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COD

fTPHĚ

Sorur.Safa@gmail.com

ly /ly :

ly /ly :

fTPHĚ

fPAH_sĚ

ÿ

f_v ççĚ

UV

pH_iH₂O₂

éL

pH_iH₂O₂

COD

pH=é ÿ / M

ÿ / mM

COD ñ / ž

UV

žPH

pH"

h

UV

COD

fPH= Ě

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UV/Fe²⁺/H₂O₂

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fTPHĚ

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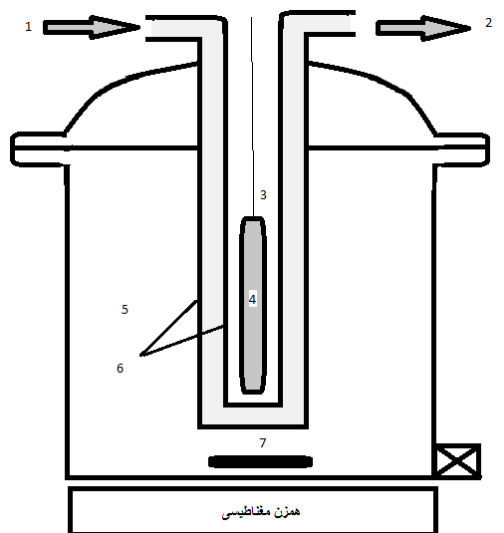
!è

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!

<p>ç/êê ç/è : çd ç/èM NaCl</p> <p>fl L ñä</p> <p>H₂O₂</p> <p>Kao êççð (BOF)</p> <p>êçç g/kg H₂O₂ ñè "</p> <p>çh (BOF)</p> <p>L ñð î</p> <p>Nogueira .(èLfl êçççç mg/kg (TPH)</p> <p>êççï</p> <p>"</p> <p>è çç DDT</p> <p>h " m è/ mg/g</p> <p>ç µg/L DDT : çç mL</p> <p>" ñ</p> <p>ñç</p> <p>(DOC)</p> <p>.(èL ïïç mg/L ïç</p> <p>ÿ</p> <p>UV/Fe²⁺/H₂O₂</p> <p>FAOPL</p> <p>"</p> <p>COD</p> <p>UV</p> <p>ž çç w L</p> <p>žÿ min è cm èïçç µw/cm²</p> <p>UVC : žVOX :</p> <p>" (Arda France</p>	<p>AOP</p> <p>H₂O₂ Fe(II) Fe(III) UV</p> <p>.(L</p> <p>Stepnowski êççé</p> <p>H₂O₂ (TPH)</p> <p>UV</p> <p>"</p> <p>TPH</p> <p>ïd</p> <p>TPH L ñð</p> <p>Richardo .(è) fl ± ÿ µg/L</p> <p>êççç</p> <p>Triton X-100 (TX-100)</p> <p>ïDDT</p> <p>" ñèçç ïç j DDE</p> <p>DDE jDDT</p> <p>h ÿM mM H₂O₂</p> <p>ž L ñèçç ð jðð</p> <p>, ÿmg/L DDE DDT</p> <p>mg/L</p> <p>- Tsai.(èè) fl ÿÿ ÿ</p> <p>êççç</p> <p>" ç/èM NaCl</p> <p>êççç mg/kg êçççç TPH-D</p> <p>H₂O₂ ñï (Fe₀/Fe₁)</p>
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۳۰ min
 pH
 ۰.۱ M NaOH
 pH
 H₂O₂
 pH
 COD
 COD
 pH
 H₂O₂
 pH
 °C
 pH < 7
 DR5000
 COD
 TPH
 HACH
 COD
 COD
 HACH
 COD
 mg/L
 DR5000
 Excel
 COD
 mg/L
 COD₀
 pH
 M
 COD
 mg/L



UV
 pH
 COD
 mg/L
 COD₀
 pH
 M
 COD
 mg/L

UV/Fe/H₂O₂

FeSO₄·7H₂O

pH=

UV H₂O₂

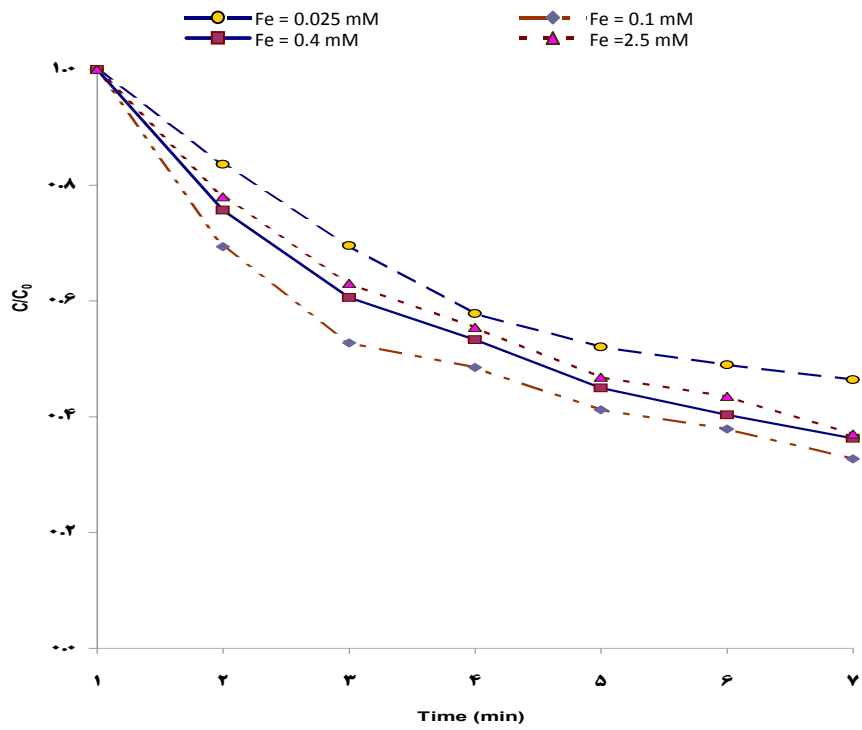
COD

UV

UV

کارایی حذف فرایند

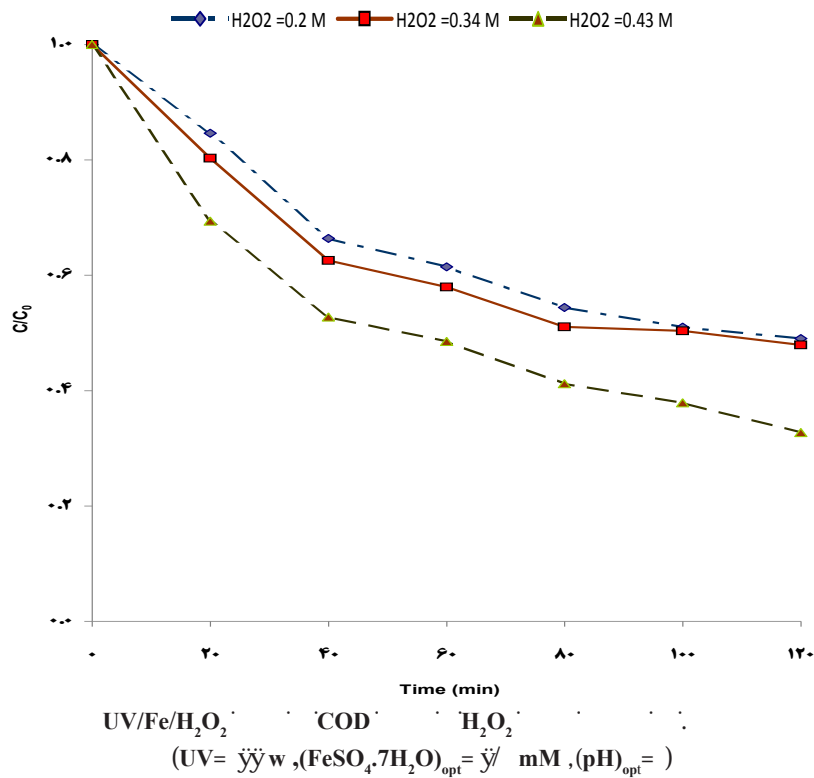
مجازی UV، % بوده است.



UV/Fe/H₂O₂ COD

(UV= , H₂O₂= mol, pH= , COD₀ = mg/L)

$\dot{y} / m M$ H_2O_2 " " / m M
 \dot{y} / mol " \dot{n}
 \dot{e} pH H_2O_2
 pH " $\dot{y} \cdot \dot{e}$ H_2O_2
 pH μ UV/Fe/ H_2O_2
 $\dot{y} M_i NaOH$ \dot{y} " "
 UV H_2O_2 $\dot{y} / m \mu$
 COD " $\dot{y} / \dot{y} / \dot{y} / \mu$ H_2O_2 "
 pH \dot{y} / μ H_2O_2 $\dot{y} / \mu m$ H_2O_2 " $pH =$
 $\dot{n} /$ " $\dot{pH} =$) H_2O_2 " "
 . (\dot{E} " UV " "
 " " "
 $UV/Fe/$ COD " $\dot{y} / m \mu \dot{E}$ COD "
 H_2O_2 $\dot{n} /$ " $H_2O_2 / \dot{y} / mol$ "
 . (\dot{E} " "
 pH "
 min COD " $1/C$ UV/ pH "
 pH " Fe/H_2O_2



$\ln(C/C_0)$

$n /$

n

UV Fe(II)

$Fe^{+2} + H_2O_2 \rightarrow Fe^{+3} + OH^- + HO^0$

(HO⁰ Fe(II) UV

H_2O_2 Fe(II) Fe(II)

COD Fe(II)

H_2O_2

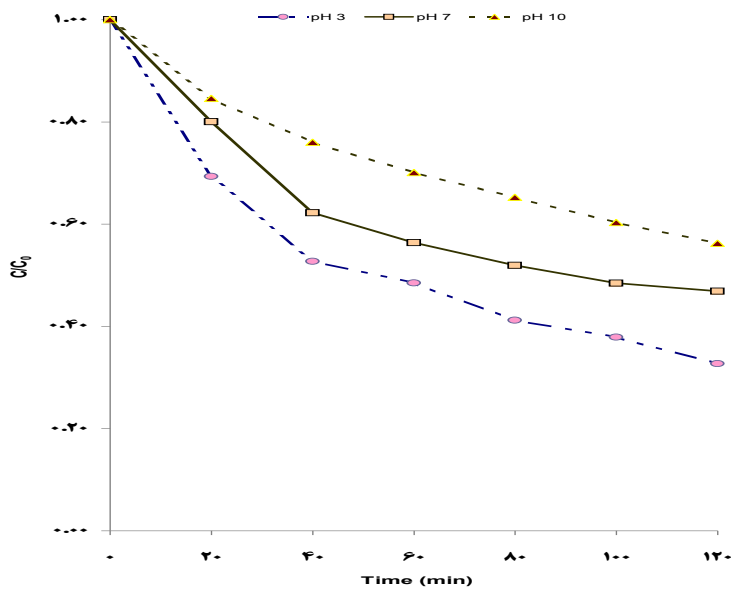
H_2O_2 COD

H_2O_2 mM COD

H_2O_2

H_2O_2

(mM



UV/Fe/H₂O₂ COD pH

(UV= 1000 μg/L, (FeSO₄·7H₂O)_{opt} = 100 μM, (H₂O₂)_{opt} = 100 μmol)

h BTX

$\text{HO}^0 + \text{H}_2\text{O}_2 \rightarrow \text{H}_2\text{O} + \text{HO}_2^0$

$2\text{HO}_2^0 \rightarrow \text{H}_2\text{O}_2 + \text{O}_2^0$

Oswaldo

Chiavone-Filho

H_2O_2

mM

mM

pH

pH

UV

Kang Hua

H_2O_2

pH =

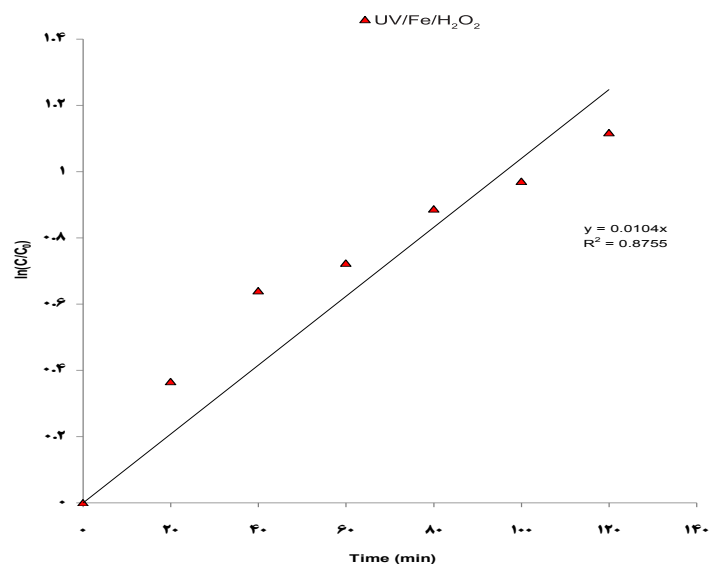
Raquel F. PupoNogueira

BTX

TritonX-100 (TX-)

Fe^{2+}

mM H_2O_2

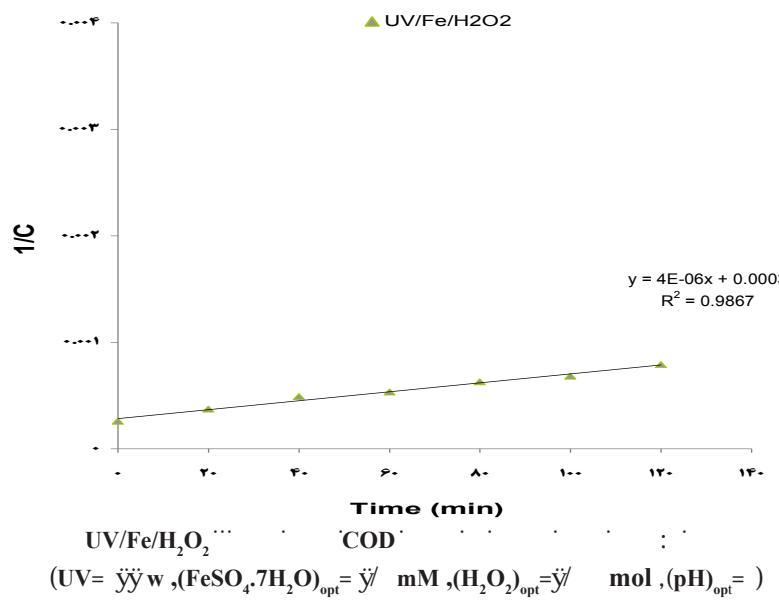


UV/Fe/H₂O₂ COD

$(\text{UV} = \text{w}, (\text{FeSO}_4 \cdot 7\text{H}_2\text{O})_{\text{opt}} = \mu\text{M}, (\text{H}_2\text{O}_2)_{\text{opt}} = \text{mM}, (\text{pH})_{\text{opt}} =)$

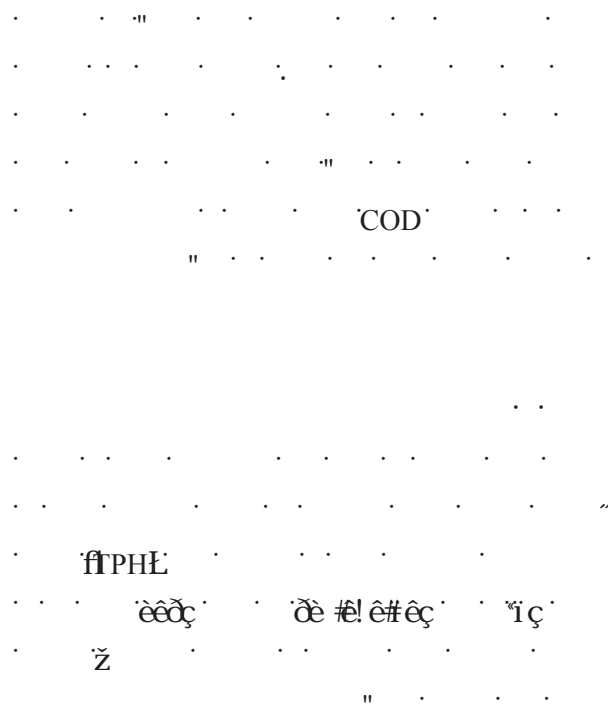
$$\frac{1}{C} - \frac{1}{C_0} = k.t$$
 COD
 Farrokhi
 UV
 COD
 pH =

pH
 PupoNogueira.
 UV
 J. Watts.
 UV/Fe/H₂O₂
 Kavitha Palanivelu
 mg/L
 pH =
 Farrokhi.
 UV
 UV
 TPH
 COD
 UV
 UV



UV/Fe/H₂O₂ COD
 (UV= w, (FeSO₄.7H₂O)_{opt}= mM, (H₂O₂)_{opt}= mol, (pH)_{opt}=)

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Application of Photo-Fenton Process for COD Removal from Wastewater Produced from Surfactant-Washed Oil-Contaminated (TPH) Soils

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ABSTRACT

Background and Objective: The base structure of total petroleum hydrocarbons (TPH) is made of hydrogen and carbon. Widespread use, improper disposal and accidental spills of this compounds lead to long term remaining of contaminations such as organic solvents and poly aromatic hydrocarbons (PAHs) in the soil and groundwater resources, resulting in critical environmental issues. In this study, an oil-contaminated soil was washed using Tween 80 surfactant and the application of photo-Fenton process (UV/Fe²⁺/H₂O₂) for treatment of the produced wastewater was evaluated.

Materials and Methods: Tween 80 is a yellow liquid with high viscosity and soluble in water. In order to determine of the photo-Fenton process efficiency, we studied effective variables including Fe concentration, pH, H₂O₂ concentration, and irradiation time. The UV irradiation source was a medium-pressure mercury vapor lamp (400 w) vertically immersed in the solution within 2 L volume glass cylindrical reactor.

Results: The results showed that efficiency of COD removal depends on the initial Fe concentration, pH, H₂O₂ concentration and irradiation time.

Under optimum conditions, (Fe: 0.1 mM, H₂O₂: 0.43 mM, pH: 3 and UV light irradiation time: 2 hours) the removal efficiency of COD was 67.3%. pH plays a crucial role in the photo-Fenton process such that the removal efficiency increased with decreasing of pH.

Conclusion: According to the results of this study, under acidic condition, this process is an efficient method for COD removal from the wastewater studied.

Keywords: Total Petroleum Hydrocarbon (TPH), Tween 80, Advanced oxidation, UV/Fe²⁺/H₂O₂ process

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