



# The Effective Removal of Herbicides from Industrial Wastewater with Arvia's Nyex™ Treatment System

Equipment Capacity/Flow Rate

Low Flow

Compounds of Concern

5 Herbicides

Influent Concentration

1.1 mg/L

Treatment Targets

<0.001 mg/L

Unit Energy Consumption

tbc

## Background

The use of pesticides and herbicides for crop protection is expected to increase as the world population rises. As intensive farming methods continue to rely heavily on chemicals, the levels of persistent herbicides and pesticides prevalent in the environment also remains at dangerous levels.

The harsh reality is that agrochemicals, such as insecticides and germicides, can remain in the environment for many years, even entering sources used for drinking water where they pose a significant threat to human health.

Fortunately, public knowledge of the dangers of these chemicals is increasing pressure on agrochemical companies to remove pesticides and herbicides before the wastewater enters other water bodies.

This new awareness of the potential dangers is driving a number of new regulations to be introduced in Europe and around the world.

In 2020, the EU regulation for discharging to a water body has been amended. Volatile AOXs (halogenated organic compounds) must fall under a yearly average of < 1mg/L and many agrochemicals fall under this category.

Many agrochemicals are resistant to conventional biological treatment owing to their high toxicity and biological persistence. This means that advanced water technologies must be employed to eradicate dangerous levels from wastewater.

There is also a drive from many companies to improve wastewater treatment plants to be more effective at treating agrochemicals. Currently, many companies lack the technology to effectively remove agrochemicals instead, sending their waste to a third party to treat or having it incinerated. Both of which are expensive and not eco friendly.

## The Objectives

Arvia was employed to work with an agrochemical manufacturer to help treat its wastewater in Israel.

The wastewater was from an agrochemical manufacturer who wanted to meet the industry standard with its wastewater discharge.

The objective of the project was to assess the effectiveness of the Nyex™ treatment system in reducing the total herbicide concentration in the wastewater to UK drinking water standards, from 1.1 mg/L to <0.001 mg/L.

The manufacturer was keen to show its commitment to protecting the environment through the removal of micropollutant compounds in discharge water.

The concentrations of 5 different herbicides: Imazomox, Florasulam, Nicosulfuron, Imazapyr and Clomazone were studied before and after treatment with the system.



Nyex-a reactors ready for installation into the treatment basin at a client's site.

## The Solution

Arvia's Nyex-a treatment system combines adsorption with advanced oxidation in a single, scalable unit. Trace organics are concentrated on the surface of Arvia's proprietary media, which is non-porous with high electrical conductivity. This patented adsorbent media allows for targeted and continuous oxidation.

Unlike granular activated carbon, this media is effectively regenerated in situ and the process can continue without interruption or replacement. Results are achieved without chemical dosing or the generation of sludge, reducing costs in terms of transport of chemicals and specialist waste disposal.

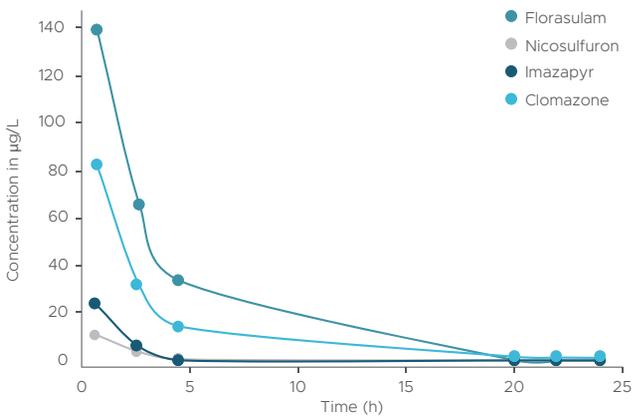
The system provides a chemical free and environmentally sound solution, which comes in a modular design and can be bolted onto an existing treatment solution. It is also versatile and can be modified to suit a manufacturer's specific requirement for reuse or effluent discharge.

A laboratory-scale version of the Nyex-a treatment system was initially tested at Arvia's in-house facility. The capabilities proven resulted in the project being scaled-up, with the construction of a Nyex 7-100a pilot system on the manufacturing site.

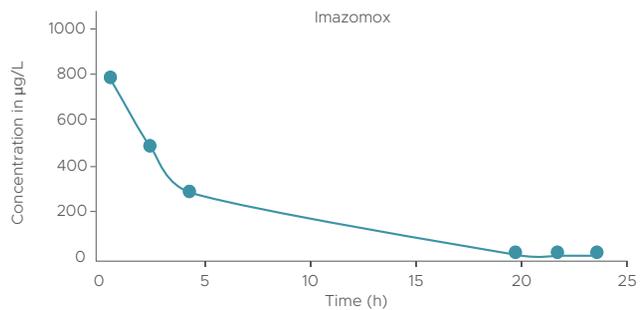
## The Results

Following the trial, the herbicides were successfully removed from the wastewater to safe levels.

This trial showed a mean herbicide removal of approximately 99.8% with an applied current of 1 Amp.



	Start Concentration (µg/L)	Final Concentration (µg/L)	% Removal
Imazomox	769	1.0	99.9
Florasulam	139	<0.1	99.9
Nicosulfuron	11	<0.1	99.1
Imazapyr	24	<0.1	99.6
Clomazone	82	1.2	99.6



Arvia has worked closely with companies in the agrochemical sector, and has experience removing a number of chemicals such as:

- 2,4-D
- Atrazine
- Mecoprop
- Boscalid
- Carbendazim
- Metaldehyde
- MCPA
- DCMU
- Terbutryn

Arvia is constantly developing ways to eliminate micropollutants and is committed to removing agrochemicals from wastewater, not only to comply with regulations, but to make water supplies safe for future generations.



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