

Treating RCRA Hazardous Wastewater Containing a Chemotherapy API, Chloroform & Ethanol to Eliminate Off-site Trucking and Incineration

Customer Pain Point

A US pharmaceutical manufacturer of oncology medicines generates CIP rinse water contaminated with a chemotherapy active pharmaceutical ingredient (API), chloroform, acetone, ethanol, and isopropyl alcohol (IPA). Chloroform is classified as a hazardous waste under the Resource Conservation and Recovery Act (RCRA) and acetone is an EPA regulated compound under Title 40 pretreatment standards. The rinse water is drummed and trucked off-site for incineration.

The plant wants to treat the wastewater on-site to eliminate off-site trucking and incineration, reduce costs, streamline operations and improve sustainability performance. In order to treat the stream on-site so it can be safely discharged to sewer, the chloroform must be treated to < 2 mg/L, the acetone must be treated to < 8.2 mg/L and the API needs to be reduced below established site limits. Axine was selected to perform treatability testing to verify the cost and performance of its technology and services for on-site treatment.



Axine pilot system at a customer site

Axine Value Proposition



Generates opex savings via Axine's service model



Eliminates off-site trucking & incineration of wastewater



Addresses corporate EHS & sustainability goals



Automates & streamlines waste treatment system

Treatability Methodology

Samples of rinse water were shipped to Axine for analysis of API, solvent, COD and TDS concentration. Each sample was processed in Axine's testing facility and the treated water was analyzed. Table 1 shows the wastewater composition before and after Axine treatment.

Treatment Results

As shown in Table 1, Axine successfully treated the chloroform and the acetone well below the required objectives while reducing COD from 21,500 to 750 mg/L.

Chloroform was reduced by > 99.9% from 488 mg/L to non-detect (< 0.001 mg/L) and acetone was reduced from 5 mg/L to < 0.5 mg/L. The API was reduced by > 99.3% from 8 mg/L to < 0.05 mg/L. Ethanol and IPA were both reduced by > 99.0%. Figure 1 below shows treatment reduction curves for COD, chloroform and the API. The objectives for chloroform and the API are met when COD is reduced to below 8,000 mg/L, which corresponds to a 63% COD reduction. It is important to note that the level of COD removal required to achieve treatment objectives for solvents and APIs can be different and is dependent on a number of factors including wastewater composition, discharge permit requirements and presence of any further treatment processes downstream.

Parameter	Units	Treatment Requirement	Untreated Water	Axine Treated Water	% Reduction
API	mg/L	< 0.2	8	< 0.05*	> 99.3%
Chloroform	mg/L	< 2	500	< 0.001*	> 99.9%
Acetone	mg/L	< 8.2	5	< 0.5*	> 90.0%
COD	mg/L	N/A	21,500	750	> 95.3%

Table 1 - Wastewater parameters and treatment results
 *Values indicate the analytical detection limits of these compounds

Conclusion

The treatability test successfully verified Axine’s capability to reduce the API, chloroform and acetone in the CIP rinse water so the treated water can safely be discharged to sewer. Adoption of Axine’s on-site treatment solution will enable the customer to generate immediate savings, streamline operations and eliminate off-site trucking and incineration.

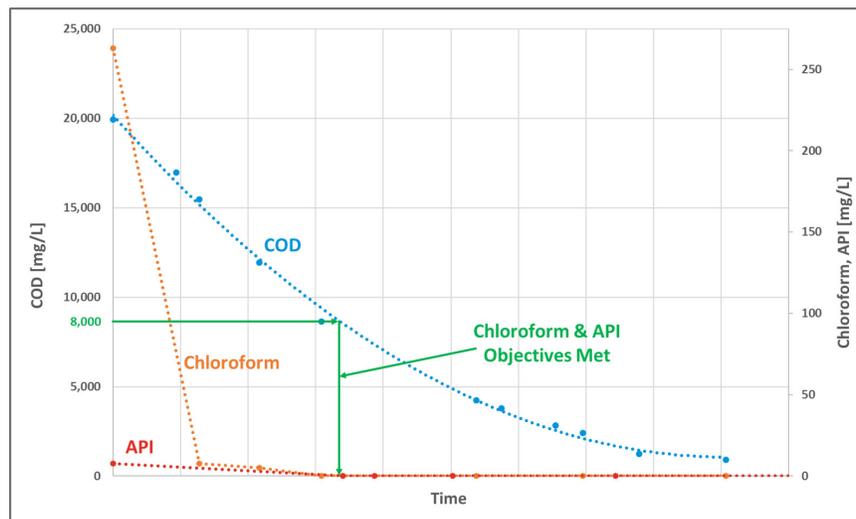


Figure 1 - Treatment reduction curves for API and COD concentrations before, during and after Axine treatment of a chemotherapy API

About Axine

Axine has created a new standard for treating toxic, recalcitrant organic pollutants in pharmaceutical, chemical and other industrial wastewater to address a global problem. Axine’s breakthrough solution combines advanced electrochemical oxidation technology with a flexible, modular system design and a unique wastewater-as-a-service business model. Axine provides customers with a robust, versatile solution capable of treating all types of organics to meet the most stringent treatment requirements without using hazardous chemicals. Axine’s service model enables customers to achieve wastewater and sustainability goals with minimal capital investment and technology risk. For more information, please visit www.axinewater.com

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