

EVALUATION OF EFFICIENCY OF



FOR THE REMOVAL OF HEAVY METALS ON INDUSTRIAL WASTEWATER

technology



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Soda Ash & Derivatives

Introduction

Solvay has developed an innovative **non-toxic mineral** named **Capterall™** for the **wastewater treatment**. It is especially efficient in the **removal** of a large gamma of **metals** and is active in a **broad range of pH**.

VITO (Vlaamse Instelling voor Technologisch Onderzoek)

VITO is a leading European independent research and technology organisation providing innovative and high-quality solutions to face the today societal challenges.

Materials and methods

In this study, **VITO** executed a test on two different types of industrial wastewater: **powder coating** and **metal recuperation**. The two samples contained various types of **heavy metals** in different concentrations which were then treated with Solvay's innovation. A **batch test** took place in order to find out the **efficiency of the product** on different **water streams**.

The **procedure** for the batch tests is as follows (Capterall™ is not pulverized, dried or sieved before starting the test):

1. Dosing of product in different concentrations (as DM) in glass bottles (500 ml or 1000 ml)
2. At each bottle 400 ml or 800 ml of wastewater is added, after pH adjustment if necessary
3. Closing of bottles and rolling/mixing of bottles overnight
4. Centrifugation 10 min @ 4500 rpm
5. Analyses of the filtrate

Results

The **results** below show that Capterall™ is able to **remove** different types of metals at **different pHs** with high efficiency. The charts and tables show the **removal rate** of the different metals in the water samples at different pHs. The first sample is from the **powder coating**:

Table 1: Water sample from powder coating of metals at different pHs

Metals (mg/l)	Inlet Concentration	Outlet Concentration (pH 6)	Outlet Concentration (pH 7)	Outlet Concentration (pH 8)
Al	0.760	0.056	<0.01	<0.01
Cr	0.055	0.004	<0.002	<0.002
F	21.5	<0.2	0.3	1.4
Fe	0.54	0.039	<0.01	<0.01
Hg	0.0029	<0.0005	<0.0005	<0.0005
Mn	5.67	0.005	0.004	0.015
Ni	7.77	0.042	0.021	0.046
Zn	1.32	0.025	0.062	0.024

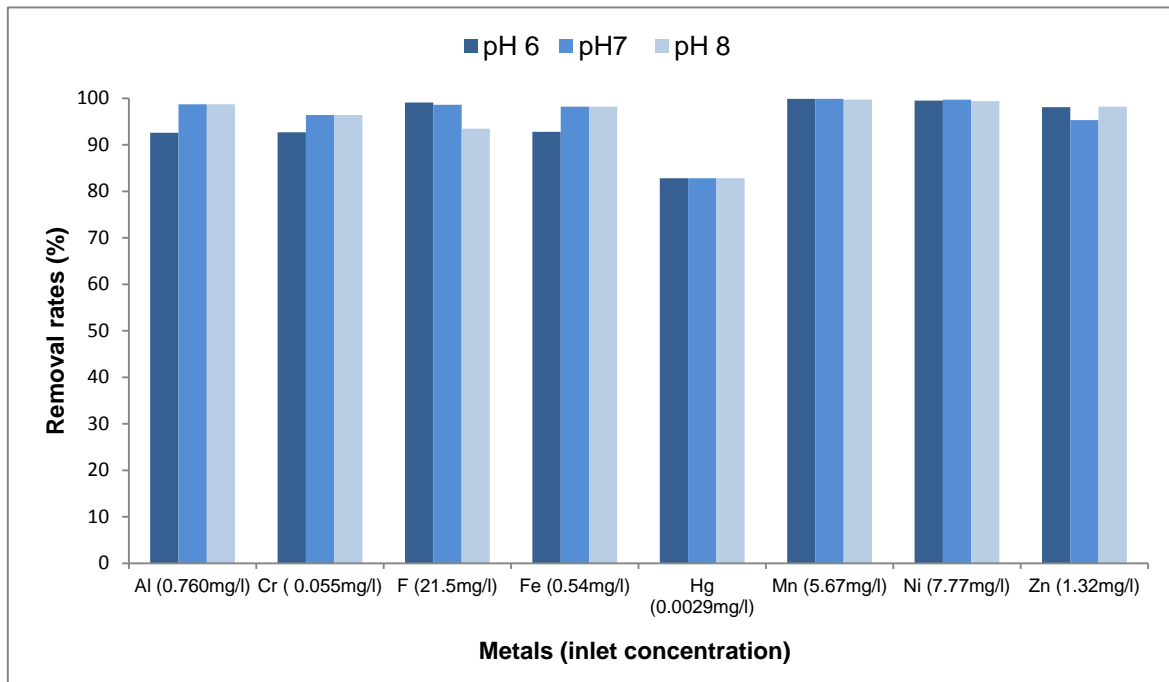


Figure 1: Removal rates of powder coating sample

On the following case, the water sample is from **metal recuperation**. In this case, the sample was done at **ph 8** without **any adjustment** to different pHs.

Table 2: Water sample from metal recuperation

Metals (mg/l)	Inlet concentration	Outlet concentration (pH 8)
Cd	0.039	0.001
Cu	0.149	<0.004
F	13.5	<0.2
Fe	0.21	<0.01
Mn	0.144	0.003
Ni	0.346	0.018
Pb	0.830	<0.002
Sb	0.028	0.002
Zn	1.42	0.004

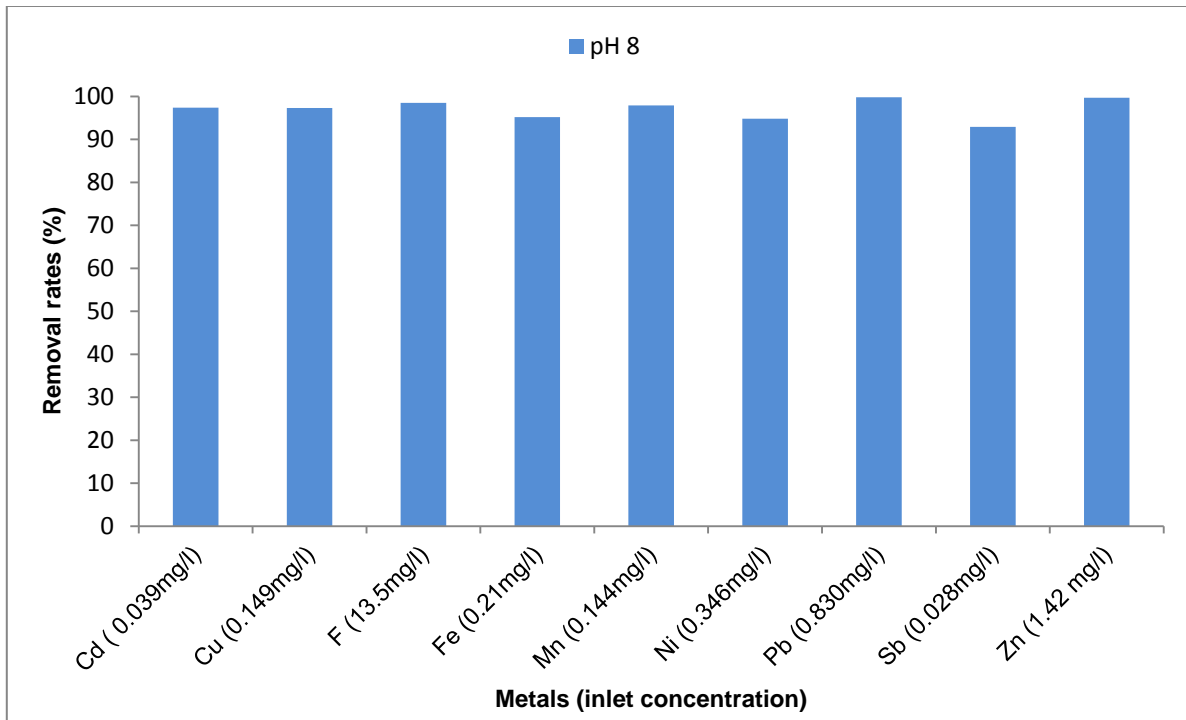


Figure 1: Removal rates in the metal recuperation sample

Case Conclusions

After this study it can be concluded that Solvay's product Capterall™:

- Is a **multi-metal capturer**
- Reaches very **low discharge limits** (ppb) allowing **water reuse** in the production.
- Handles **fluctuations**
- It has **high removal efficiency** regardless of the initial concentration
- Efficient at **different pHs**
- Is a **non-toxic product** placed in a **compact installation** (Reactor + Decanter)
- Needs relatively **low maintenance**
- The results are **guaranteed by Solvay**.