

## Analysis for Innovators (A4I): Supporting industry

Providing technical validation to enhanced credibility for a novel disruptive technology that enables quick and clean non-chemical water treatment.

## Background

Air Quality Research Ltd (AQR) develops bespoke chemical-free, energy-saving products for bacteria control and chemical decontamination, providing safe and clean water.

Water is a precious resource that we must aim to conserve. In the UK, high value manufacturing is seen as a key area of economic growth, yet industry is one of the main consumers of water (>70 %). Manufacturing industries face rising wastewater treatment costs from increasing environmental regulations with potentially expensive penalties for getting it wrong. Rather than release wastewater to municipal treatment plants, industries are tending to invest in on-site treatment processes. Novel technologies and solutions for wastewater management are necessary for the UK to meet its sustainability goals, reducing water wastage and enabling reuse wherever possible.

AQR has developed a novel energy-saving, non-chemical disinfection process based on generation of a suite of free radicals, including hydroxyls. Hydroxyls are recognised as nature's most effective disinfection agents, significantly more effective than ozone. However, measuring the presence and amount of hydroxyl radicals produced is challenging as they are short-lived and reactive, and cannot be measured directly.

Through the Analysis for Innovators (A4I) partnership, AQR had access to innovative and advanced measurement and analytical technologies within the National Measurement Laboratory (NML) at LGC to better understand their treatment process and increase its efficiency.

## Impact

Our scientists supported AQR to validate that radicals are produced in their disinfection process and provide technical evidence for the efficacy of their non-chemical system.

We developed a method using direct ambient ionisation coupled to transportable mass spectrometry. This method, which allowed measurements to be made in non-laboratory environments, confirmed that hydroxyl radicals were generated using AQR's technology. A number of test rigs were assessed for radical generation and initial optimisation of the technology performed.

As a result of this project, AQR have been able to develop their product for high value manufacturing applications where 'single-pass' disinfection is preferred. They are now working with a major water company on a feasibility study to treat raw surface waters rich in organic content to sustainably provide affordable point-of-use drinking water for small rural communities, improving local regional infrastructure. If successful, this study could lead to £40 million revenue for the business.

In addition, a new Commercial Director was employed at AQR during the A4I project with the aim of expanding the potential target applications to different sectors that require fluid treatment at source, such as the food processing, pharmaceutical and textile industries.

"The A4I project with the NML provided crucial technical validation and has given significant credibility to our novel disruptive technology. The impact of the project has been extremely positive and given us confidence to bid for contracts that we may otherwise have not considered. We have recently won such a contract that has the potential for generating £40 million worth of business for AQR, a fantastic success story for the collaboration between AQR and the NML through the A4I programme."

- Rayne Longhurst, Operations Director, AQR

### Analysis for Innovators (A4I)

The A4I programme is run by the UK National Measurement Laboratories, the Science and Technology Facilities Council and Innovate UK. It provides companies with access to state-of-the-art measurement and analytical technologies to solve existing analysis and measurement problems that are a barrier to competitiveness or productivity.



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