Water - **MDPI**
Supporting Information for manuscript

Arsenite to Arsenate Oxidation and Water Disinfection via Solar Heterogeneous Photocatalysis: A Kinetic and Statistical Approach

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S1 Ferric chloride dose determination.

Multiple linear regression has been reported as a tool to find optimal dosage for coagulant [1–3]; in the present experiment, simple linear regression analysis was used to find the optimum ferric chloride ($FeCl_3$) dose. 0.5 L of groundwater were spiked with a sodium arsenite (NaAsO2; J.T. Baker, USA, CAS: 7784-46-5) solution to increase arsenite (AsIII) concentration in 300 µg /L; groundwater already had an arsenic (As) concentration of 51.52 µg/L (46.06 µg/L of As^{III} and 5.46 µg/L of As^{V}). Different doses were assessed in a coagulation-flocculation experiment following a jar test protocol with rapid mixing (400 rpm) for 1 min, followed by slow mixing (20 rpm) for 10 min, and 20 min for settling [4]. After settling, As concentration in the supernatant was quantified by graphite furnace atomic absorption spectroscopy (GH-AAS). Table S1 shows the different testes dosages, as well as the As concentration in the supernatant.

Table S1. $FeCl_3$ dose and As concentration in the supernatant.

$FeCl_3$ (mg / L)	As^{III} (µg / L)
7.68	1.93
3.84	4.44
1.92	15.53
0.96	70.23
0.48	301.07
0.24	341.97
0	365.43

Data was fitted to exponential regression equation, as show in Equation S1

$$y = \alpha \times e^{\beta \times x} \quad \text{(S1)}$$

Coefficient of determination (R^2) was 0.90; coefficients were calculated with regression analysis: α =211.92, and $\beta = -1.442$. To attain an As concentration lower than 10 μg / L, 2.19 mg / L $FeCl_3$ is needed.

References

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