

Tertiary Treatment for Compliant Discharge and Reuse in the E-Cigarette and Tobacco Manufacturing Industry

Background

Major tobacco processing facilities have approached Arvia for treatment support in different stages of their value chains.

Common applications include reducing the overall organic loading to enable wastewater recycling, as well as the targeted removal of nicotine for compliant discharge to the local sewer.

Preliminary studies show that inadequately treated wastewater containing organic compounds which eventually leaches into aquatic ecosystems, becomes acutely toxic to fish and microorganisms. This can lead to severe pollution of local waterways surrounding these facilities and negative press for the offending organisations.

An existing solution for the removal of these compounds is to collect the wastewater and truck it off-site for specialist treatment. Not only is this labour intensive for the company, it also comes with expensive recurring costs and environmental impacts.



The Objectives

Tobacco processing facilities have been looking for more cost-effective and sustainable methods which are in-line with their water management plans.

Client One was looking for a complete closed-loop solution in which Chemical Oxygen Demand (COD) would be reduced from 50mg/L to as close to zero as possible. This wastewater could then be reused for other purposes around the facility, including cleaning.

Client Two was looking for an on-site solution for the removal of nicotine from wash water collected from e-cigarette liquid vessels between production batches. Their existing process was to truck all wash down water off-site for specialist treatment as they are not permitted to release this water to sewer, due to the nicotine content.



Full scale Nyex containerised system

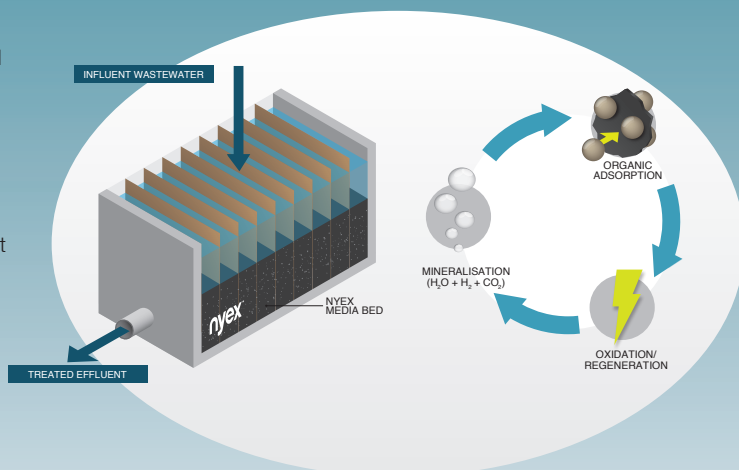
The Solution

Arvia's Nyex™ Treatment Systems combine adsorption with electrochemical oxidation in a single, scalable unit.

Contaminants are concentrated on the surface of Arvia's proprietary adsorbent media which is non-porous with high electrical conductivity. This patented media allows for targeted and continuous oxidation using a low electrical current. Unlike Granular Activated Carbon (GAC), Nyex™ media is effectively regenerated in-situ and the process can continue without interruption or replacement.

The system provides a chemical free and environmentally sound solution, which comes in a modular design and can be integrated into an existing treatment train to improve organic removal capacities.

Figure 1 – Schematic of Arvia's combined adsorption and electrochemical oxidation process, Nyex™



The Results

Client One

The project involved the treatment of wastewater using a Nyex™ 1-20a system at the client's site on samples of wastewater taken at the final stage of their existing treatment train, for advanced 'polishing' treatment.

The inlet water was analysed at a COD level of around 50 mg/L and final samples were just above the limit of detection, as requested.

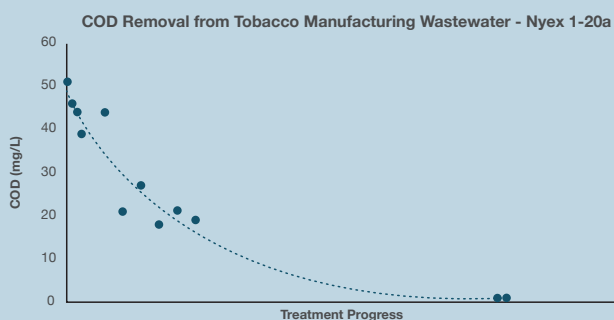


Figure 2 – On-site COD removal by Arvia's Nyex™ 1-20a system, against treatment progress

Client Two

This work was conducted to demonstrate the ability of the Nyex™ technology in removing nicotine from wash water, containing their e-cigarette liquid.

For this study, the Nyex™ 1-20a was employed at Arvia's in-house laboratory facilities and results were as follows.

An inlet nicotine concentration of 9.84 mg/L was trialed, resulting in a 0.41 mg/L outlet concentration following treatment – a removal rate of 95.8%.

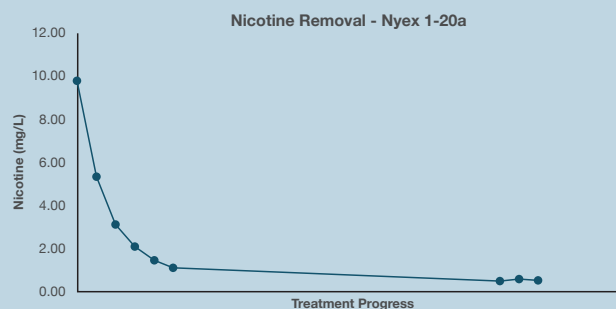


Figure 3 – Nicotine removal by Arvia's Nyex™ 1-20a system, against treatment progress

The above-mentioned treatments of COD for wastewater reuse and nicotine for compliant discharge to sewer, demonstrate the Nyex™ process's ability to manage recalcitrant, toxic contaminants in wastewater streams.

Arvia are continuing to work with a number of clients in the tobacco and smoke-free alternatives sectors with wastewater analysis and treatment, as well as ongoing value chain investigation to support further cost-saving and sustainable water management practices.

To organise an on-site water management analysis by one of our experienced Process Engineers or a Treatability Trial on a sample of wastewater from your own facility, please get in touch on **+44(0)1928 515 320**.

Get in touch to discuss your company's treatment challenges and arrange a treatability trial on your wastewater today.

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Safer water for future generations