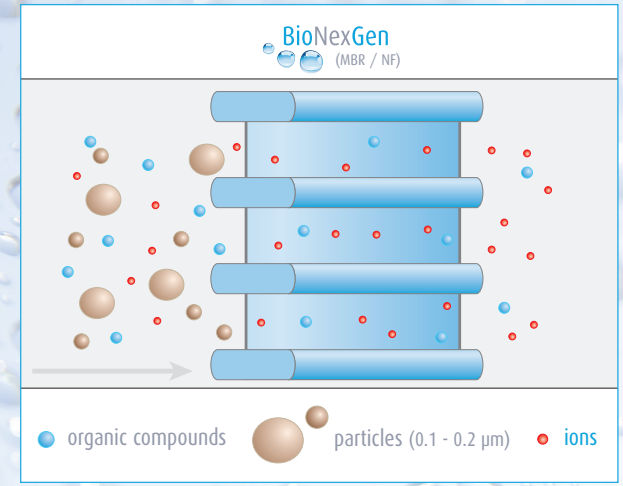


BioNexGen: a robust 1-step process with anti-fouling properties and high performance

Expected Impacts and Benefits of BioNexGen

The BioNexGen technology will have important impacts on the implementation of water reclamation and purification plants.

This one-step process technology will achieve breakthroughs by:

- Increasing the efficiency and the operational time due to less membrane fouling which permits a constant high membrane flux
- Decreasing operational and maintenance costs
- Improving the quality of the filtration by retaining micro-pollutants
- Increasing the performance of the biological degradation by improving the permeability of the membrane to salts and reducing the generation of toxic sludge

The BioNexGen technology will furthermore help to protect natural resources and contribute to the sustainable development and well-being of the society in Europe and the MENA countries.

BioNexGen partners

Germany
Karlsruhe University of Applied Sciences
www.hs-karlsruhe.de

Italy
Institute on Membrane Technology
www.itm.cnr.it/English/

UK
Swansea University
www.swansea.ac.uk

Greece
Foundation for Research and Technology, Hellas
Institute of Chemical Engineering and High Temperature Chemical Processes
www.iceht.forth.gr/

Germany
Steinbeis-Europa-Zentrum of the Steinbeis Innovation gGmbH
www.steinbeis-europa.de/

Germany
Microdyn-Nadir GmbH
www.microdyn-nadir.de

Turkey
Izmir Institute of Technology
www.iyte.edu.tr

Syria
Al Baath University
www.albaath-univ.edu.sy

Egypt
Central Metallurgical Research and Development Institute
www.cmrdi.sci.eg/

Tunisia
Centre de Biotechnologie de Sfax
www.cbs.rnrt.tn/

Greece
Research and Development of Carbon Nanotubes - Nanothinx S.A.
www.nanothinx.com

BioNexGen contact:

Coordinator: Prof. Dr. Jan Hoinkis
Karlsruhe University of Applied Sciences (HSKA)
Tel: +49 721 925 1372
jan.hoinkis@hs-karlsruhe.de

Project Officer:Dr. Johan-Martin Veiga Benesch
European Commission
Tel: +32 2 29 66577
johan-martin.veiga-benesch@ec.europa.eu

Further information: **www.bionexgen.eu**

BioNexGen

Clean Water.
Clear Solutions.

Development of the Next Generation membrane Bioreactor system

BioNexGen is co-financed by the European Commission under the 7th Framework Programme

Project Summary

BioNexGen is a Medium-scale focused research project co-financed by the European Commission within the scope of the 7th Framework Programme.

An international consortium consisting of 11 partners from 8 different countries will aim at developing a new class of high efficiency membrane for Membrane Bioreactors (MBRs) in order to improve wastewater treatment and reuse in municipal, agricultural and a variety of industrial sectors in Europe and Middle East and North Africa (MENA).

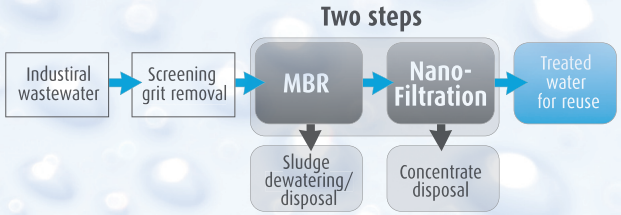
BioNexGen Overall Objectives

BioNexGen will develop a novel single step Nano-Filtration MBR operated with low energy consumption, small foot-print, flexible design, and automated operation make it ideal for localized, decentralized wastewater treatment and recycling in the European and MENA countries.

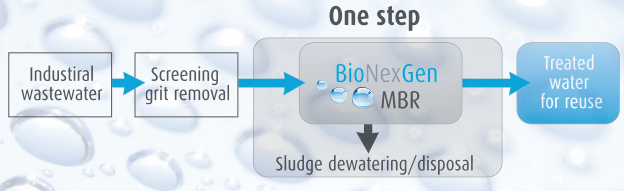
BioNexGen's Specific Objectives

- to develop 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
- to conduct computer modelling of the transport processes to enhance the membrane materials optimization process
- to conduct performance tests of the membrane materials on laboratory scale with model water in order to characterize the membranes
- to demonstrate the viability of the membrane materials by producing prototype devices to meet specific end-user requirements
- to demonstrate the possible application for industrial wastewater treatment and reuse through collaboration with industry in MENA countries

Membrane bioreactor process combined with nanofiltration



BioNexGen approach



The Membrane Bioreactor Technology (MBR)

The MBR technology is a combination of the conventional biological sludge process with a micro- or ultra-filtration membrane system. The biological unit is responsible for the biodegradation of the waste compounds and the membrane module for the physical separation of the treated water from the mixed liquor.

The MBR offers the advantage of having a low footprint and producing water of high quality. Due to its advantages, MBR technology has great potential in wide ranging applications including municipal and industrial wastewater treatment and process water recycling.

The main industrial applications are in food and beverage, chemical, pharmaceutical and cosmetics, textile industry as well as in laundries.

Despite the fact that the technical feasibility of this technology has been demonstrated through a large number of small and large scale applications, membrane fouling is regarded as an important bottleneck for further development.

BIO-CEL® submerged MBR module of Microdyn-Nadir GmbH

BioNexGen Strategy

BioNexGen will pursue three different new approaches implementing novel engineering and process intensification concepts in order to improve anti-fouling properties and the overall performance of the new Nano-Filtration MBR hybrid approach.

BioNexGen partners will perform field tests with these newly developed membranes. The tests will be carried out with wastewater from 3 different industries (cosmetics, textiles and olive oil industry) which play an important role in the MENA countries.