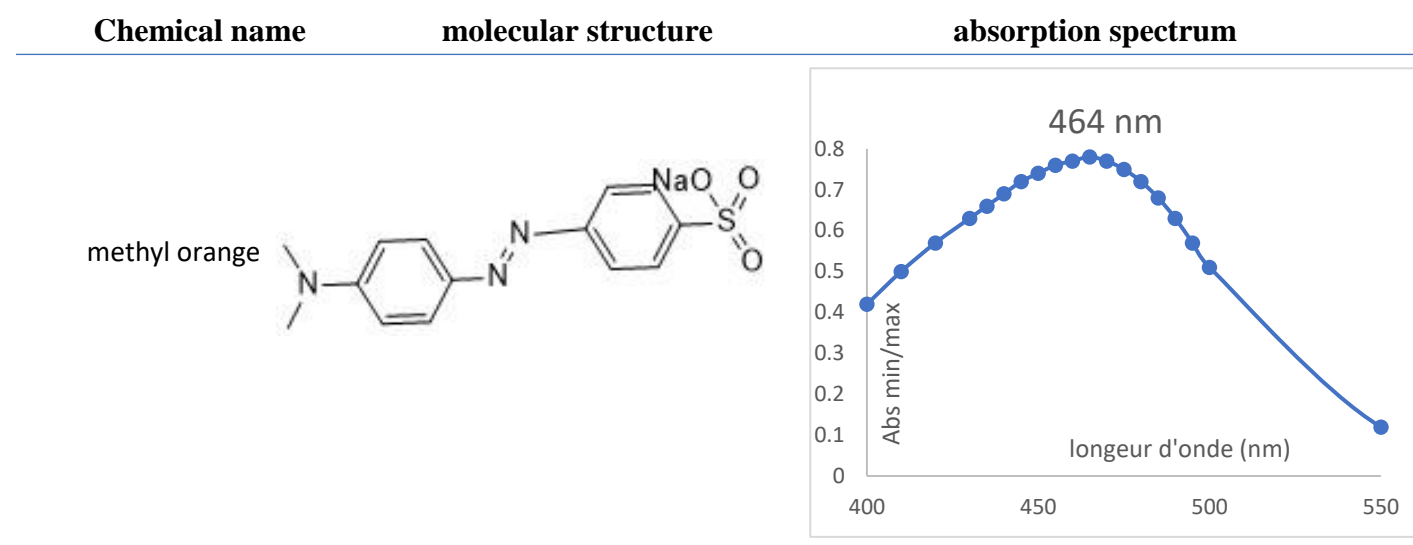| Chemical name	molecular structure	absorption spectrum
methyl orange		

Figure S1. Molecular structure and absorption spectrum of methyl orange MO.
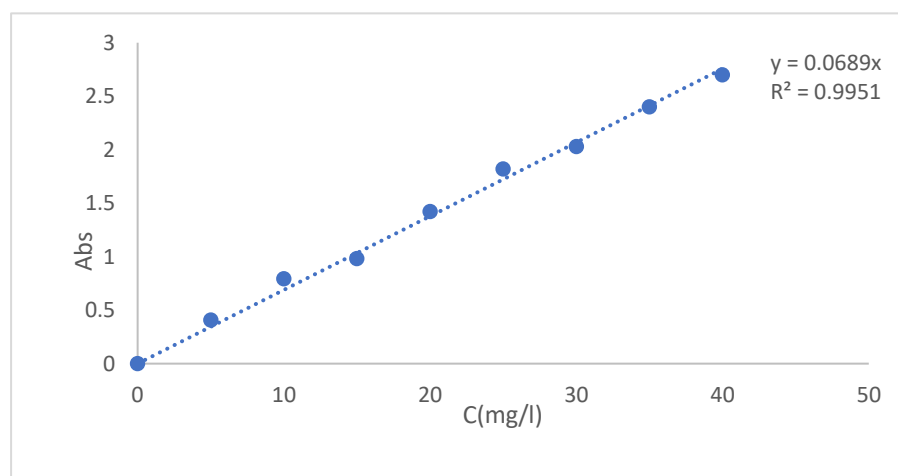

Figure S2: Calibration curve of methyl orange dye at 464nm wavelength

Prediction and Optimization of Electro Fenton process parameters using a BBD experimental design
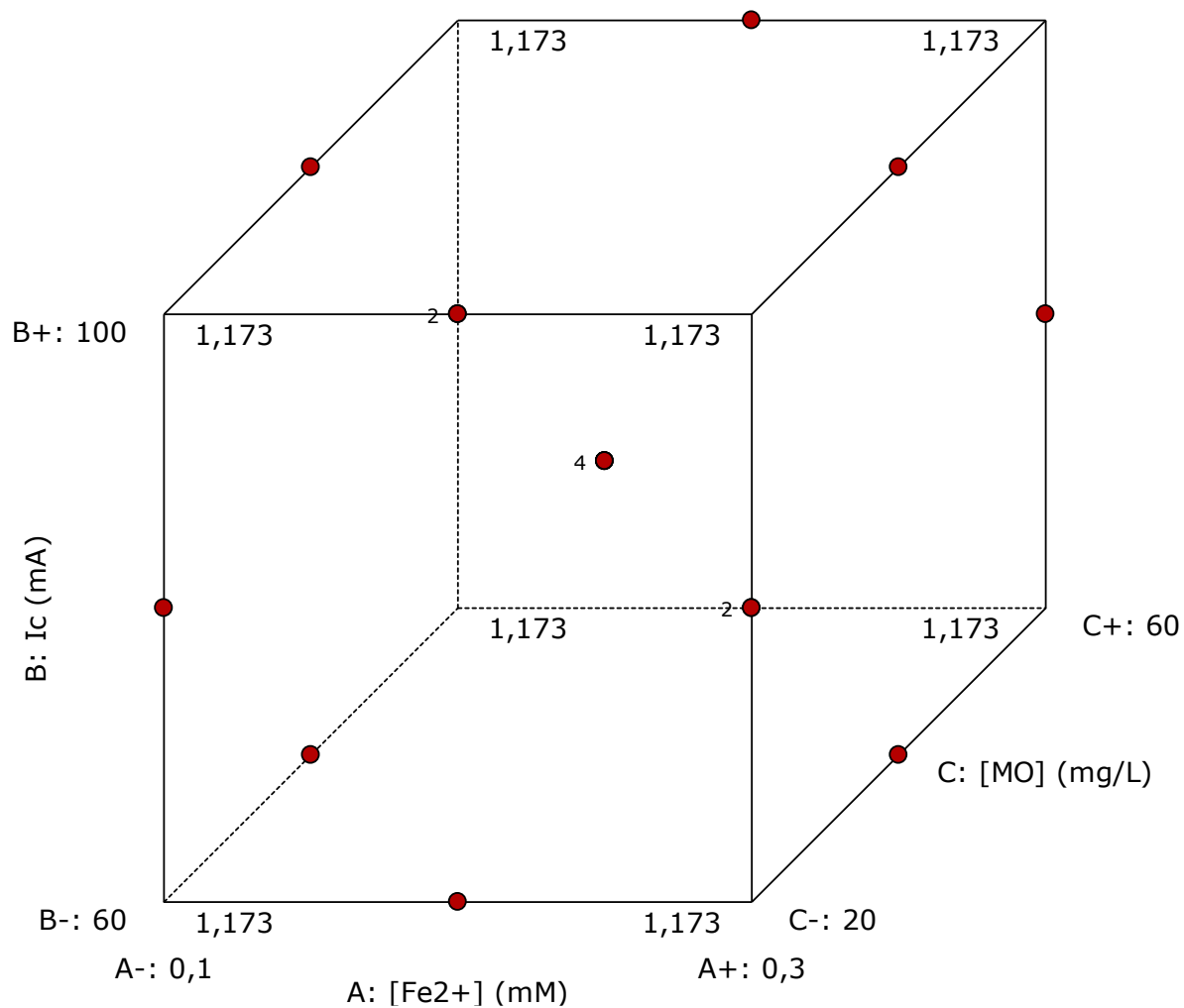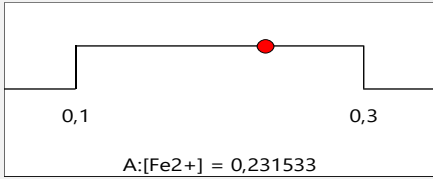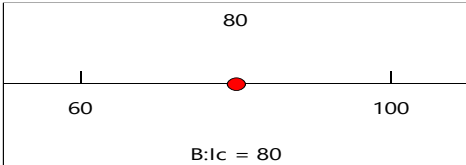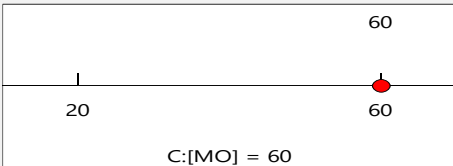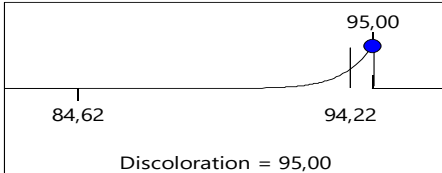

Figure S3: geometrical location of the experimental points of the BDD design.

Table S1: Experimental design matrix and response

	Factor 1	Factor 2	Factor 3	Response 1	
Run	A:[Fe^{2+}]	B:I$_c$	C:[MO]	Dis coloration rate (%)	
	mM	mA	mg/L	Experimental	Predicted
1	0,2	60	60	93,00	95,06
2	0,2	100	20	85,27	85,90
3	0,2	80	40	91,94	90,48
4	0,1	100	40	85,50	87,88
5	0,3	80	60	94,20	96,32
6	0,1	60	40	88,72	89,23
7	0,2	60	20	87,11	87,25
8	0,3	60	40	94,22	93,08
9	0,1	80	60	94,19	92,46
10	0,2	80	40	91,98	90,48
11	0,2	80	40	91,94	90,48
12	0,3	100	40	93,83	91,74
13	0,2	100	60	93,07	93,72
14	0,2	80	40	91,94	90,48
15	0,1	80	20	84,62	84,65
16	0,3	80	20	86,20	88,50

Table S2: Optimization constraints using the desirability function:

Name	Goal	Importance	Graphe
$[Fe^{2+}]$	is in range [0,1 - 0,3]	3	0,1 0,3 A:[Fe2+] = 0,231533
I_c	egual to 80 mA	3	80 60 100 B:Ic = 80
[MO]	equal to 60 mg/L	3	60 20 60 C:[MO] = 60
Discoloration rate	Target = 95%	5	95,00 84,62 94,22 Discoloration = 95,00