

INNOQUA

INNOVATIVE WASTEWATER TREATMENT

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PEOPLE ARE STILL WITHOUT
SANITATION FACILITIES.

1000

CHILDREN UNDER 5 DIE EACH DAY
FROM WATER BORNE DISEASES

INNOQUA is an EU-funded project through the Horizon 2020 research and innovation programme launched in June 2016, the project aims at answering the growing need for protection and improvement of natural water resources. This challenge is related to the fact that worldwide, about 2.5 billion people are without sanitation facilities. Still, almost 1000 children under 5 die each day from diarrhoea caused by inadequate water, sanitation and hygiene.

The project aims to meet this challenge by promoting sustainable water sanitation technologies capable of performing a whole water treatment cycle.

These technologies resemble natural cleaning processes and are based on the purification capacity of earthworms, zooplankton, and alternatively microalgae and sunlight exposure.

THE OBJECTIVES

INNOQUA is an innovative, patent protected, award winning and scalable fully ecological sanitation solution, available in multiple modular configurations adapted to local contexts and markets. This type of integrated solution for the treatment of wastewater has not been employed before.

Project objectives include:

- Integrate individual low cost, sustainable and biologically-based water sanitation technologies capable of performing a whole water treatment cycle and available in multiple modular configurations adapted to local contexts and markets.
- To demonstrate low-cost and innovative solutions for wastewater treatment and reclamation for each market target via specific demonstration site scenarios in real non-controlled environments in different locations both in EU and further afield, assessing the socio-economic implications of the developed integrated systems, including the social acceptance of the featured technologies and related user behaviour.
- To eco-design and optimize the proposed solutions to increase the sustainable performance of the water sector through an optimized environmental performance (reduced water consumption, increased resource efficiency, reduced carbon footprint, etc.) a socially accepted and affordable wastewater treatment system.

PILOTS

Current innovative solutions in the field of water sanitation lack real scale demonstration of their long term viability. INNOQUA main goal is to improve this situation by showing the effectiveness of the innovative and sustainable INNOQUA system and thus encompass pre-commercialization challenges to initiate market uptake of the system. The project will demonstrate this across 11 countries in 4 continents and both in domestic and industrial applications.

The countries involved:

Ireland – Spain – France – Italy – Scotland – Turkey – Romania – Ecuador – Peru – Tanzania – India



TECHNOLOGIES

LUMBRIFILTER



The "lumbrifiltration" is an alternative treatment method of organically polluted water. The principle is based on the vermifilter degradation of domestic water pollution by the association of earthworms *Eisenia fetida* and *Eisenia andrei*, and microorganisms (aerobic bacteria). Lumbrifiltration is efficient for wastewater, but also industrial and agricultural wastewater treatment heavily charged with organic matter, such as cannery and dairy. In China, lumbrifilters had been found to be generally good for swine wastewater treatment, municipal wastewater treatment, and domestic wastewater treatment.

DAPHNIAFILTER



Natural purification systems have been used for years to improve the quality of wastewater before discharge or reuse. Based on this observation, the University of Girona has investigated the purification mechanisms performed by *Daphnia* sp. and especially their role in the reduction of suspended solids and pathogen bacteria. After several years of testing and experiments, they have demonstrated that Daphniafilter constitutes a technically feasible and competitive (in terms of cost and efficiency) innovative tertiary treatment.

MONITORING & CONTROL UNIT



INNOQUA Monitoring and Control Unit is a portable low-cost monitoring and control platform responsible of collecting and analyzing data about the operational status of INNOQUA wastewater treatment system through the combination of different sensing technologies. It will be capable of capturing key operational metrics such as pH, dissolved oxygen (DO), conductivity (salinity), oxidation-reduction potential (ORP), temperature, ions concentration to measure different chemical and physical water quality parameters.

BIO SOLAR PURIFICATION



The Bio-Solar purification technology intensifies, in closed photoreactors, ecosystems services occurring at the air/water interface. The BSP technology combines organic wastes degradation, dissolved hazardous compounds removal and faecal contaminants destruction in photobioreactors, using sunlight and CO₂ to intensify natural photosynthesis. The special design of photobioreactors allows purification of 100 to 2000 L wastewater per m² exposed to sun and per day according their shape and sunlight recovery means.

UV PURIFICATION



The UV system is the result of continuous investment in R&D and partnerships with universities and industry. The latest lamp and lamp driver technology in combination with newly designed highly efficient UV reactors developed to have the optimal hydrodynamic conditions will allow to achieve an evenly distribution of the UV light through the water to be treated. As a result the amount of UV radiation each particle is exposed to and the log reduction, based on the different UV dose response of the microorganisms in question.



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