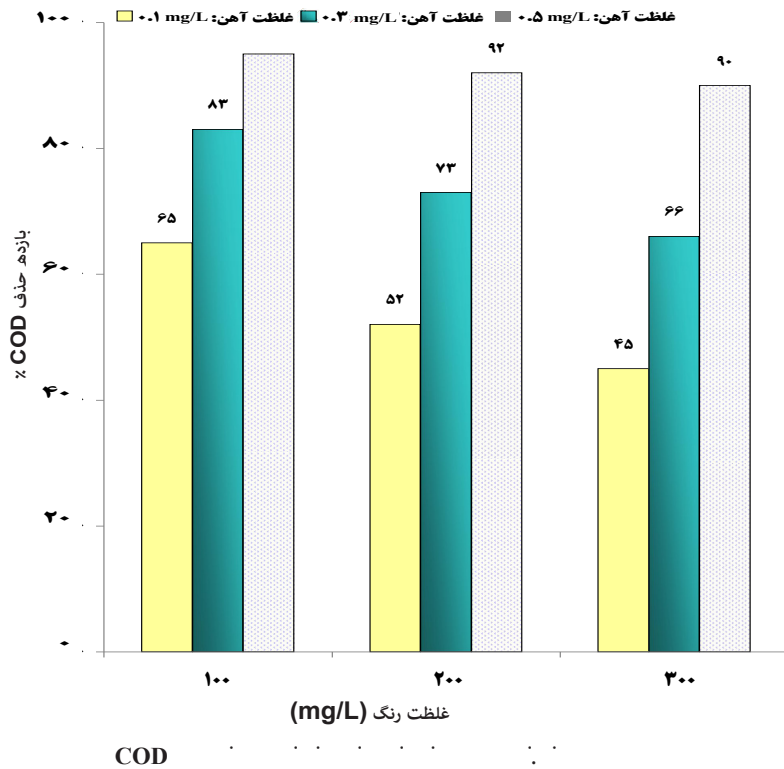


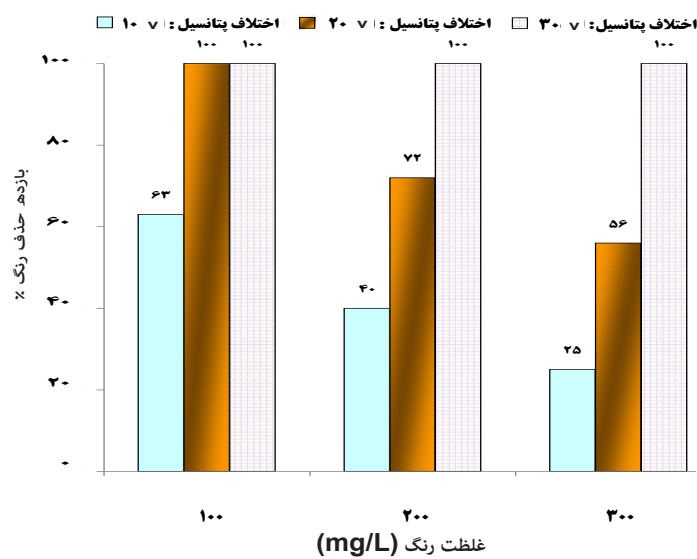
Anthraquinone (L) ...
 COD ...
 Fe²⁺ ...
 pH ...
 H₂O₂ ...
 CO₂ ...
 E⁰ = 2.87 V ...
 E⁰ = 3.06 V ...
 (RB19) ...

Methylene Blue
 ()
 RB19
 RB19
 RB19
 COD
 COD
 mL
 cm cm mm
 DC power
 (Philips Model) Spectrophotometer UV-Vis
 pH pH PU 8740
 COD
 (Hunna instrument) COD
 Excel
 NaOH H₂SO₄ pH
 M
 Merck
 Dystar
 pH
 H₂O₂
 Fe²⁺
 ()
 () Methyl Red () Acid Yellow 36
 () Acid red 14 () Reactive black 5
 Chlobromuron
 TOC
 !
 () diuron

COD" nm
 COD " nm
 COD " nm
 " L
 Fe²⁺ " nm
 Na₂SO₄ L mol
 Fe²⁺ nm
 pH= | min COD
 " | mg/L



COD (| mg/L | pH= | min | L



(\bar{y}_1 \bar{y}_2 \bar{y}_3 mg/L) \bar{y} mg/L $pH = j$ \bar{y}_{min} \bar{y}

\bar{y} mg/L

\bar{y} COD

COD

COD

\bar{y} mg/L

$pH = j$ \bar{y}_{min}

\bar{y} mg/L

" \bar{y}_1 \bar{y}_2 \bar{y}_3 mg/L

\bar{y} mg/L

COD

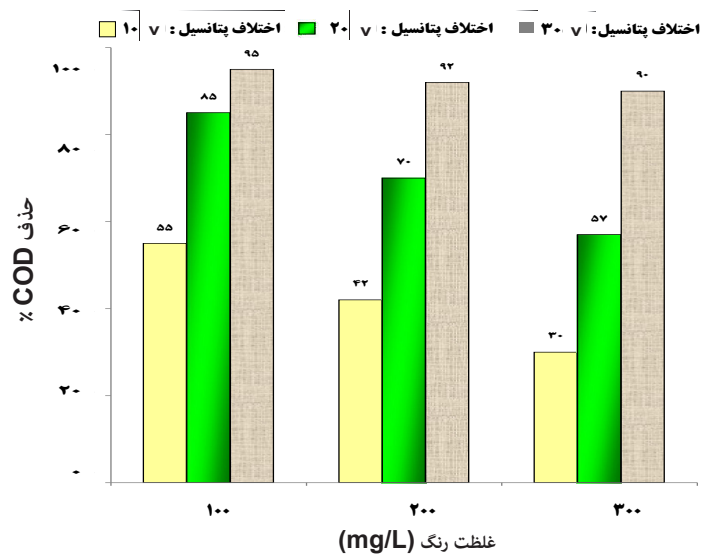
\bar{y} \bar{y} mg/L

\bar{y}_1 \bar{y}_2 mg/L

COD

\bar{y} mL

COD \bar{y} \bar{y}



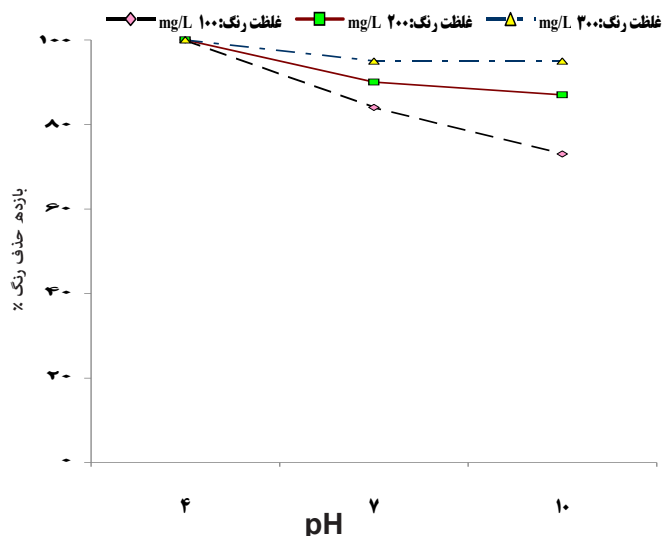
COD

(\bar{y}_1 \bar{y}_2 \bar{y}_3 mg/L)

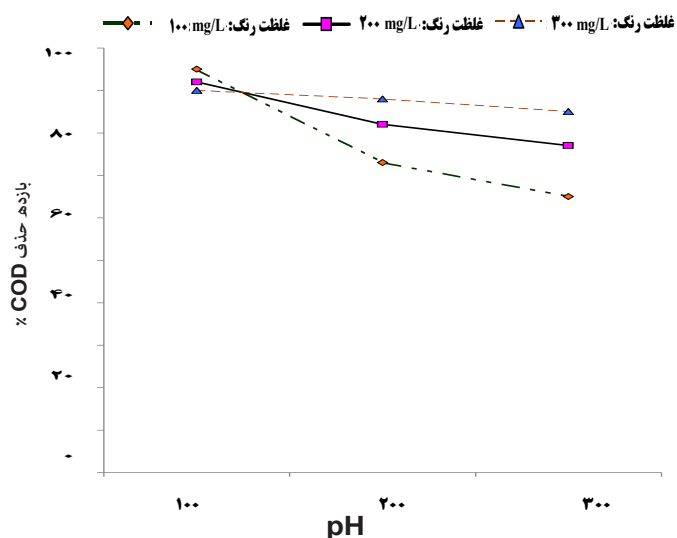
\bar{y} mg/L

$pH = j$ \bar{y}_{min}

\bar{y}



شکل ۱: درصد حذف رنگ در برابر pH برای غلظت‌های مختلف رنگ (۱۰۰، ۲۰۰، ۳۰۰ mg/L). در این نمودار، محور عمودی نشان‌دهنده درصد حذف رنگ و محور افقی نشان‌دهنده pH است. نتایج نشان می‌دهد که با افزایش pH، درصد حذف رنگ برای تمام غلظت‌ها کاهش می‌یابد. همچنین، در هر pH، درصد حذف رنگ با افزایش غلظت رنگ کاهش می‌یابد.



شکل ۲: درصد حذف COD در برابر pH برای غلظت‌های مختلف رنگ (۱۰۰، ۲۰۰، ۳۰۰ mg/L). در این نمودار، محور عمودی نشان‌دهنده درصد حذف COD و محور افقی نشان‌دهنده pH است. نتایج نشان می‌دهد که با افزایش pH، درصد حذف COD برای تمام غلظت‌ها کاهش می‌یابد. همچنین، در هر pH، درصد حذف COD با افزایش غلظت رنگ کاهش می‌یابد.

Reactive Black5	chiou		
pH			COD
	pH	"	COD
pH	pH		
"fl L			
		"	
	"fl L		
(ÿmg/L			
min			
n ÿ	pH	"fl L	
ÿ min	flÿmg/L)	pH	"
zhou	"		
Methyl Red		"	
		H ₂ O ₂	Fe(OH) ²⁺ / pH
"fl L			
Acid Yellow 36	Gonzalez	"	OH ⁰
		(H ₃ O ₂ ⁺ L	fl L
"fl L	n min		H ₂ O ₂
	"		OH ⁰
		pH	"fl L
		Fe(OH) ₃	Fe ³⁺ Fe ²⁺
		"	
		"	
		H ₂ O ₂	pH
"fl L		(L	
COD		pH	pH
ÿmin			"
"	n ÿ! n ÿ	pH	pH COD
	"		
Fe ²⁺	"	Reactive Blue 19	
"		Methyl Red	zhou
		"fl L	

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Evaluation of Electro-Fenton Process Performance for COD and Reactive Blue 19 Removal from Aqueous Solution

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ABSTRACT

Background and Objectives: Synthetic dyes represent one of the largest groups of pollutants in wastewater of dyeing industries. Discharging these wastewaters into receiving streams not only affects the aesthetic but also reduces photosynthetic activity. Electrochemical advanced oxidation processes such as Electro-Fenton process are low operational and have high mineralization degree of pollutants. In this study, we investigated affective factors in this process to determine the optimum conditions for dye and COD removal from aqueous solutions containing Reactive Blue 19 dye.

Materials and Methods: Synthetic samples containing Reactive Blue 19 dye were prepared by dissolving dye powder in double distilled water. and the the solution prepared was transferred into pilot electrochemical cell having two anode and cathode electrode made of iron and carbon. Electro-Fenton process was began by adding of Fe²⁺ ions and establishing electrical potential difference. After testing and at specified time intervals, each sample was collected from the pilot cell, and process performance was evaluated through measuring dye concentration and COD.

Results: Based on the results obtained, optimum conditions of Electro-Fenton process for dye and COD removal was determined. Accordingly, potential difference of 20 volt for dye concentration up to 100 mg/L and potential difference of 30 volt for dye concentration of more than 200 mg/L, reaction time 60 minutes, 0.5 mg/L of Fe²⁺ concentration and suitable pH for the maximum dye removal efficiency equaled 4 respectively. Under such conditions, the dye and COD removal was 100 and 95% respectively.

Conclusion: Based on the results obtained, it was revealed that Electro-Fenton process has significant ability in not only dye removal but also in COD removal. Accordingly, it was found that the effective parameters in Electro-Fenton process for removal Reactive Blue19 dye are electric potential difference, concentration of iron ions and electrolysis time.

Keywords: Electro-Fenton process, Avanced oxidation, Reactive Blue19 dye, Electrical Potential difference

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