knowledge base

Lab Project at IWP Zevenbergen

Showcase DOC removal and turbidity reduction using CIWI Fe produced on-site with a TRL5 pilot system at IWP Zevenbergen.

CIWI

ciwi.earth

Lab project at **IWP Zevenbergen**

Objective

Showcase DOC removal and turbidity reduction using CIWI Fe produced on-site with a TRL5 pilot system at IWP Zevenbergen. CIWI Fe was produced at prototype-pilot scale, collected as product, and then applied in separate lab tests (jar-tests); it was not dosed directly into the operational treatment process during this pilot.

Plant Overview

IWP Zevenbergen is no longer operated as a drinking-water production plant, but produced process water for industrial use. In this project it should be considered a primary-treatment site. The treatment line consists of coagulation/flocculation with flotation, followed by rapid sand filtration (anthracite/sand).

Before distribution to industrial clients, the water is chlorinated. The site uses Biesbosch/Meuse (Maas) surface-water as a source, with a capacity of around 5 million m^3/year.

Sampling notes & limitations

CIWI Fe was produced on-site using a pilot unit (not the CIWI ME lab system), using mild steel feedstock, salt (NaCl), water and electricity to generate an iron-based coagulant at pilot scale. The produced CIWI Fe was collected as product samples and transported/used for off-line lab testing (jar-test style) to evaluate DOC removal and turbidity reduction. During this pilot phase, CIWI Fe was not dosed directly into Brabant Water's operational treatment process.

Because performance was assessed off-line, outcomes reflect controlled lab conditions rather than full-scale in-process behaviour (mixing, hydraulics, contact time, sludge handling, and operator setpoints). The focus was therefore on validating pilot-scale production and demonstrating product performance in lab tests.

Custom-made dosing for DOC-removal

CIWI

knowledge base

The **Procedure**

CIWI operated a pilot system at the Zevenbergen site to produce CIWI Fe at a larger scale than the CIWI ME lab system. Product samples were collected from the pilot and analysed for basic quality parameters (e.g., iron concentration). The collected CIWI Fe, after integrated HCl dosing to reach the targeted H+/Fe-ratio, was used in separate lab experiments at Brabant Water to assess DOC removal and turbidity reduction under controlled conditions. Jar-tests were performed in a flocculator setup, following Brabant Water's standard jar-test procedure. To the beaker containing influent water from the site, CIWI-Fe or $FeCl_3$ was dosed during rapid mixing (200 rpm). This was followed by medium-intensity mixing (50 rpm) for 2 minutes and slow mixing (10 rpm) for 15 minutes. After 15-30 minutes of settling, supernatant samples were taken for DOC and turbidity analysis.

The **Result**

With influent DOC at 4.0 mg C/L, dosing of 12 mg $FeCl_3$ removed 1.2 mg C/L, to 2.8 mg C/L in the clear SN water. While for a CIWI-Fe with a H+:Fe-ratio of 0.3:1 the DOC removal was limited, a CIWI-Fe with a H+:Fe-ratio higher than 2.0:1 reached near similar removal as for $FeCl_3$.

Data Higher H+:Fe ratios improve DOC removal