BioNexGen
Clean Water.
Clear Solutions.

Newsletter

No.04

In this issue…

BioNexGen ID

Title

Development of the **Next** **Gen**eration membrane **Bio**reactor system

Programme

Seventh Framework Programme, Collaborative Project

Duration

01/09/2010-28/02/2014

Main objective

BioNexGen is developing a new class of functional low fouling membranes for membrane bioreactor technology with high water flux and high rejection of organic matter with low molecular weight

Partner countries

Egypt, Germany, Greece, Italy, Syria, Tunisia, Turkey, UK

Editorial

Dear Readers,

Welcome to the forth issue of our **BioNexGen** newsletter! In this issue we will inform you about a few activities where our consortium was involved in during the past months. First of all, we will present you an article of the WATERBIOTECH Conference in Cairo. We will present you an interview of the Student Francesco Galiano from **BioNexGen** partner ITM-CNR in Italy, who has done a student exchange at HSKA in Karlsruhe, Germany.
In the fourth issue of our newsletter, we will also inform you about our upcoming second training workshop in Calabria, Italy and the **BioNexGen** final conference in Izmir, Turkey in October 2013.
Moreover we warmly invite you to also regularly consult our project website under www.bionexgen.eu in order to be updated on the latest developments.

Yours sincerely,
BioNexGen consortium

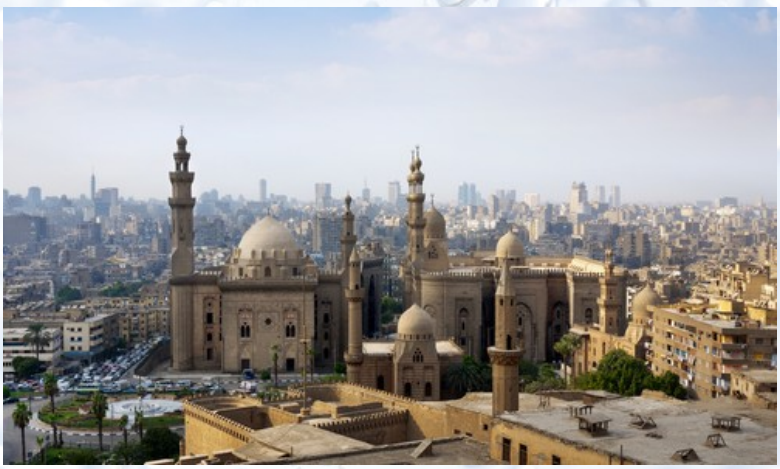
BioNexGen Partners

The project is carried out by **7 European, 1 Turkish and 3 MENA partners,** namely two partners from North Africa and one from the Middle East.

The consortium has been carefully selected to ensure a multidisciplinary approach which is necessary to realise this innovative concept. It consists of academic and industrial partners and of technology transfer institutions.
Technology transfer: Coordinator, Karlsruhe University of Applied Sciences (Germany), Steinbeis-Europa-Zentrum (Germany)
Membrane's development: Institute on Membrane Technology at Italian National Research council (Italy), Foundation for Research and Technology, Hellas (Greece), Izmir Institute of Technology (Turkey), Swansea University (UK), as well as Microdyn Nadir (Germany) and Nanothinx (Greece), as European leaders in innovative MBR membrane technology and carbon nanotubes' manufacturing
Demonstration and field test activities: Centre de Biotechnologie de Sfax (Tunisia), Central Metallurgical Research and Development Institute (Egypt) and Al Baath University (Syria)

WATERBIOTECH Conference, Cairo (Egypt), 9-11 October 2012

The first international WATERBIOTECH Conference was held in Cairo (Egypt) from 9th to 11th October 2012 at the National Research Center (NRC). The Conference provided the opportunity to enter in contact with two of the main problems affecting many African countries: water scarcity and lack of safe drinking water. The main impact of water scarcity and water contamination is on human health but it is also expressed, as related social and economic consequences, in low productivity and development.



The conference gave the possibility to gather local scientists with scientists coming from Europe and Asia in order to discuss jointly the major challenges in water treatment and to share their experiences and opinions. The main topics of the conference focused on wastewater treatment, water re-use for irrigation in agriculture, climate change in Africa, domestic and industrial water supply and wastewater disposal. The fruitful discussion underlined the clear role of wastewater treatment and how, in particular, it can meet at the same time the claims derived from water scarcity and water pollution.

An oral presentation, "Performance test of novel membrane regarding water permeability, fouling behavior and dye rejection; F. Galiano, S. A. Deowan, A. Figoli, J. Hoinkis, L. Veltri, B. Gabriele", based on the work done within the BioNexGen project, was given by Mr. Francesco Galiano. The work was carried out in joint collaboration between the ITM-CNR (Italy) and the Karlsruhe University of Applied Sciences (Germany). Aim of the presentation was to underline the importance and the possibility of using novel membranes in the Membrane BioReactor (MBR) process. The work focused on the preparation of nanostructured membranes applied to water purification and in particular to the removal of dyes which can be encountered, for example, in textile wastewater. Textile manufacturing, in fact, is one of the largest industrial producers of wastewater. It is also a chemically intensive one; the wastewater from textile processing contains bath residues from preparation, dyeing, finishing, slashing and other operations. These residues can cause pollution if not properly treated before discharge to the environment.

Within the BioNexGen project, novel coated nanostructured membranes were prepared and characterized in terms of membrane morphology, superficial properties and water permeability. The novel membranes were applied for dye removal from water using model dye solution (red and blue). The novel nanostructured membrane performances, in terms of dye rejection and flux, were then compared with those obtained from pure commercial membranes. The preliminary results showed interesting performances obtained with the novel membranes in terms of lower fouling and water permeability regaining. Further tests are now in progress to validate the results obtained and improve dye rejection and water permeability.
Further information: www.waterbiotech.eu.

Student Exchanges: Fostering students' advancement and cooperation between universities

Please give a short introduction of yourself.

My name is Francesco Galiano, I am 26 years old and I have a master degree in Pharmacy. At the moment, I am a Ph.D. student at the Doctorate School of Science and Technique at the University of Calabria (Italy). Furthermore, I work at the Institute of Membrane Technology ITM-CNR (Italy) as a research associate within the BioNexGen project under the supervision of Dr. Alberto Figoli. My research field is mainly focused on membrane preparation and characterization.

Please briefly describe the context of the exchange you were/are involved in: guest university, duration, application procedure, eventual funding or grant, etc. Was it really an "exchange"? How did it come to it?

Since the beginning of August, I have been an exchange student at the University of Applied Sciences (HSKA) in Karlsruhe (Germany) under the supervision of Prof. Jan Hoinkis. My exchange program was funded by an international exchange grant of the University of Calabria with the support of ITM-CNR. The exchange program provided the opportunity to spend a period of six months at a university abroad for research and study activities. The application procedure was available online and was open for all PhD students of the University of Calabria wishing to spend a period of their doctorate abroad.

What topic are you working on?

My work is mainly focused on membrane preparation by polymerisable bicontinuous microemulsion (PBM). During the period at HSKA, different surfactants were used for microemulsion preparation in order to find optimal conditions from a chemical and economical point of view. PBM-obtained membranes were, thus, tested in terms of water permeability and dye rejection and characterized in terms of conductivity measurements and weight loss determination tests. Furthermore, my work also focused on the incorporation of different nanoparticles into the polymeric membrane matrix.

What "added value" did it give to your research to come to Germany for a few month?

Coming to HSKA I had the opportunity to directly test, on a larger scale, the membrane that I had previously prepared in Italy. Furthermore, this experience gave me the possibility to connect with new scientists and researchers sharing opinions and knowledge on specific topics. The mutual interaction with other people, in fact, allowed me to overcome many practical and theoretical problems of my work.

What have you learnt/done here which you could not have learnt in Italy?

For the first time, my period at HSKA gave me the possibility to directly get in contact with the Membrane Bioreactor (MBR) technology. Membranes previously prepared, in fact, were assembled in a big module with flat sheet configuration and immersed in a fermentor in contact with a model textile wastewater. I had the possibility to understand the principle on which MBR technology is based and to study all the variables that can affect and influence the process.

What advice would you give to other students who are willing to follow your example?

My exchange period at HSKA was an excellent experience in many aspects and I would strongly suggest it to other students. During my stay in Karlsruhe, I met people from many countries with completely different cultures, which helped me to broaden my horizon. Beside the scientific advantages, this period was a wonderful opportunity for me to get to know Germany, its traditions, habits and the German way of living. For all these reasons I would like to thank, in particularly, Prof. Jan Hoinkis for providing me with the possibility to work in his research group and for his kind hospitality and welcoming. Furthermore, I would like to thank Dr. Shamim Ahmed Deowan for contributing his time and efforts to be my mentor and all the other students from the lab for making my stay in Karlsruhe happy and productive.

Upcoming project events

2nd Training Workshop on the "Functionalized membranes for wastewater treatment - Nanoparticles and surfaces modifications", 15th– 17th May 2013 in Calabria, Italy

From 15th-17th May 2013 the second Training Workshop under the topic "Functionalized membranes for wastewater treatment -Nanoparticles and surfaces modifications" will be held in Cetraro (CS), Italy.

This two-day training workshop organised within the frame of BioNexGen will focus on the results obtained in the project on the membrane preparation, functionalization, characterisation and its application in wastewater treatment. Furthermore, the potentiality of using novel nanoparticles in membranes will be also reported by several speakers coming from all over Europe. Besides the presentations, this workshop will also provide the opportunity to visit a MBR plant on site. This will allow participants to become further acquainted with relevant industrial membrane technologies for wastewater treatment. Poster session is open for students and researchers on membrane preparation, characterisation and/or application in wastewater treatment.

This workshop also aims at fostering new contacts and collaborations among academics, water engineering experts, researchers, stakeholders, municipalities and companies.

For further information, you can contact Dr. Alberto Figoli: a.figoli@itm.cnr.it

BioNexGen Final Conference: "Use of nanotechnology in membrane for water treatment", 9th-10th October 2013 in Izmir, Turkey

From 9th-10th October 2013 the BioNexGen Final Conference under the topic "Use of nanotechnology in membrane for water treatment" will be held in Izmir, Turkey.

Keynote speakers will address critical issues for membrane application in wastewater treatment and, in addition, the conference will serve as a platform for the partners to convey their experiences, research results, and ideas through podium and poster presentations. Participants include a wide variety of stakeholders from policy, business, science, industrial sectors, retailers and government organizations. It should be noted that the official language of the organization is English, yet simultaneous translations to Turkish and French will accompany the talks.

The focus of the talks and presentations will be put on:

- Membrane Development and Characterization for (Waste)water Treatment
- Nanotechnology in (waste)water treatment
- Modeling and simulation
- Surface modification and functionalization
- Biofouling
- Antifouling membranes for (waste)water treatment
- Antimicrobial membranes for (waste)water treatment
- Antibacterial nanoparticles and their application in (waste) water treatment
- Reactive membranes and nanocatalysts for (waste)water treatment
- Nanocomposite membranes for (waste)water treatment
- Membrane bioreactors

Further information on the agenda and registration procedures will be available shortly.

Other upcoming events

3rd Dissemination Workshop of the Nano4Water cluster - Nano - and Membrane- based systems for water treatment

April 17–18, 2013, Dresden, Germany

Call for papers and posters

The Nano4Water cluster cordially invites you to attend the 3rd workshop themed "Nano- and membrane-based systems for water treatment", which will be organized and housed by Fraunhofer Institute for Ceramic Technologies and Systems IKTS in Dresden.

With your participation, the Nano4Water cluster looks forward once again to discussing the most important questions in the field of water treatment and purification as this is a main challenge for the current and upcoming generations. Membrane processes, nanosized materials and the combination from both offer a wide range of possibilities and ways for water treatment by means of filtration and catalytic processes. Engineers, designers and managers are invited to lecture on their state-of-the-art developments and future prospects, present specific topics in the poster session or display their products as exhibitor.

The topics of interest include, but are not limited to

- Nanostructured membranes for advanced water purification
- Nano-catalysts for water purification
- Molecularly imprinted materials for organic molecules
- Bioactive nanoparticles as alternative disinfectants
- Nanosorbents as separation media in water purification
- Biomimetic membranes for water treatment
- Membrane bioreactor (MBR) technology

The organizers of the workshop invite scientists, engineers, educators, ceramists and managers to submit abstracts for oral or poster presentation electronically as a Word file by e-mail to nano4water@ikts.fraunhofer.de.

Please find more information on the workshop´s webpage.