[illegible]

[illegible] COD [illegible]

[illegible]

[illegible] m.malakootian@yahoo.com

[illegible]

[illegible]

[illegible] COD [illegible] Reactive Blue 19 [illegible]

[illegible] Reactive Blue 19 [illegible] Fe^{2+} [illegible] COD [illegible]

[illegible] COD [illegible] mg/L [illegible] mg/L [illegible] min [illegible] pH [illegible] mg/L [illegible] COD [illegible]

[illegible] COD [illegible] Reactive Blue19 [illegible]

[illegible] Reactive Blue19 [illegible]

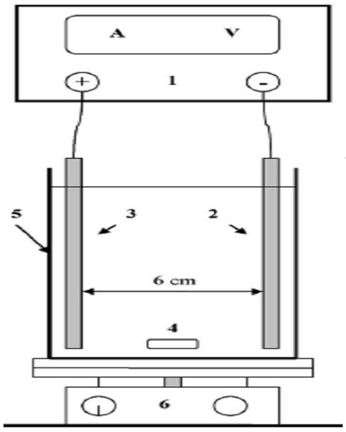
[illegible]

$$O_2H_2 \rightarrow O_2 + 4H^+ + 4e^-$$

$$O_2 + 2H^+ + 2e^- \rightarrow O_2H_2$$

$$Fe^{3+} + e^- \rightarrow 2+ Fe^{+2}$$

$$Fe^{+2} + O_2H_2 \rightarrow Fe^{3+} + OH^0 + OH^-$$



1. [illegible]
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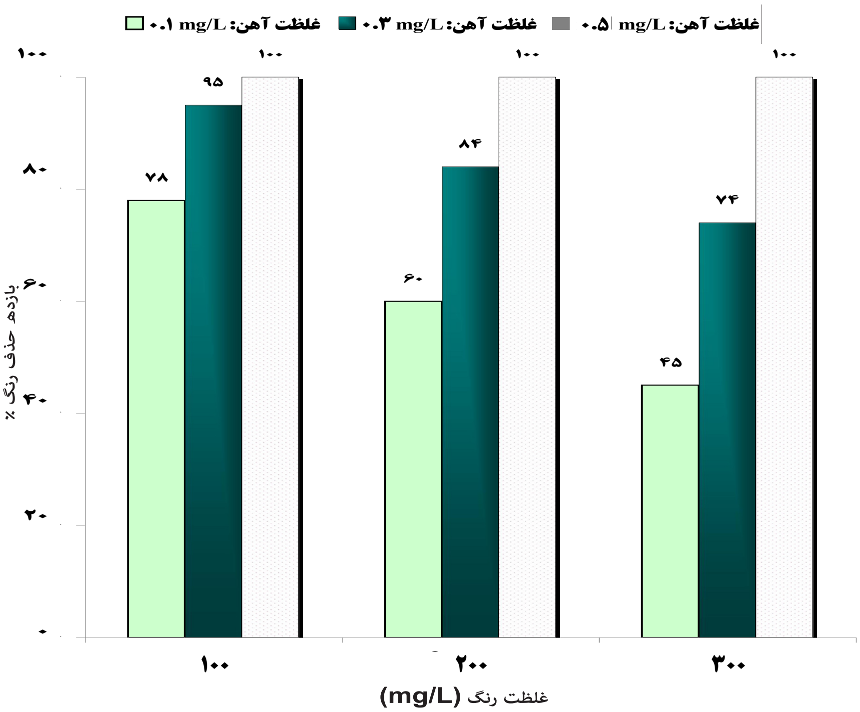
6. [illegible]

[illegible] :1 [illegible]

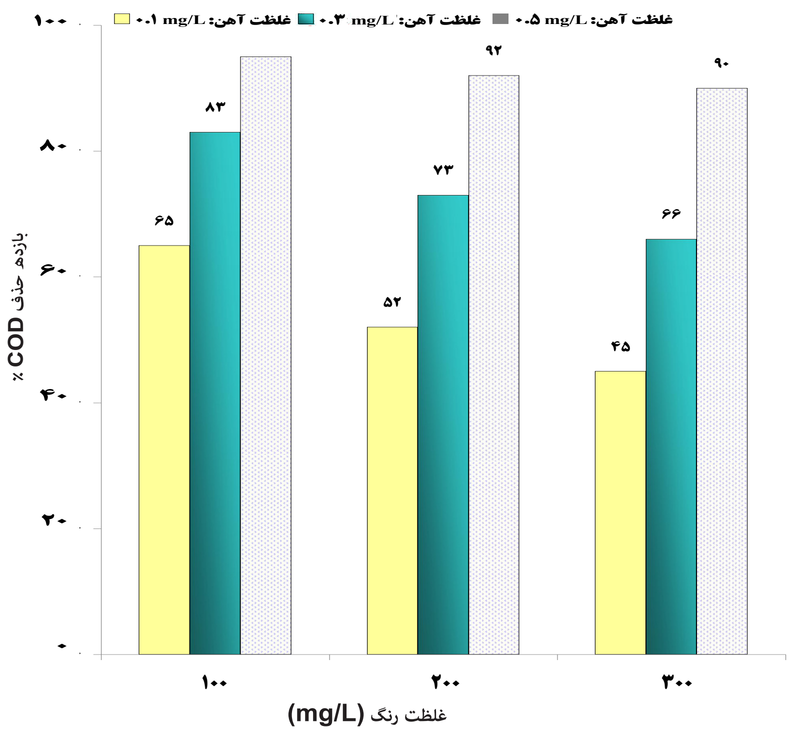
(5) [illegible] (4) [illegible] 1/5 mg/L [illegible] 0/5 [illegible] min [illegible] VDC [illegible] mg/L [illegible] pH [illegible].

[illegible] (RB19) [illegible] mg/L [illegible] pH [illegible]



[illegible] :2 [illegible]

([illegible] min [illegible] pH=[illegible] mg/L [illegible])


غلظت آهن: ۰.۱ mg/L
غلظت آهن: ۰.۳ mg/L
غلظت آهن: ۰.۵ mg/L
٪ COD بازده حذف
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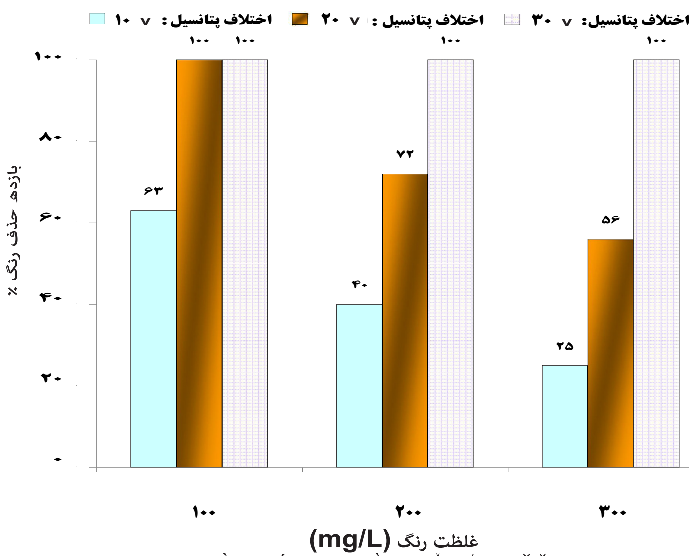
غلظت رنگ (mg/L)



اختلاف پتانسیل : ۱۰ v
اختلاف پتانسیل : ۲۰ v
اختلاف پتانسیل : ۳۰ v
بازده حذف رنگ ٪
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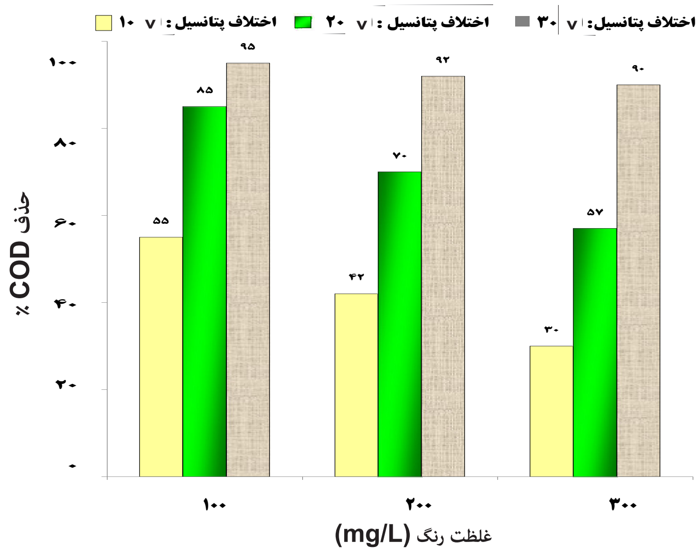
غلظت رنگ (mg/L)



اختلاف پتانسیل : ۱۰ v
اختلاف پتانسیل : ۲۰ v
اختلاف پتانسیل : ۳۰ v
٪ COD حذف
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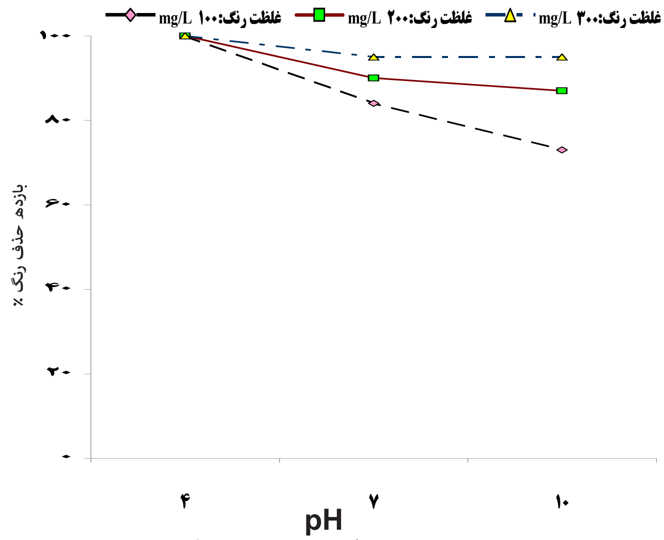
غلظت رنگ (mg/L)



غلظت رنگ: ۱۰۰ mg/L
غلظت رنگ: ۲۰۰ mg/L
غلظت رنگ: ۳۰۰ mg/L
بازده حذف رنگ ٪
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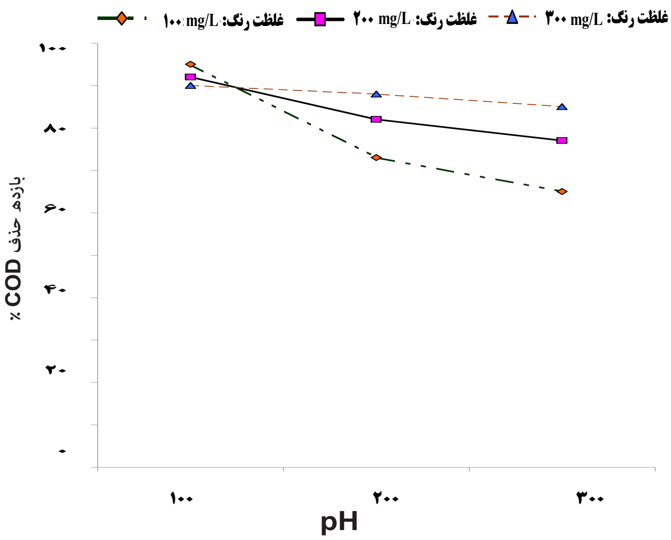
pH



غلظت رنگ: ۱۰۰ mg/L
غلظت رنگ: ۲۰۰ mg/L
غلظت رنگ: ۳۰۰ mg/L
بازده حذف COD ٪
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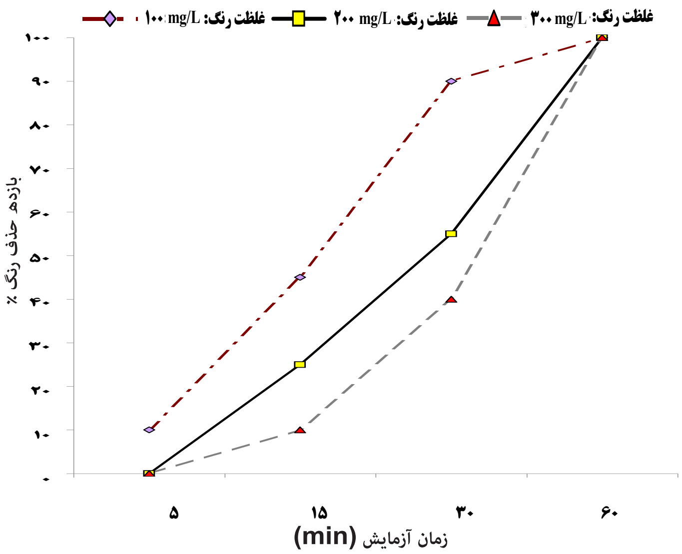
pH



Ūᇬȝ Ùzf Æǂȝǩg ƹǹ ǀ ǃgǂƿ ǯǨǭƹ ƹǿǫǨơ :ī ǨǦǁ

(Ȟġġ ƿ ȟġġ ǕȞġġ mg/L Ūᇬȝ ǻǨǵƠǒǪǕ ƿ ġ/Ĩ mg/L ǰġǻ ǻǨǵȝǸǂ ƠǒǪǕ ¡Ȟġ vǨǿsǅǨǐ ǙÊǐƠǂ ¡pH=ħ : ǀ ǂǪǭƹǻ njǂƹǁ)

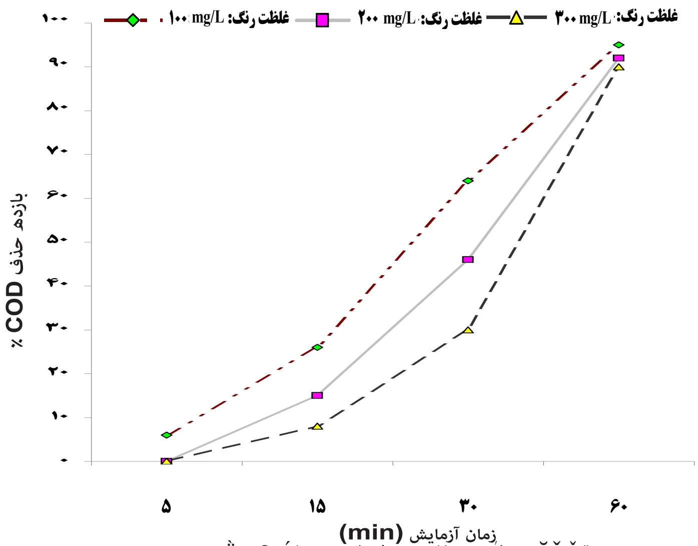
ǀ ǃǂǂƿ ǯǨǭƹ ƹǿǫǨơ

COD ƿ Ūᇬȝ Ùzf Æǂȝǩǂ ƹǹ ǀ ǃǂǂƿ ǯǨǭƹ ƹǿǫǨơ ī ƿ Ĩ ǨŨǁ ǰġǻ ǻǨǵȝǸǂ ƠǒǪǕ ǕȞġ V ǨǿsǅǨǐ ǙÊǐƠǂ ǕpH=ħ ȝY ȝȝ Ȟġġ ƿ ȟġġ ¡ Ȟġġ mg/L Ūᇬȝ ǻǨǵƠǒǪǕ ƿ ġ/Ĩ mg/L Æǂȝǩǂ Ǖ ǀ ǃǂǂƿ ǯǨǭƹ ǀ ǂȝǝǂ Ǩǹ Ǖ 2 Ǩƽǂ ǰǂ ƹǹ .yǧYÆǪ ȝǨǂǁ ȝY ǕYǸǁÆǪ ǁyǧǨǂǪ Ǵǂ ȝǸǍ ȝǨȝǵ .yǨǂÆǪ ǀ ǂȝǝǂ yǂǂƹǝ ǰǿǂǨǐ ȝǨǿsǹ Ūᇬȝ Ùzf ȝǂȝǿǪ ȞĨ min ƹǂ ƹǪȝǂ ǻǨǵȝǨǭƹ ǻǨǵǵǨŨǂYȝ ƹǐǂǿǹ yǿǨǸơ Ǵᶅǿǐ ȝY ƿ ȝǨǪƹ Ơǁzū Ǩǹ Ǩǭǂ Ơƽǂ ǀ ǂȝǝǂ ǻƹǿūǬǂš ȝǸǍ Ǵǹ Ūᇬȝ Ùzf ȝǂȝǿǪ ǕǨǿsǂƿȝyǿǵ Ơǁzū ƹǂ yǕǹ ǀ ǂǨǪƹǻ ƟèǨf ƹǐǂǿǹ ȝY Ǵǂ ǻȝǸǍ Ǵǹ ǕyǨǂÆǪ

ȝǨǪyǁȝ ĕ Ĩġ Ǩơ ǕŪᇬȝ ǜǐǕǪ ǻǨǵƠǒǪǕ ȝY ƿ Ȟġ min ȝǨǪƹ njǂƹǁ ȝY ƿ ĩġ min ȝǨǪƹ ȝǨǂǨǐ ȝY ƿ yǂǂÆǪ ƠƽY Ǵǹ Ùzf .yǂǂÆǪ ƠƽY ǴǹCOD ƿ Ūᇬȝ Ùzf ƹǂǂyf ǕyǂǂƹǝǴǹǂǹ ȝY ȝǨsŪǂ Ùzf ǁYƹǨǹ Ǵǹ ȝyǿƽȝ ǻǂƹǹ Ǵǂ yǁ ǁyǧǨǂǪ ǰǿǂšǪġ .yǨǂÆǪ ǀ ǂȝǝǂ ƹǨǿǁ YȝǸǪ ȝǨǪƹ ǕŪᇬȝ ǜǐǕǪ ǻǨǵƠǒǪǕ

ƿ Ʈǹ

RB19 Ūᇬȝ ǻƿǨf ǩÊljǨǝ ÆǂǨǿȝǿǁƿƹǐŪǂ ȝǸǿƽǂyǿsǂ Ǵǹ ǀ ǂǨǪƹǻ ǜǐǕǪ njǂƹǁ ƠƮǿ ȝǸǐǝƿƹǐŪǂ yǂǂƹǝ ǴǿƽƿǴǹ



COD Ùzf Æǂȝǩǂ ƹǹ ǀ ǃǂǂƿ ǯǨǭƹ ƹǿǫǨơ :ĨǨǦǁ

(Ȟġġ ƿ ȟġġ ¡ mg/L ȞġġŪᇬȝ ǻǨǵƠǒǪǕ ƿ ġ/mg/L Ĩ ǰġǻ ǻǨǵȝǸǂ ƠǒǪǕ ¡Ȟġ vǨǿsǅǨǐ ǙÊǐƠǂ ¡pH=: ħ ǀ ǂǪǭƹǻ njǂƹǁ)

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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 dying 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 Fe^{2+} 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 Fe^{2+} 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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