Photo-irradiation and Adsorption based Novel Innovations for Water-treatment

Sprawozdania

Informacje na temat projektu

PANI WATER

Identyfikator umowy o grant: 820718

Strona internetowa projektu

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Projekt został zamknięty

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SOCIETAL CHALLENGES - Climate action, Environment, Resource Efficiency and Raw Materials

Koszt całkowity
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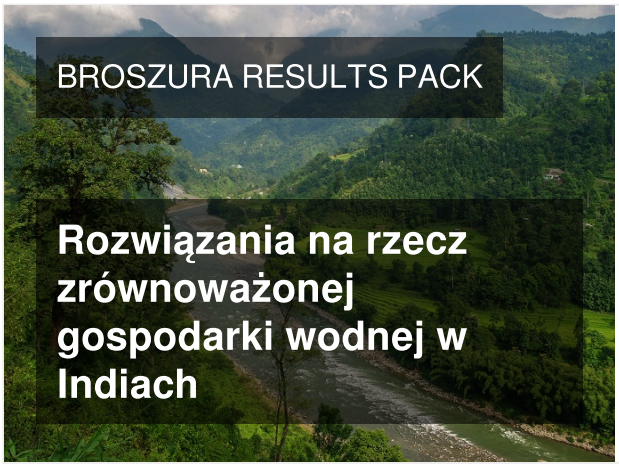
Wkład UE
€ 3 576 532,50

Koordynowany przez
ROYAL COLLEGE OF SURGEONS IN IRELAND
Ireland

Ten projekt został przedstawiony w...



9 Listopada 2023

Periodic Reporting for period 3 - PANI WATER (Photo-irradiation and Adsorption based Novel Innovations for Water-treatment)

Okres sprawozdawczy: 2022-02-01 do 2024-01-31

Podsumowanie kontekstu i ogólnych celów projektu

PANIWATER (Photo-irradiation and Adsorption based Novel Innovations for Water-treatment) was an Horizon 2020 India-EU water cooperation project, co-funded by the European Commission and by the Indian Department of Science and Technology.
Globally, 2.1 billion people live without access to safe water, and about 159 million people collect their drinking water directly from surface water sources. This issue is particularly prominent in water stressed areas, such as India, which accounts for a rural population of ca. 700 million, 63 million of which do not have access to clean water . In addition, Contaminants of Emerging Concerns (CECs) are increasingly being detected in wastewater effluents around the world. CECs are pollutants that can cause deleterious effect to aquatic life and human health, but are not yet in routine monitoring programs. In India, the Central Pollution Control Board reveals that more than 50% of wastewater remains untreated, at risk of compromising environmental services and drinking water resources. PANIWATER developed, deployed and validated in the laboratory and in the field six prototypes for the removal of contaminants, including CECs, from wastewater and drinking water. The prototypes for wastewater treatment were (i) a 20000 L/day multifunctional oxidation reactor, (MFR) (ii) a 10 L/day photoelectrochemical system (PES), and (iii) a 100 L/day solar photolytic plant (SPP). The prototypes for drinking water treatment were (iv) a 300 L/hour filtration, adsorption, and UVC LED system (FAU) (v) a 20 L transparent jerrycan for solar water disinfection (TJC), and (vi) a 2000 L/day electrocoagulation, oxidation, and disinfection system (EOD). These prototypes have been deployed in peri-urban and rural areas in India. The consortium worked closely with the communities at the field sites, and carried out water quality analyses, health and social impact assessments. Furthermore, through local territorial organisations, the project advocated for safe reuse of treated wastewater for irrigation, and preservation of drinking water sources. PANIWATER technologies can find promising application among the agricultural sector, water-demanding businesses (e.g. textile, pharmaceutical), and the Indian water utilities

The goal of the project was to increase the availability of safe drinking water to the minimum level recommended by the WHO (at least 7.5 L/person/day) in target communities in India, and to obtain wastewater treatment capacity of at least 10000L /day, producing irrigation-grade, CEC-free, water.

Prace wykonane od początku projektu do końca okresu sprawozdawczego oraz najważniejsze dotychczasowe rezultaty

PANIWATER generated six Key Exploitable Results:
Three technologies for the removal of Contaminants of Emerging Concern from Wastewater
1) a Multifunctional Reactor (MFR) capable of treating 50 cubic meters of wastewater per day. Two demonstrators of the MFR have been built, one in Fasano (IT) and one in Nagpur (India). The demonstrator in Fasano is currently used for the commercial provision of tertiary wastewater treatment service by one of the project beneficiaries and is used as background IP on a follow up Horizon Europe project. The demonstrator in Nagpur has been installed in the Airforce base of Vayusena Nadar and is providing irrigation grade water for the crops on the base
2) a Solar-powered Photocatalytic Plant (SPP) capable of treating 10 cubic meters of wastewater per day. Two demonstrators of the SPP have been built. One in Almeria (ES) and one in Nagpur (India). The demonstrator in Almeria is being used for the commercial provision of tertiary wastewater treatment service by one of the beneficiaries and is used as background IP in 4 national and international projects. The demonstrator in Nagpur is being evaluated in the campus of a research centre.
3) a Photoelectrochemical System (PES) capable of treating 1 cubic meter of wastewater per day. The system is modular and can be scaled up to larger volumes. A prototype exists in Ulster (UK) that is being further developed for the integration of additional functionality. The owner of the prototype is foreseeing a patent filing and further development project. A second prototype is being evaluated in Nagpur (India)
Three technologies for drinking water treatment
1) a Filtration, Adsorption and UVC disinfection system (FAU), capable of treating between 0.03 and 0.3 cubic meters of water per day (community scale and household scale). The FAU is demonstrated in a university campus in Goa and is providing drinking water to the resident students and staff. The household scale prototypes are being evaluated in a local community. The UVC-LED component of the system is industrialised, produced and sold by one of the beneficiaries. The potential of this component to displace mercury lamps for water disinfection from the market is being evaluated.
2) An Electro-Oxidation and Disinfection system (EOD), capable of treating 2 cubic meters of water per day. The demonstrator is deployed in Auroville (India) and is providing drinking water to the local community. The beneficiary owning the results is investigating commercialisation possibilities in other Indian states, as well as in Pakistan.
3) A Transparent Jerrycan (TJC), capable of treating 10 litres of water per day. The prototype of the Jerrycan is being evaluated to select more suitable materials to overcome limitations highlighted during the course of the project

Throughout its duration, PANIWATER generated 44 peer-reviewed publications and annexed datasets, as well as one book and more than 50 communication and dissemination actions

Innowacyjność oraz oczekiwany potencjalny wpływ (w tym dotychczasowe znaczenie społeczno-gospodarcze i szersze implikacje społeczne projektu)

• Improved and efficient wastewater treatment systems, combined with recovery and reuse of energy, substances and treated water

The MFR is a reactor integrating automatic mixing and dosage with two separate Advanced Oxidation Processes, based on the MITO3X® proprietary device. It is capable of treating 50 liters per day
The PES is a solar-driven device capable of removing organic matter, microorganisms, and contaminants of emerging concern from wastewater at the point-of-entry. It is capable of treating 100 liters per day
The SPP is a high-capacity plant that makes use of sunlight to trigger to activate powerful oxidants such as oxygen and persulfate. It is capable of treating up to 2000 liters per day

● Improved novel drinking water purification technologies for safe drinking water with easy access at affordable cost both in rural and urban regions:

The FAU is a multistep system combining filtration, adsorption, and disinfection by LED-generated Ultraviolet Light to produce drinking water at community scale. It is capable of treating 300 liters per hou
The TJC is a jerrycan constructed of UV-transparent, food grade material, and can be used to obtain drinking water at the household scale. It is capable of treating 20 liters per day
The EOD is a device that combines removal of geogenic contaminants (e.g. iron, arsenic and fluoride) by electrocoagulation, with the disinfection of chlorine dioxide and oxidation

● Strengthening the Sustainable Development Goals (SDGs) agenda on water.
● Creating a level playing field for European and Indian industries and SMEs working in this area, paving the way for a potential joint venture for manufacturing of water treatment technologies and systems

PANIWATER beneficiaries

Wall painting advocating WASH in Bundelkhand

Ostatnia aktualizacja: 11 Września 2024

Permalink: https://cordis.europa.eu/project/id/820718/reporting/pl