Hertkorn et al**., German Research Center for Environmental Health, Helmholtz Zentrum Munich, Germany

The detailed programe of the conference can be down loaded: https://icce2019.org/content/ICCE-2019-Conference-Programme.pdf

The next ICCE meeting will take place in Venice, in 2021.

Gudrun Abbt-Braun
Yiannis Deligiannakis
Conference Chairs

8th International Symposium of Interactions of Soil Minerals with Organic Components and Microorganisms

Understanding Soil Interfacial Reactions for Sustainable Soil Management and Climatic Change Mitigation

Soil can be seen as an important and delicate interface between biosphere, hydrosphere, atmosphere, and lithosphere. Biogeochemical processes occurring at this interface are crucial for maintaining soil ecosystem function, plant productivity and water quality. Aside from controlling the fate of pollutants, this interface plays a key role within the biogeochemical cycles and thus for soils to act as a source or sink of greenhouse gases.

Bearing this in mind, we decided to organize the 8th International Symposium on Interactions of Soil Minerals with Organic Components and Microorganisms (ISMOM 2019) with the focus on "**Understanding Soil Interfacial Reactions for Sustainable Soil Management and Climatic Change Mitigation**". With this meeting, we intended to provide a platform for fruitful discussions between scientists and students from soil sciences, chemistry, biology, biochemistry, physics, ecology or environmental sciences.

The ISMOM 2019 took place in Seville, Spain, during June 23 - 28, 2019 and was organized as a part of a series of international symposia of Commission 2.5 (Soil chemical, physical and biological interfacial reactions) of the International Union of Soil Sciences (IUSS). These meetings take place every 4 years.

During the meeting, we had the pleasure to present contributions of 170 participants from 33 countries. In total 185 abstracts were submitted of which 155 were finally presented as part of the following thematic subjects:

- ***Soil as a C and N sink*** – Who is the major player, soil minerals, soil organic matter quality, microbial activity or their interplay?
- ***New physical, chemical and biological analytical approaches*** – How can they lead us to a better understanding of soil interfaces?
- ***Ecological disturbances*** – How do mismanagement of soils (overgrazing, erosion etc.) or natural disasters (fire, flooding etc.) affect the interplay between soil minerals, SOM and microorganisms?

- ***Dynamics of pollutants at soil interfaces*** – What is new and how can environmental biotechnology be beneficial for soil restoration and bioremediation?
- ***Soil amendments*** (biochar, composts and digestates) – How do they affect interactions at soil interfaces?
- ***Nutrient availability in soils*** – Can our knowledge on soil interfaces improve biotechnological approaches or soil management to decrease the need for artificial fertilizers?

The number, diversity and quality of the submitted abstracts, as well as the excellent work of the scientific committee guaranteed an interesting and well-balanced scientific program. We greatly thank the members of this committee, who independently evaluated the scientific contributions to one of the above thematic topic assigned to them.

We were able to attract keynote speakers for 5 of the thematic topics and 2 more speakers for the plenary session. In total 54 orals were presented during morning and afternoon sessions. As a special highlight, the winner **of Dr. P.M. Huang Prize Talk, Dr. Rota Wagai**, demonstrated a convincing summary of his research.

With the help of the **International Humic Substance Society (IHSS),** we could invite two of the 5 keynote speakers as representatives of the IHSS. **Dr. Deborah P. Dick** from the Federal University of Rio Grande do Sul presented a summary of her research on "**Organo-mineral associations in weathered soils and their implications on SOM stabilization"** and **Dr. Etelvino Novotny** from Embrapa Solo introduced to **Lessons from the Terra Preta de Índios of the Amazon Region for the utilisation of charcoal as soil amendment.**

Dr. Etelvino Novotny

Dr. Deborah P. Dick

The 96 posters were grouped according to the 6 thematic topics of the symposium and allowed to be shown for two days, one of which was assigned as key day at which the respective presenter was expected to be available for discussions at the poster during the poster session. In order to give the posters more attention, the presenters had also the possibility to come on stage and provide a quick introduction of their posters within 2 min during special sessions called PICO. Although practiced for the first time in the frame of an ISMOM symposium, this opportunity was well accepted and appreciated.

Aside the scientific presentations, a field trip was organized to the inner core of the Donaña National Park on Thursday Afternoon, June 25th 2019, which is one of the most important wetlands of Spain, a refuge for many birds and a mosaic of different landscapes.

First stop of the field trip at the beach of the Coto de Donaña

However, although the culture was not neglected. After a special guided tour through the Real Alcazar, the welcome reception was celebrated in the Patio of the Old Royal Tabak Fabric (nowadays used as the main Building of the Rectorate of the University of Seville), which, inspired not only Prosper Merimée (1847) to his famous novel “Carmen” but also Georges Bizet to his world-known opera “Carmen” (1875).

On Tuesday evening, for those who were interested a short trip was offered to a nearby town called “Alcalá de Guadáira to visit one of its famous mills. After learning a bit of the history of its fortress, the group enjoyed typical local food in a nearby tapa bar.

Visit of Alcala de Guadaira: in the yard of the fortress

The conference dinner took place on Wednesday, June 24th 2019. During this event, poster prices, travel awards and the Dr. P.M. Huang Prize was awarded. The travel awards were sponsored by the **commission 2.5 of the IUSS** and **IUSS Stimulus Fund** to wave the conference fees for young scientists and scientists of low-income countries. With this support we were able to enable 13 scientists to participate personally in the conference. Additionally, we were able to present the poster contribution of three further scientists, which unfortunately were not able to come.

We would like to thank the ISMOM 2019 Organizing Committee and the stuff of the organizing office and of the hotel. We also thank the donors and sponsoring companies, and in particular the IHSS for their support without which the ISMOM 2019 would not have been possible. The logo of all sponsors were shown on the conference webpage and during the conference. During the coffee breaks, flyers of the IHSS were distributed.

Heike Knicker
Francisco J. González-Vila
Conference Chairs

UPCOMING MEETINGS

Special sessions on humic substances and organic matter at the European Geosciences Union General Assembly 2020, Vienna, Austria, May 3-8, 2020

Next year again, the following sessions which may be of interest for IHSS members are offered at the General Assembly of EGU 2020:

SSS5.7: Mutual interaction of humic substances with heavy metals, pesticides and PAHs (co-sponsored by IHSS at the European Geosciences Union General Assembly, May 3 – 8, 2020, Vienna, Austria

Conveners: Jerzy Weber, Teodoro Miano, Aleksandra Ukalska-Jaruga

The EGU journal SOIL is considered (provisional acceptance) to publish selected papers presented at the session. It also will be opened for all volunteered submissions within its scope.

Fate and activity of heavy metals, pesticides, PAHs and other xenobiotics depend on their interaction with humic substances present in soil, coal, freshwater and marine systems. They may be deactivated due to various interactions with humic substances, and from the other hand, xenobiotics may affect the properties of humic substances. These processes play a crucial role in many various processes affecting quality of the terrestrial and aquatic systems, and they are dependent on the properties of specific fractions, including humic acids, fulvic acids and humin. Papers covering various aspects of mutual interaction between humic substances and heavy metals, pesticides and PAHs are welcome. This will provide deeper insights and understanding of the mechanisms of xenobiotics sorption on humic substances, as well as their influence on properties of humic substances occurring in terrestrial and aquatic systems.

SSS5.4: Soil organic matter turnover: estimating SOM dynamics by combining biomarker with stable isotope analyses

Conveners: Layla Márquez San Emeterio, José González-Pérez, Jens Holtvoeth, Nicasio T Jiménez-Morillo

We are interested in studies that combine traditional techniques with novel biomarker approaches, covering both structural and chemical aspects related to SOM turnover rates and otherwise ubiquitous functional groups (e.g., plant-derived biopolymers (lignin-derived phenols, aliphatic structures, n-alkanes, carbohydrates, phospholipid fatty acids), along with their isotopic composition. We also aim to present and discuss different analytical challenges that still may remain, due to environmental and analytical uncertainty (e.g. compound-specific isotope analysis).

SSS9.9: Soil amendments –innovative applications and sustainable land use

Conveners: Giacomo Ferretti, José María de la Rosa, Paloma Campos, Katharina Maria Keiblinger, Giulio Galamini

During the last decades several organic and inorganic amendments (e.g. zeolites, biochar manure, etc. have been recognized as an efficient strategy for soil, water and air preservation. Specifically, the application of different inorganic and organic soil amendments has been found to improve soil quality, soil organic matter, aggregate stability, nutrient retention, plant N use efficiency, influence microbial activity, and population as well as soil gaseous emissions.

With this session, we aim to focus on the current research and latest advances on a wide spectrum of soil inorganic and organic amendments in agriculture as well as for the restoration of degraded soils covering biological, chemico physical, biochemical and environmental aspects.

The deadline for abstract submission (100 to 500 words) is **15 January 2020 at 13 CET.** Online submission: https://www.egu2020.eu/

Heike Knicker
IHSS secretary

20th International Conference of the International Humic Substance Society, August 16-21, 2020

We are delighted to announce the 20th Meeting of the International Humic Substances Society(IHSS), which will be held from August 16-21, 2020, in Estes Park, Colorado, USA. More information are available at https://ihss2020.org/.

Important dates:

- January 31, 2020- Travel Award Applications Due
- February 1, 2020 – Abstracts Due

Conference Themes:

- Analytical methods for characterization of humic substances in soil and water
- Climate change impacts on content and character of organic matter in different environments
- Challenges with the presence of DOM in water treatment
- Stabilization mechanisms of soil organic matter
- Key unresolved questions about the chemistry and structure of humic substances
- Agricultural and commercial applications of humic substances

For more information please contact: info@ihss2020.org

Fernando Rosario-Otriz
and Ray Hozalski
Conference Chairs

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All members are encouraged to apply for IHSS sponsorship of scientific meetings. The respective guidelines are published on the webpage.

http://humic-substances.org/apply-for-ihss-sponsorship-of-a-conference/

Training Research Award – a special achievement!

In 2019, 9 of our young members received the Training Research Award of the IHSS to visit a collaborating institute to complement their education with a special training related to their research activities. One of them already kindly provided her technical reports for publication in the NL. In the present issue, the report of Lyubov Bondarenko from the Moscow Aviation Institute, Russia. Thanks to Lyubov Bondarenko for sharing her results.

STUDY OF THE EFFECT OF HUMIC ACIDS ON COLLOIDAL PROPERTIES OF MAGNETITE/SIO2 NANOPARTICLES

by

Lyubov Bondarenko

Host: Prof. Etelka Tombacz, Szeged University, Hungary

Training time: June 6th 2019 – July 26th 2019

1. Aim and objectives of the IHSS Training Award Grant

The humics-magnetite nanocomposites have a wide scope of applications – from the magnetic separation of versatile technical media [Kydralieva et al. 2016] to the preparation of polymeric suspensions for biomedicine [Tombacz et al. 2015]. The principal challenges that have to be addressed are a detailed understanding of how the surface chemistry (surface charging, modification, adsorption) and colloidal interactions influences subsequent magnetite-humic acid (HA) nanoparticles (NPs) interactions with biosystems. To this end, the overall aim of this grant was to study the effects of HA adsorption on pH and concentration dependent surface charging and aggregation of magnetite nanoparticles without and with SiO_2 shell. The specific objectives of the grant were to:

1. To modify Fe_3O_4-APTES via silylation reaction due to its terminal amino groups;
2. To characterize the mean particle size, zeta-potential values, colloidal stability of samples obtained;
3. To characterize the effect of HA adsorption on pH-dependent surface charging and aggregation of Fe_3O_4-APTES NPs.

2. Overview of activities

To reach the proposed objectives, the preparations of Fe_3O_4-HA and Fe_3O_4-APTES-HA NPs were formulated by the sol-gel synthesis method. To refine the synthesis methods proposed in the literature, Fe_3O_4-APTES-HA NPs were formulated in both argon and air atmosphere. In addition, various methods for sample preparation before measurement by dynamic light scattering were developed. To study the surface charge of the samples, the method of potentiometric acid-base titration was used. A scope of activities performed is described below.

2.1 Synthesis of samples, modification Fe_3O_4-APTES via silylation reaction due to its terminal amino groups

According first way, the magnetite nanoparticles were prepared by the coprecipitation method, which described in [Pomogailo et al. 2011]. Amino-functionalized Fe_3O_4-APTES nanoparticles were prepared by surface modification of Fe_3O_4 nanoparticles using (3-aminopropyl) triethoxysilane (APTES) as the silylation agent. According to Ozmen et al. (2010), APTES was added into the solution under Ar atmosphere and Fe_3O_4-APTES(ar) were dried under vacuum.

Before measurement, dialysis of part of Fe_3O_4-APTES (ar) were performed. Then Fe_3O_4-APTES (ar) sample after dialysis was processed in an ultrasonic bath during 30 min (sample Fe_3O_4-APTES (ar dial US). In parallel, Fe_3O_4-APTES (ar) sample after dialysis was processed during 24 hours on a magnetic stirrer (sample Fe_3O_4-APTES, ar dial no US).

According second way, magnetite was prepared with the same method without argon atmosphere and drying in vacuum: sample was prepared and dried at air atmosphere. In total, five types of samples were obtained: Fe_3O_4, Fe_3O_4-APTES(ar), Fe_3O_4-APTES (ar dial US), Fe_3O_4-APTES (ar dial no US) and Fe_3O_4-APTES(O_2) (Fig. 1).

Fig. 1 Samples used for measurement

2.2 Characterization of samples by potentiometric acid-base titration

The net proton surface excess (Δnσ) was determined by potentiometric acid–base titration over the pH range 3 to 11 at different ionic strengths [Illes and Tombácz 2003]. Equilibrium titration was performed by means of a self-developed titration system (GIMET1) with 665 Dosimat burettes (Metrohm), nitrogen bubbling, a magnetic stirrer and a high performance potentiometer (Fig. 2). The whole system (amount and frequency of titrant, bubbling, stirring, millivolt measurement) was controlled by an IBM PS/1 computer using AUTOTITR software.

Fig. 2. System for potentiometric acid-base titration

2.3 Characterization of the mean particle size and zeta-potential values of Fe_3O_4, Fe_3O_4-APTES (ar) and Fe_3O_4-APTES (O_2) and effect of humic acids adsorption

Measurements of particle size and zeta-potential values of samples were performed using a NanoZS apparatus (Malvern, UK) with a He-Ne laser (λ = 633 nm), operating in backscattering mode at angle 173◦ and 12.8◦ respectively. The stock sol of magnetite particles was diluted with KCl electrolyte. The pH of the systems was adjusted in the range of 3 to 10, measured directly before placing the sample in the measuring cell. pH-meter is shown in Fig. 3.


Fig. 3. System for sample pretreatment (sonicator and pH-meter)

3. Preliminary results

During two months, it was possible to study the surface charge of the samples by potentiometric titration. However, due to problems with the device, at the moment it turned out to study only Fe_3O_4 and Fe_3O_4-APTES (O_2) samples. The remaining samples will be appreciated soon. According to potentiometric titration of Fe_3O_4 and Fe_3O_4-APTES (O_2) samples, the magnetite pzc seems to be at pH = 7.8 ± 0.1, but in case of magnetite-APTES pzc shift to acid region at pH = 6.5 ± 0.1. The shift of pzc from ~7.8 to ~6.5 and decrease in the net surface proton excess compared to unit mass of bare Fe_3O_4, in good accord with the previous data about storage of magnetite [Tombacz et al. 2007]. The APTES coating reduces the number of surface sites available for protolytic reactions. This can simply be a

consequence of the decrease in specific surface area during magnetite-maghemite transformation. However, we can compare the amount of the net proton surface excess at pH~3, 0.23 (up to 0.39) mmol/g of Fe3O4 and 0.12 (up to 0.2) mmol/g of Fe_3O_4@APTES (O2). It can be seen that APTES coverage roughly halves the net proton surface excess, and so the number of protonated surface sites decreases from 1.38 (up to 2.34) to 0.72 (up to 1.2) site per nm2. It can be supposed that $–NH_2$ groups react with ≡Fe-OH sites (via e.g., ≡Fe-O-…+H_3N-R bonds). The measured data of bare Fe_3O_4 and Fe_3O_4@APTES, prepared in O_2 atmosphere, are compared in Fig. 4.

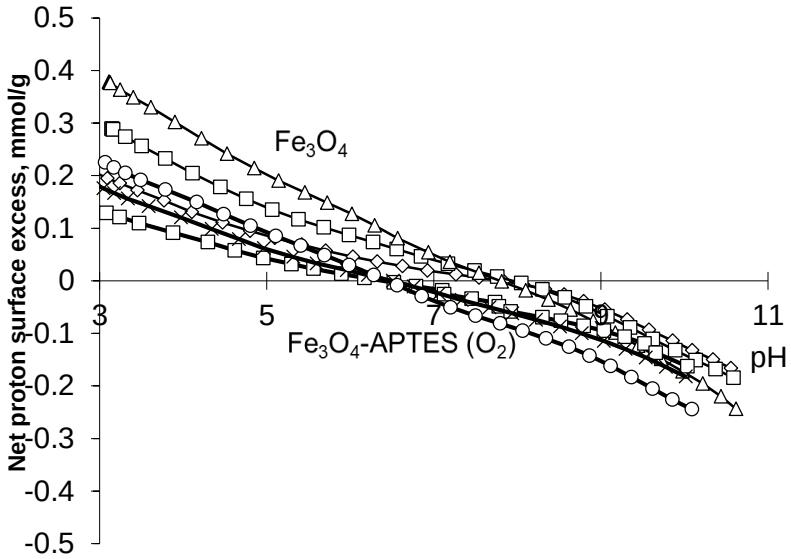

Fig. 4. Net proton surface excess amount of Fe_3O_4 and Fe_3O_4-APTES (O_2) as a function of pH at different KCl concentrations. The points were calculated from the material balance of H+/OH− in the course of equilibrium acid–base titration.

For the study effect of humic acids adsorption on pH-dependent surface charging and aggregation of NPs, 0.0077 to 0.1161 g of HA per 1 g of Fe_3O_4 were added to all the samples listed above. These data make it possible to determine the amount of HA that is necessary to completely cover any of the studied nanoparticles. Fig. 5 shows an example of the values of the zeta potential for different volumes of HA. Such curves were obtained for all samples.

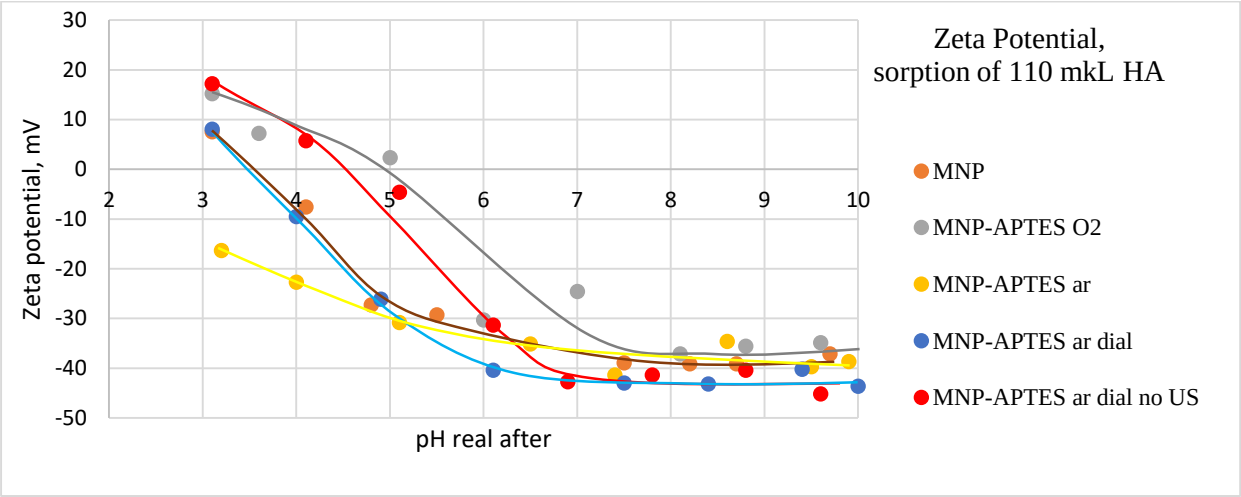

Fig.5. Comparing the effect of HA on pH-dependent zeta potential of samples in the presence of the same amount of HA; the latter was enough to cover completely nanoparticles in MNP-APTES ar sample, while those in the other samples were only partially coated.

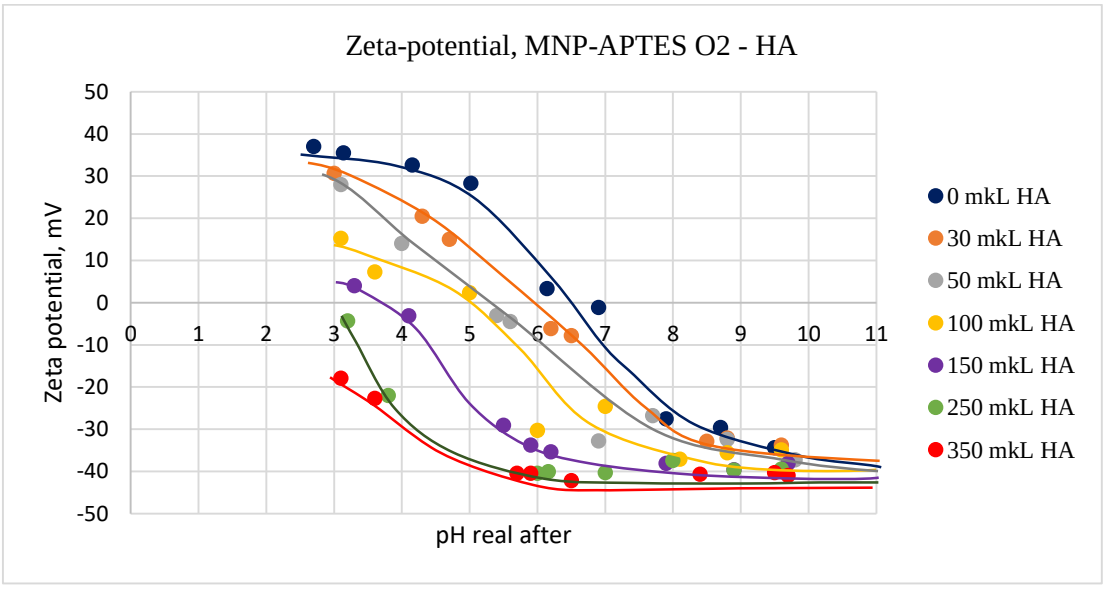

Fig. 6. Effect of humic acids adsorption on pH-dependent surface charging (zeta potential is proportional with the particle charge)

The curve in Fig. 5 clearly show the shift of isoelectric point (iep, the pH of $\zeta = 0$) from pH~7 to ~3 with increasing HA addition, finally reaching the complete zeta potential reversal in the presence of the highest HA amount. The latter occurs when the surface of the particle is completely covered by HA molecules, so this phenomenon is closely related to HA adsorption. According to the magnitude of the shift of the pH-dependent zeta potential functions due to the sorption of increasing amount of HA in case of all samples, it is possible to construct a series of samples in which the sorption capacity decreases:

Fe_3O_4-APTES (ar dial no US)≥ Fe_3O_4-APTES(O_2)> Fe_3O4≥Fe_3O_4-APTES(ar dial US) ≫Fe_3O_4-APTES(ar) (Fig. 5). Sample preparation has a great effect on the sorption capacity of the samples. Using the Fe3O4-APTES (ar) sample as an example, it was shown that the sample after dialysis is capable of adsorbing a larger amount of humic acid than the sample without dialysis. In addition, the sample exposed to the magnetic stirrer has a larger sorption capacity than the sample after the ultrasonic bath: Fe_3O_4-APTES (ar dial no US)>Fe_3O_4-APTES(ar dial US)≫ Fe_3O_4-APTES(ar). It is likely that harsh condition during sonication (extreme high temperature and pressure in cavities forming at interfaces) is able to destroy Fe_3O_4-APTES-HA bonds and reduce the sorption capacity.

For all samples, hydrodynamic size data and size distribution were obtained. The hydrodynamic diameter increases near the isoelectric point for all samples not coated with HA. For example, for Fe3O_4-APTES(O_2), the hydrodynamic size at pH < 5 and pH > 9 is less than 300 nm. In the range 5 < pH < 9, the hydrodynamic size is about 600 nm. With incomplete coverage with HA, the hydrodynamic diameter also increases near the isoelectric point. However, with full coverage with HA, the hydrodynamic size remains unchanged at all pH range. For Fe_3O_4-APTES (ar dial no US), when fully coated, it is about 100 nm.

4. Future collaboration with the host institution

As mentioned above, not all of the proposed analyzes were completed during a 2-month visit. Thus, after receiving the remaining data and a joint analysis of the results, a joint publication will be prepared. We plan to continue to continue working together with Szeged University and Prof. Etelka Tombacz.

5. Projected publications / articles resulting or to result from the grant

Bondarenko L., Illes E., Kydralieva K., Tombacz E. Study of the effect of humic acids on colloidal properties of magnetite/APTES nanoparticles (in preparation).

6. Acknowledgements

This work was possible due to University of Szeged supplied the laboratory facilities and equipment and the IHSS Training Award, which funded the visit to Szeged.

7. References

Illés, E., Tombácz, E. (2003). The role of variable surface charge and surface complexation in the adsorption of humic acid on magnetite. Colloids and Surfaces A: Physicochemical and Engineering Aspects, 230(1-3), 99-109.

Kydralieva, K. A., Dzhardimalieva, G. I., Yurishcheva, A. A., Jorobekova, S. J. (2016). Nanoparticles of Magnetite in Polymer Matrices: Synthesis and Properties. Journal of Inorganic and Organometallic Polymers and Materials, 26(6), 1212-1230.

Ozmen, M., Can, K., Arslan, G., Tor, A., Cengeloglu, Y., Ersoz, M. (2010). Adsorption of Cu(II) from aqueous solution by using modified Fe3O4 magnetic nanoparticles. Desalination, 254(1-3), 162-169.

Pomogailo A.D., Kydralieva K.A., Zaripova A.A., Muratov V.S., Dzhardimalieva G. I., Pomogailo S. I., Golubeva N.D., Jorobekova S.J. (2011). Magnetoactive humic-based nanocomposites. Macromol Symp, 304, 18-23.

Tombácz, E., Turcu, R., Socoliuc, V., Vékás, L. (2015). Magnetic iron oxide nanoparticles: Recent trends in design and synthesis of magnetoresponsive nanosystems. Biochemical and Biophysical Research Communications, 468(3), 442-453.

Tombácz, E., Illés, E., Majzik, A., Hajdú, A., Rideg, N., Szekeres, M. (2007). Ageing in the inorganic nanoworld: Example of magnetite nanoparticles in aqueous medium. Croatica Chemica Acta, 80(3-4), 503-515.

Attached to this Newsletter: The candidates' statements and CV's.

IMPRESSUM

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