

[Supplementary Material]

Critical Review: Biogeochemical Networking of Iron, Is It Important in Constructed Wetlands for Wastewater Treatment?

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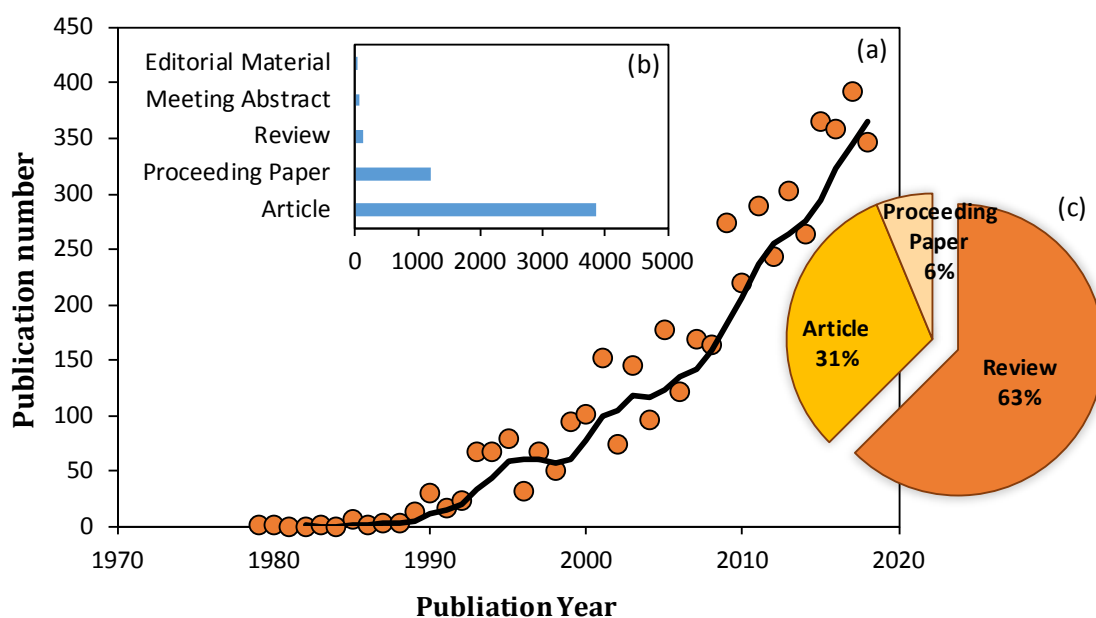


Figure S1 Publication record in the timespan of 1900-2018 in the Web of Science Core Collection by searching for “TITLE: (constructed wetlands) OR TITLE: (treatment wetlands)”. (a) Yearly publication record; (b) Document types; (c) Distribution of highly cited papers in field.

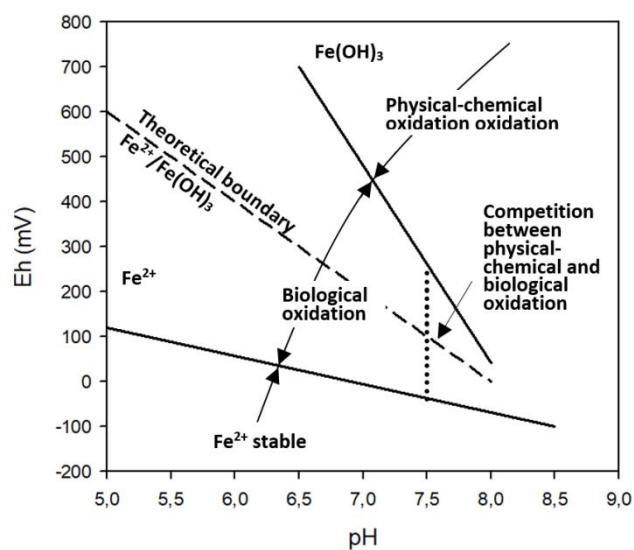


Figure S2 Field of activity of iron bacteria as defined by thermodynamic analysis of the electrochemical equilibria (adapted from Mouchet (1992))

Table S1. Content of Fe in various wastewaters

Wastewater Type	Fe concentration (mg/L)	Places	References
Municipal sewage	0.930±1.140	Morina, Czech Republic	1
	2.417±2.860	Brehov, Czech Republic	1
	0.980±0.550	Slavosovice, Czech Republic	1
	2.2-15.3	Kotowice, Poland	2
	0.28-5.2	Kostrzyca, Poland	2
	1.4-7.6	Brzezno, Poland	2
	0.43-0.76	Flanders, Belgium	3
Agricultural runoff	<0.02	Canada	4
	0.038-1.69	Florida, USA	5
	0.17	Arkansa, USA	6

Golf course effluent	0.75-1.49	Purdue, USA	7
Highway runoff	0.032-3.31	California, USA	8
	13.2-60.2	Osaka, Japan	9
	9.8-57.9	Stockholm, Sweden	10
Oil refinery wastewater	4-7.5	Rawalpindi, Pakistan	11
	1.4	India	12
	0.33-11.7	Ruwais, UAE	13
Tannery wastewater	3.12	Rouiba, Algiers	14
	20	Italy	15
Textile	0.28	Taiwan, China	16
	0.83-2.12	Turkey	17
	1.08-3.11	Pakistan	18
	0.11-0.16	Malaysia	19
Landfill Leachate	45±31	Esval, Norway	20
	32±35	Bolstad, Norway	20
	16.2	Wiltshire, UK	21
	27-116	Sundon landfill, UK	21
	11.1	Buckden South leachate, UK	21
	16.9	Siltshire, UK	21
Mine drainage	45	Whittle Colliery, UK	
	170	Athens, USA	22
	2.1-255.6	Tinsukia, India	23
	6.7-650		24
	229	Korea	25
	105-1400	Canada	26
	44	Jackson, USA	27
	100	Jackson, USA	28
	27-333	Athens, USA	22
	205	Jackson, USA	27
	6.5-33.6	UK	29
	682-45595	Spain	30
	278-688	England, UK	31

Table S2. Use of materials rich in iron as substrate in CWs

Materials	Description	Reference
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Sponge iron	Sponge iron is direct reduced iron, produced from the direct reduction of iron ore to iron by a reducing gas or elemental carbon produced from natural gas or coal.	32, 33
Bauxite	Bauxite is a rock material with a relatively high aluminum content and mixed with the two iron oxides goethite and haematite.	34-37
Fly ash	Fly ash is a waste product from coal combustion, consisting mainly of spherical glassy particles of silica, alumina and iron oxides	38-40
Steel slag	Steel slag is primarily made of iron and calcium oxide, as a result of the use of fluxing agents (mainly lime) during the steelmaking process.	41-44
Drinking water treatment residuals	By-products from drinking water production from surface water in which Al- or Fe-rich flocculants are added to precipitate suspended solids and phytoplankton.	45-48
Emerging materials with iron coating	<ul style="list-style-type: none"> ▪ Expanded clay with iron oxide coatings; ▪ Quartz sand with iron oxide coatings; ▪ Sand with iron oxide coatings; ▪ Crushed brick with iron oxide coatings. 	49, 50 51 52 52

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