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[illegible] a.jonidi@modares.ac.ir

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چکیده

[illegible]

[illegible] Fe^{2+} /H_2O_2 [illegible] pH [illegible] Excel [illegible]

[illegible] mmol/L [illegible] pH= [illegible] Fe^{2+}/ H_2O_2 = [illegible] (Fe^{2+} = [illegible] mmol/L) [illegible] mmol/L [illegible] mmol/L [illegible]

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واژگان کلیدی: [illegible]

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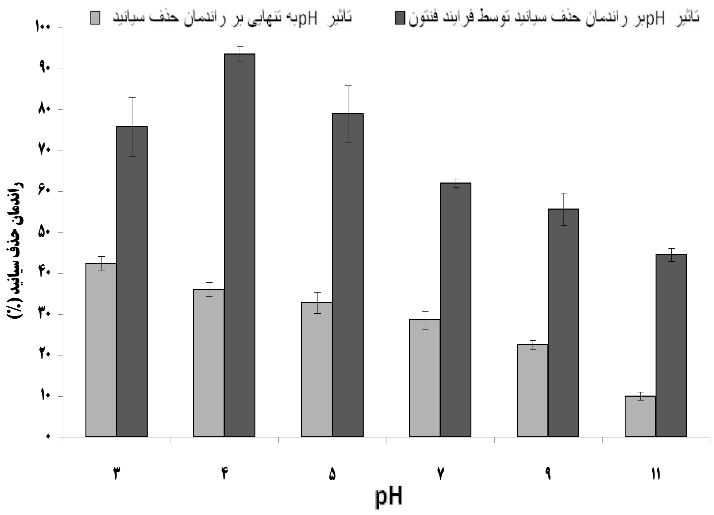

(ĕ) ǯǸǬǝ ǯǸĠǳǂyĠƽŧǂ yǬĠǂƸǝ ǮǤ ǯǳ ƸĠǵǨǫ Ɋ yĠǨǨĠǳ Ǜƶƒ ǯǨǭyǬǯ ƸǨ ŮĠǨǨǬǫ Ǵǁ **pH** ƸĠǵǨǫ :ĤǨŨǁ
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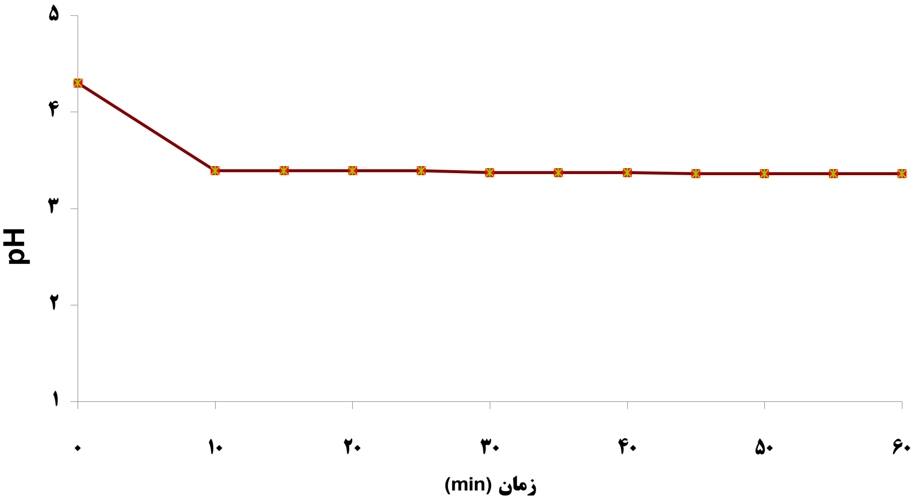
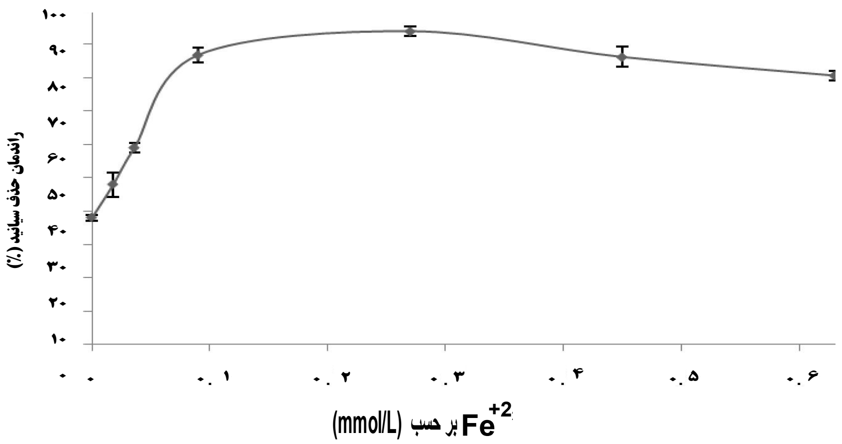


ù ǪǬŬǭ ŭǨǵǯǨǭƸ ŮǍ ǮǤ ǯǸǬǝ yǬĠǂƸǝ **pH** ƟǂƸĠĠǘǫ :ĥǨŨǁ



[illegible] (H_2O_2 = [illegible] mmol/L [illegible] pH = [illegible] min [illegible] mmol [illegible])

[illegible] H_2O_2 = [illegible] mmol/L [illegible] (Fe^{2+} [illegible] (Fe^{2+}/H_2O_2 = [illegible]) [illegible]

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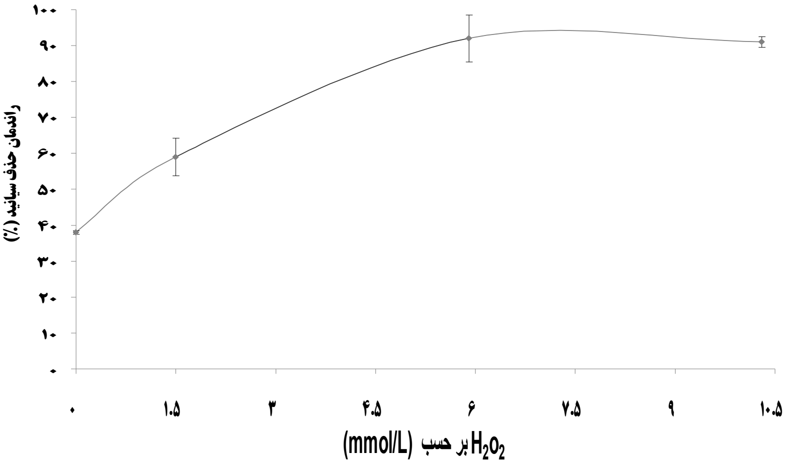
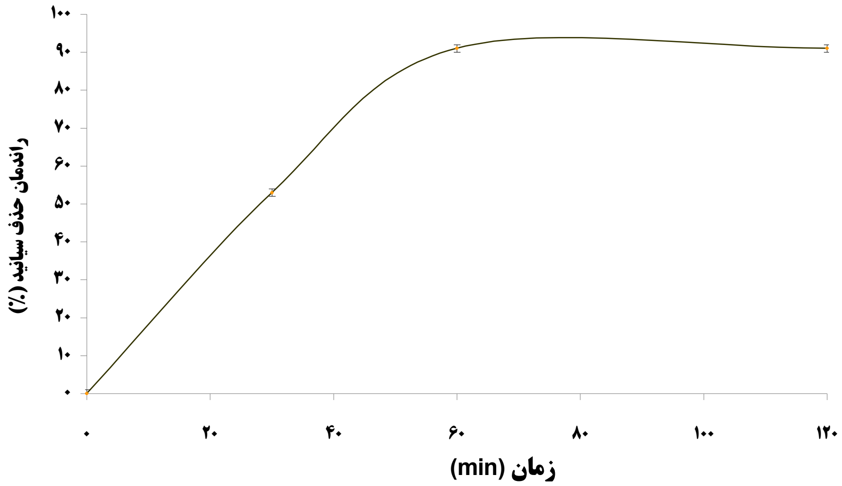


[illegible] (Fe^{2+} = [illegible] mM/L [illegible] pH = [illegible] min [illegible] mmol [illegible])



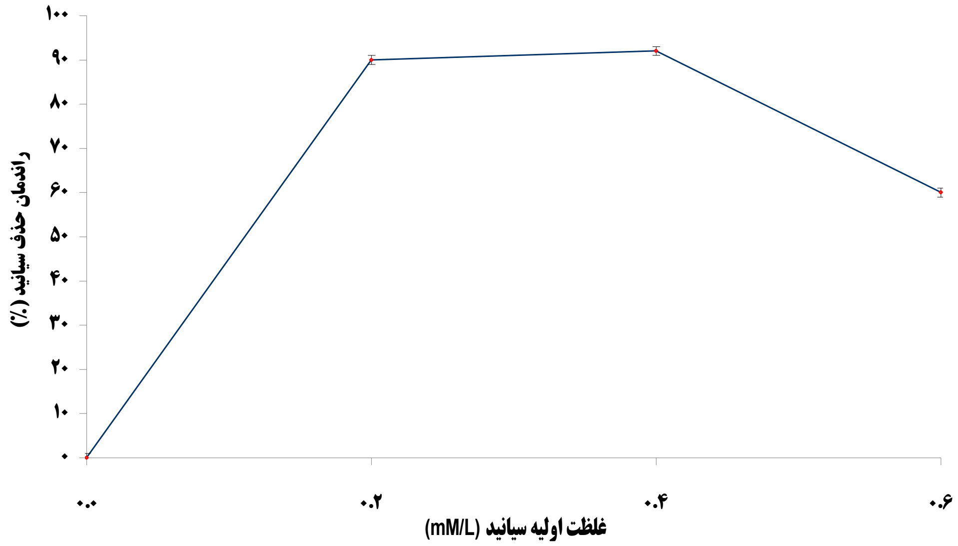
(ĕ) ǯǸǊǮ yǊĠĿǕ ǯY ǀ ǊŧĿþ ǯǨǭǕ Ǝ ş f ǕĂ yĠǊĠ5 Ǜz f ǯǨǭyǊǯ :ĪǨŨǁ

((Fe^{2+} = ǵ/ĥĪ mmol/L) Fe^{2+}/H$_2$O$_2$ = ǵ/ǵħĩŮǨǸǭ ƠǊs ¡pH =ħ ¡ǵ/ħ mmol ǨĂ ǕĿǕĂ yǊǨǿ5 ǴǨþĿ Ơǒǭǘ)

ǴǊ5Y ǯY Ǭǿ5ǨǊř yǊǨǿ5 Ǵŧ ǰǽĿ ǴĂ ǴΣǸơ ǨĂ .(ĥĤþĥǵ) yǊǸǁÆǭ (Strong Acid dissociable) ŦǿŨĀơ ǨǨǩ ấǸā ấǨǵyǿ5Ŀ Æǎ5ǸǊǭ yf ǯY ǨĦǊơ ǰǽǨř ấǨǵ pH ǯY Ů(ĥĤ) YǕǿūÆǭ ǯĿǕā ǴǕǨǎǭ ǰǽĿ ƨǽǨǊ ǨĂ ĀǨǨǎǭ Ǵŧ ƠǝǕū yǵĿǸǕ ǯĿǕā ǕǿþǨơ ƠŢơ .Ơ5Ŀ

¡(ĥĥ) Ơ5Ŀ pH ǕǿþǨơ ƠŢơ ƟyǁǴĂ ǯǸǊǮ ǯǸǿ5Ŀyǿşŧǁ yǊǽĿǕǝ yǊǨǿ5 Ǜz f ǯǨǭyǊǯ ǕĂ pH ǕǿþǨơ ƟǨǂǽǨǭǕď Ǵŧ ấǯǸĂ ǴĂ ǯǨǭyǊǯ ǰǽǕǊĦĂ Ǵŧ YǨY ǯǨǂǁ ǴǨǨǎǭ ǰǽ ǯY ůǯǸǊǮ yǊǽĿǕǝ ǌǎ5Ǹơ

ǕĿ ǕǿèǨĂ ấǨǵ pH ǯY þ ěĪǵ YþyƒpH =ħ ǯY yǊǨǿ5 Ǜz f ǵþĿ Ĥǵmin ǯY ǵǸǊŢǭ pH ÆǝǕĂ ǕĿ .YǸĂ ěĩǵ ǕĿ ǕǊǯŧ ŮĪ ¡(Ĥħ þĤĤ) (H^{+} ǯǸǸǰf) yǿ5Ŀ ǨǿŨǂơ ƠǊǭǕ ǴĂ ǀ ǊŧĿþ ŮþǕǁ ÆǾǨūǨǎǭ ƨǽǨǊ .(ĥ ǨŨǁ) ƠǝǨǽ ǀ ǵǨŧ Ħ ǴĂ ħ ǨĂ ǕĿǕĂ pH ǕĿ ǴĦǕǿǁ ấǕǽzřǴǽƨŀơ Ů(ĤĦ) yǊǨǿ5 Ǜz f ǯǨǭyǊǯ ǕĂ ǯǨĖĿŢǭ Ǵŧ ǨĂ (ĤĪ) ĿǕǕǎǜ ÆǊǨǊǍ ấǨǵƙÊlǰǨǝ ǰǿǊšǬǵ þ (ĤĤ) ǴǨǨǕ Ħ/Ī ấǨǵpH Ǝ ǿǕơ ǴĂ ǯǿǊ ǊyǊYY ǫǨŀǁ ǯǸǊǮ ǨǨǂǛ ǕĿ ǊYǨĀǊ5Ŀ ǯY ǯǸǊǮ yǊǽĿǕǝ .yǊYǸǯǊ ƙǨUǊĦ ǴǊǿĦǊĂ pH ǯĿǸǊǛ ǴĂ Ŀǯ ħ þ



(mmol) yĠǊĠ5 ǴĠǨþĿ Ơǒǭǘ ǕĿ ŮĀǊǊǕǭ ǕĠYǨĿǭ ǯY yĠǊĠ5 Ǜz f ǯǨǭyǊǯ :ĩ ǨŨǁ

(Fe^{2+} = ǵ/ĥĪ mmol/L) Fe^{2+}/H$_2$O$_2$ = ǵ/ǵħĩŮǨǸǭ ƠǊs ¡ĩǵmin ǀ ǊŧĿþ ǯǨǭǕ ¡pH =ħ ǌǽĿǕǁ ǯY) [illegible] Fe^{2+} [illegible] (pH = [illegible]) [illegible] pH [illegible] pH [illegible] Fe^{2+} [illegible] pH [illegible] OH^0 [illegible] H^+ [illegible] H_2O_2 [illegible] OH^0 [illegible].

[illegible] Fe^{2+}/H_2O_2 = [illegible] H_2O_2 [illegible] Fe^{2+} [illegible].

$$Fe^{2+} + H_2O_2 \rightarrow Fe^{3+} + OH^0 + OH^- \qquad (Ĥ)$$

[illegible] Fe^{2+}/H_2O_2 [illegible]: (ĥ)

$$Fe^{2+} + OH^0 \rightarrow Fe^{3+} + OH^- \qquad (ĥ)$$

[illegible] Fe^{2+}/H_2O_2 < [illegible] Neyens [illegible] mmol) [illegible] Tă [illegible] mmol [illegible].

[illegible] mmol/L [illegible] Fe^{2+}/H_2O_2 [illegible] H_2O_2 [illegible] (Ħ).

$$2H_2O_2 \rightarrow 2H_2O + O_2 \qquad (Ħ)$$

$$H_2O_2 + OH^0 \rightarrow H_2O + HO_2^0 \qquad (ħ)$$

[illegible] Fe^{2+}/H_2O_2 [illegible]

[illegible] Fe^{2+}/H_2O_2 < [illegible].

[illegible] min [illegible] Lipczynska [illegible] Kavitha [illegible] mmol [illegible] min [illegible].

[illegible] H_2O_2 [illegible] mM [illegible] H_2O_2 :CN [illegible] mmol/L [illegible] (H_2O_2:CN^-) = [illegible] mg/L [illegible] min [illegible] (Fe^{2+}) [illegible] Masahafi [illegible] (H_2O_2:CN^-) = [illegible] mg/L [illegible] min [illegible] mg/L [illegible].

[illegible]

[illegible] mmol/L [illegible] pH= [illegible] mmol/L [illegible] = [illegible] mmol/L [illegible] (Fe^{2+}/H_2O_2 = [illegible]) H_2O_2 = [illegible] mmol/L [illegible] Fe^{2+} [illegible] min [illegible] mmol [illegible]

[illegible] H_2O_2 :CN [illegible] H_2O_2 [illegible].

[illegible]

[illegible]

[illegible] (IV) [illegible]

[illegible]

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The Study of Fenton Performance in Removal of Cyanide from Aqueous Solution

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ABSTRACT

Background and Objectives: Cyanide is a toxic pollutant existing in the various industrial effluents such as iron and steel, coal mining, non-ferrous metals manufacturing and metal plating. Its presence in water resources and wastewater, as serious hazardous substances leads to undesirable effects on both the environment and human. Thus, its concentration control is essential for human health. The main goal of this study was to evaluate Fenton process efficiency in cyanide removal from aqueous solution.

Materials and Methods: This is an experimental study Conducted at Lab scale in a batch system. We investigated effect of different variables including; pH, mole ratio of Fe^{2+}/ H_2O_2, contact time, and initial concentration of cyanide. Data were analyzed using Excel software.

Results: We found that cyanide with initial concentrations of 0.4 mM/L was reduced by 92 %. This removal result was related to oxidizing agent of hydroxyl radicals under optimum conditions including; pH = 4, molar ratio Fe^{2+}/ H_2O_2= 0.046 (Fe^{2+}=0.27 mM/L) after 6o min reaction time. An increase in reaction time was not improved cyanide removal efficiency. Moreover, the Fenton process efficiency in cyanide removal decreased from 92 to 60 %, by increasing the initial cyanide concentration from 0.4 to 0.6 mM/L.

Conclusion: It can be concluded that Fenton oxidation Process can be considered as a suitable alternative for cyanide removal to achieve environmental standards.

Keywords: Advanced oxidation, Hydrogen peroxide, Fenton, Wastewater treatment, Cyanide

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