

CLEANWATER

Large eco-production of hypochlorous acid (HClO) for a safe water disinfection by an innovative ion exchange membrane

The drinking water disinfection necessarily includes a step of "chlorination", which consists in the disinfection with chlorine products (bleach or sodium hypochlorite NaClO, Cl₂...). This leads to several negative effects, including the formation of carcinogenic by-products (trihalomethanes or THM). Current chlorination processes require the transport and the storage of toxic products: gas chlorine is highly dangerous and difficult to manipulate.

Expertise of the consortium

Ceram Hyd is a French environmental technology SME that applies proprietary membrane technologies to break molecules in a controlled, cost and energy efficient manner to create high value products from low cost raw materials. Ceram Hyd has namely developed an innovative approach based on 4 patents which consists in activating Proton Exchange Membranes (PEM). They have elaborated in consequence a machine that produces chlorine product on site from salt and water. This solution called CW 1 000 substantially reduces or eliminates by-products. It produces a stable residual chlorine which prevents recontamination in pipelines.

Aqualia is the Spanish leader in water treatment. The social objective of Aqualia is to obtain water and make it suitable for human consumption in accordance with strict quality, distribution and subsequent treatment controls, in order to return it to the environment in satisfactory volumes and in acceptable condition, using the resources and materials employed in the process in an efficient and sustainable manner. Their R&D objectives include the quality of distributed water, reuse, desalination and metering.

Ceram Hyd eco-innovation

In order to answer to the European drinking water's issues, Ceram Hyd introduced an **innovative membrane technology** called CERAPEM. The flexible ceramic membrane technology allows **efficient ion exchange able to provide highly effective electrolysis** compared to other existing membrane technology (which are polymeric). From this membrane, Ceram Hyd has developed an **efficient drinking water disinfection system that produces directly hypochlorous acid**. Indeed, actually, in water treatment, hypochlorous acid is the active sanitizer resulting from the dissolution of hypochlorite-based products (Chlorine Gas, Sodium Hypochlorite or other chlorine sources) in water. The Ceram Hyd technology is able to **generate hypochlorous acid directly, rather than indirectly through other forms of chlorine, making the disinfection process faster, safer and more reliable, with a reduced environmental impact** (reduced chemicals and energy consumption, reduced production of chlorine by-products).

Objectives of CleanWater

The overall objective of CleanWater is to introduce this eco-innovative technology in the European drinking water disinfection market. Therefore, the CleanWater project aims to :

- **Scale-up Ceram Hyd's disinfection system up to CW 50 kWh (from 100 000 to 250 000 m³/day) - CW 100 kWh (from 250 000 to 500 000 m³/day) for applications** in European municipalities and drinking water treatment/distribution industries;
- **Install 3 commercial demonstrators including in Aqualia's industrial sites.** CleanWater will implement intensive tests in operational conditions in order to optimize the system for commercial and certification purposes;
- **Launch a certification process** in order to qualify the Ceram Hyd's final drinking water disinfection products at European level;
- **Promote and disseminate the results** all over Europe to ensure market replication of the eco-innovation for water disinfection applications including drinking water, desalination, wastewater treatment or food disinfection.



CIP Eco-Innovation

The eco-innovation initiative bridges the gap between research and the market. It helps good ideas for innovative products, services and processes that protect the environment become fully-fledged commercial prospects, ready for use by business and industry. In doing so the initiative not only helps the EU meet its environmental objectives but also boosts economic growth.



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