

Supplementary material to

AN ENVIRONMENTALLY FRIENDLY INDIGO DYEING PROCESS USING IRON (II) GLUCONATE AS A REDUCING AGENT

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Table S1. Reduction process parameters and their levels.

Input parameters	Symbols	Variation levels		
		-1	0	1
Reduction temperature (°C)	T (°C)	50	75	90
Sodium hydroxyde concentration (g/L)	S (g/L)	5	20	30
Iron (II) gluconate concentration	Red (g/L)	8	18	20

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Table S2. Responses of the full factorial design.

Run order	Factors			Responses	
	Red (g/L)	S (g/L)	T (°C)	K/S	RP (mv)
1	18	30	90	14.8 ± 0.4	-642 ± 9.9
2	8	30	90	4.3 ± 1	-581 ± 8.5
3	18	5	75	16 ± 0.7	-592 ± 9.1
4	8	30	50	4 ± 0.4	-580 ± 7.1
5	18	5	90	9 ± 0.7	-608 ± 11.3
6	20	30	50	15.2 ± 0.4	-650 ± 9.9
7	20	5	90	10.9 ± 0.8	-575 ± 8.5
8	18	5	50	9.2 ± 0.4	-578 ± 14.1
9	20	5	50	15.1 ± 0.6	-595 ± 18.4
10	8	5	75	2.1 ± 0.4	-582 ± 5.7
11	20	30	90	15.9 ± 0.4	-649 ± 14.1
12	8	20	75	6.5 ± 0.4	-598 ± 17
13	8	20	90	4.5 ± 0.4	-597 ± 21.2
14	20	5	75	9.5 ± 0.3	-588 ± 18.4
15	18	30	75	16.8 ± 0.3	-650 ± 12.7
16	8	5	90	2.2 ± 0.8	-578 ± 15.6
17	18	20	75	18.9 ± 0.1	-657 ± 9.9
18	8	20	50	4.2 ± 0.4	-596 ± 9.9
19	20	20	75	19.8 ± 0.4	-660 ± 14.1
20	18	20	50	18.3 ± 0.3	-665 ± 5.7
21	18	30	50	16 ± 0.7	-662 ± 8.5
22	20	30	75	17.8 ± 0.3	-688 ± 14.1
23	8	30	75	3.9 ± 0.6	-592 ± 9.9
24	20	20	90	19.8 ± 0.2	-650 ± 11.3
25	20	20	50	18.5 ± 0.4	-675 ± 12.7
26	8	5	50	2.1 ± 0.4	-585 ± 21.3
27	18	20	90	20 ± 0.3	-642 ± 11.3

Table S3. Regression coefficients for the color strength (K/S).

Constante	Coefficients	P
Red (g/L)	-34.3273	0.000
T (°C)	3.1859	0.000
S (g/L)	0.3810	0.907
Red (g/L)·Red (g/L)	0.7764	0.004
T (°C)·T (°C)	-0.0812	0.074
S (g/L)·S (g/L)	-0.0028	0.210
Red (g/L)·T (°C)	-0.0258	0.000
Red (g/L)·S (g/L)	-0.0014	0.758
T (°C)·S (g/L)	0.0104	0.152
Constante	0.0016	0.492

Table S4. Regression coefficients for the redox potential (RP).

Terms	Coefficients	P
Constante	-422.6745	0.000
Red (g/L)	-7.1304	0.000
T (°C)	-2.7777	0.320
S (g/L)	-4.0313	0.000
Red (g/L)·Red (g/L)	0.2194	0.402
T (°C)·T (°C)	0.0181	0.178
S (g/L)·S (g/L)	0.1564	0.000
Red (g/L)·T (°C)	0.0196	0.460
Red (g/L)·S (g/L)	-0.02456	0.000
T (°C)·S (g/L)	0.0068	0.615