Table S1. Effect of subsequently coagulation on Fenton reaction and reduction/HDC using Al-Ni alloy.

Entry	Applied degradation method	Quantity of used reagents per 0.05 mmol of MB9 in 200 mL H_2O	Reaction time	Decoloration	COD removal
1	Fenton reaction (pH = 2.18)	6 mmol H_2O_2 + 0.2 mmol $FeSO_4$ + 3.6 mmol H_2SO_4	3 hours	86.1 %	37.6 %
2	Coagulation after Fenton reaction (pH = 7)	Entry 1 + 18 mmol NaOH	1 hour	>99 %	57.1 %
3	Chemical reduction Raney Al-Ni (pH = 12.1)	5 mmol Al in Al-Ni alloy + 24 mmol NaOH	3 hours	96.9 %	0 % of COD (94.5 % of AOX)
4	Coagulation after chemical reduction Raney Al-Ni (pH = 6.5)	Entry 3 + 8 mmol H_2SO_4	1 hour	>99 %	15.5 %

Table S2. A comparison of economic viability of MB9 removal using different oxidative/reductive agents.

Applied degradation method	Quantity of used reagents per mol of MB9	Price of method per mol of MB9 *	Ref.
Fenton oxidation	28 mol H_2SO_4 120 mol H_2O_2 + 4 mol $FeSO_4$	425 $	[52-54]
Chemical reduction ZVI	150 mol Fe^0 800 mol H_2SO_4	266 $	[52,56]
Chemical reduction Al^0 powder	200 mol Al^0 100 mol NaOH	215 $	[57,58]
Chemical reduction Al^0 powder + Ni^0 powder	200 mol Al^0 50 mol Ni^0 100 mol NaOH	423 $	[27-59]
Chemical reduction Raney Al-Ni	100 mol Al^0 used in Al-Ni 100 mol NaOH	1686 $	[28,60]
Chemical reduction Al^0 powder + Raney Al-Ni	120 mol Al^0 480 mol NaOH 44 mol Al^0 (in Al-Ni) 480 mol NaOH	1340 $	[57,58,59]
Chemical reduction $NaBH_4$	132 mol $NaBH_4$	735 $	[61]
Chemical reduction $NaBH_4/Na_2S_2O_5$	66 mol $NaBH_4$ + 66 mol $Na_2S_2O_5$ + 18 mol H_2SO_4	614 $	[52,61,62]

* Costs demonstrated the lowest available price according to global market suppliers [52-62].

Figure S1. The dependence of decoloration efficiency/COD removal on pH value for Fenton reaction using 6 mmol H_2O_2 + 0.2 mmol $FeSO_4$ per 0.05 mmol of MB9 in 200 mL H_2O (reaction time 20 hours).

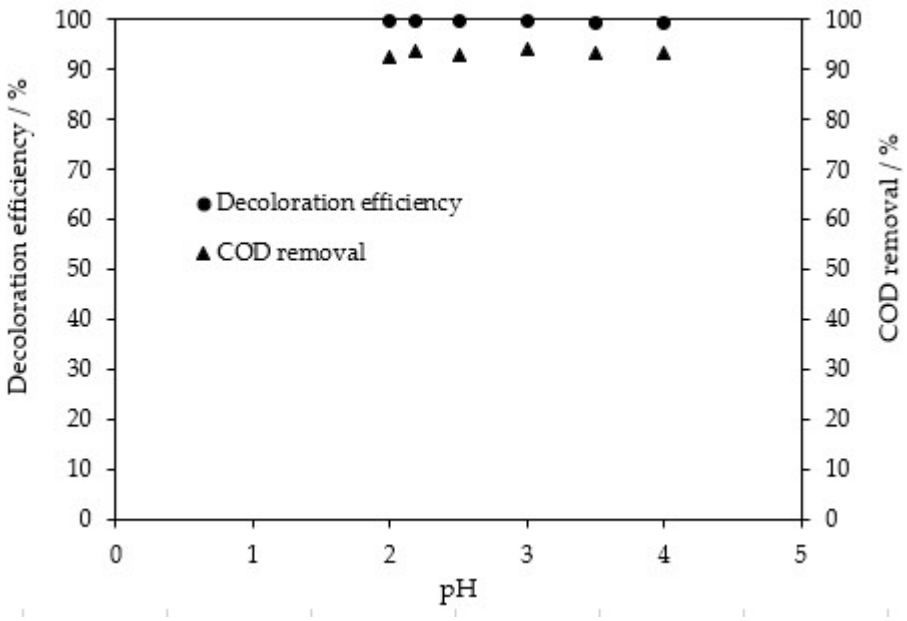
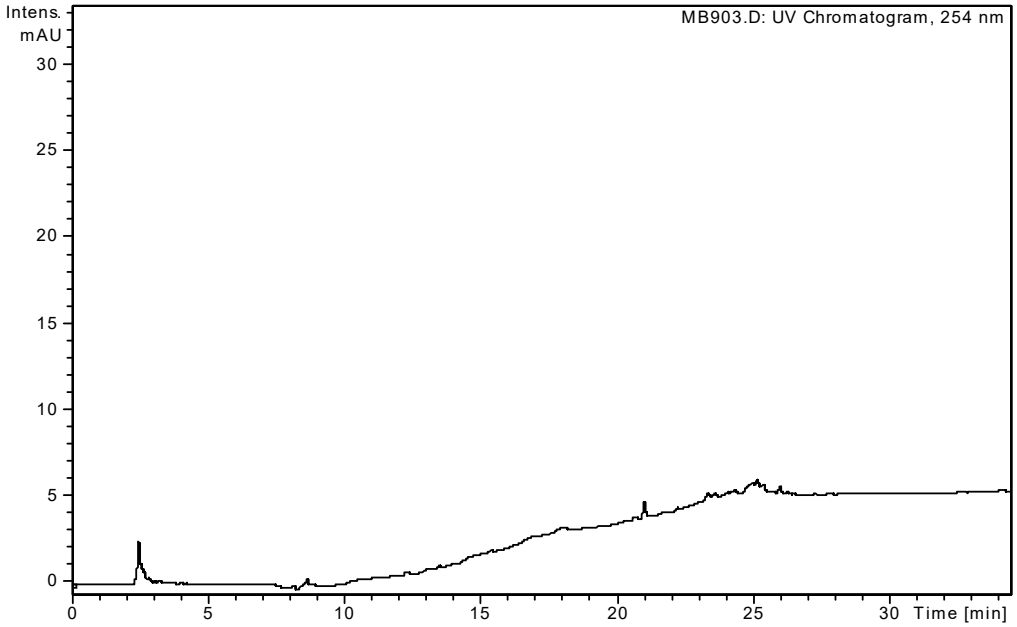


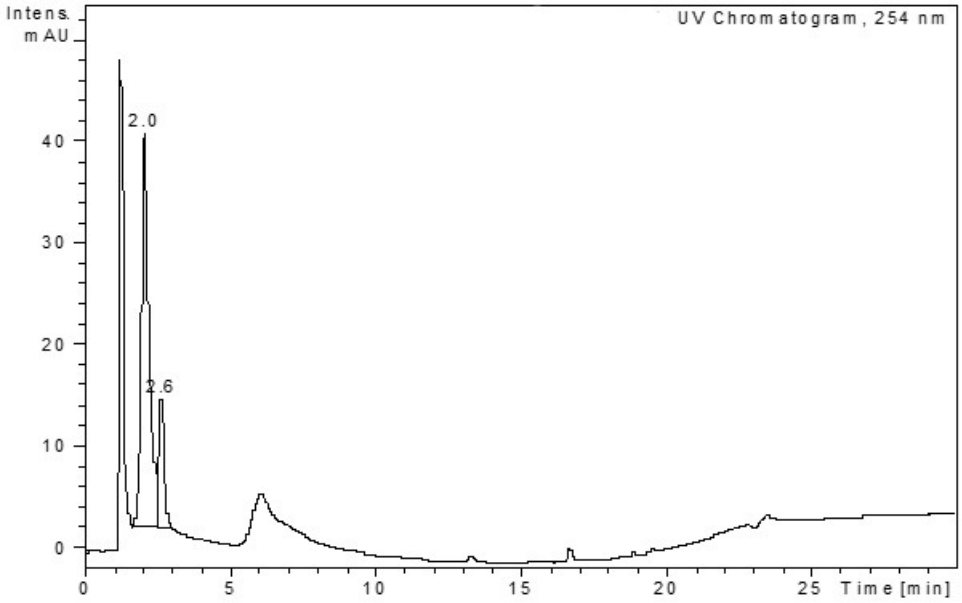
Figure S2. LC chromatogram of LC-MS analysis of reaction mixture obtained after reductive degradation of MB9 using Al-Ni/NaOH.



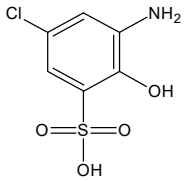
No components that may contain a chlorine atom in their molecule were identified in the sample, see Figure S2 above.

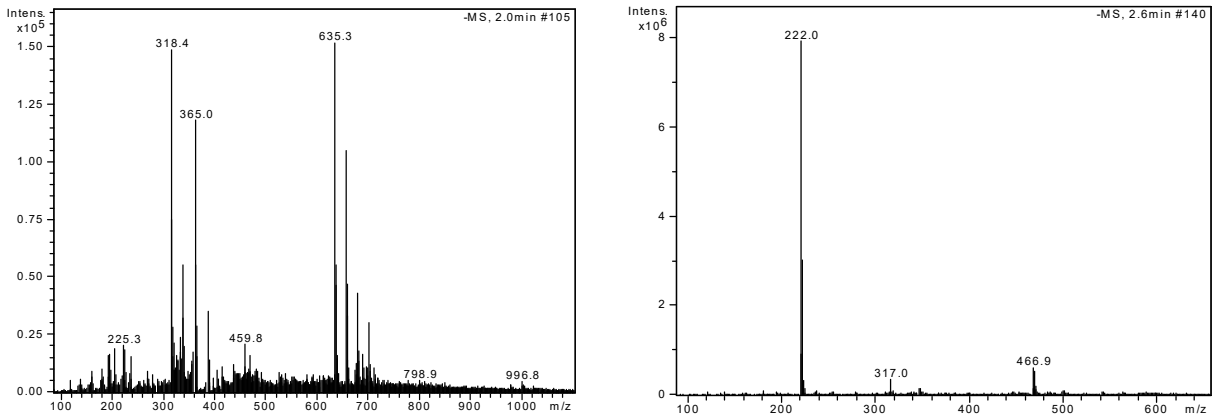
Note: Structures of the detected isomer compounds were not possible to confirm due to a lack of corresponding standard compounds.

Figure S3. (a) LC chromatogram of LC-MS analysis of reaction mixture obtained after reductive degradation of MB9 using $NaBH_4/Na_2S_2O_5$.



(b) Qualitative LC-MS analysis of reaction mixture obtained after reductive degradation of MB9 using $NaBH_4/Na_2S_2O_5$.

RT (min)	*MW*	*Structure*
2	636	Non-chlorinated compound
2.6	223	

Note: Structures of the detected isomer compounds were not possible to confirm due to a lack of corresponding standard compounds.

(c) Mass spectrums (EI, 70 eV) of analyzed components.