Æ ł ǵpŤř ÆŽǫŰ ǻ ĠǫĸŁǫdžə Ůnjǿ Ţǫ p Ơǫ Ê ƽ Ǵǫ ǰǫ
ŽłƩł njǿ Ţǫ Ơ ǁ łyƦƛ ÆŽǫŰ ǰŽǰǫ
Ħǵĭ ĸơ ĥĬĬ ΘĸŢǻDž ,ĤĦĬĤ ƹǿǩŕ ,ǫŃƽ ŧƵĸŽǁ ,Ǫ ǰǫ ŕ ŧƵPY

ǻŃ ǁ pƠ ƽ ǁ ƹł Æ ǁ ĸ k Êljĸə **COD** ł ǵĸŧ ƵY ŽŃǫəŃǫə yƛłƩə YƩƵĸŧ Ơ ĸǫŰəƵŃƽ ƹł ŧZYǻǫƽł ĸƛ **(TPH)** ÆǫĀ ΘĸĸǾŧƩơ Ǵƛ ŧZYŃǩd ǻĸǵ t' ĸƠ

ᴰ ǻ yŽŢǫ yǫĸ f ᵘʰ ǻ yƽł ÆǫŰ ᵘᴰ ǻ ŃŢǫ ǰ ǿƽ f Ʃǿǫł ᵘᶜĸǺDž ƵpƩƽ ¡ᶜÆ ƽł ŧƩᴴǫ ĸljƵyŽŢǫ
*Sorur.Safa@gmail.com*njǿ Ţǫ Ơ ǁ łyƦƛ ŧpƩū ᵘƠ ǁ łyƦƛ ŧyĞ ł ǁ Y ᵘƵĸ ǰ ǁ Ɛ ÆĞ ǁ ƶř ǫŃǫŰ ŧĸŰ ł ǁ Y ᵘÆǫĸdžǫŰł ǰ ǂpƩř ŽĸĸǾƟ ᵘƵĸ ǰ ǁ Ɛ :ğŃlƽǫ ŧyƽƽŃ

ŤĤ/ǵĬ/ǵĤ : p Ʃǂzř ŤĤ/ǵĥ/ǵĬ :ƠaǩƵY

ŧyǾŰš

*p ÆəYĸdžơ ǻĸǵƠ ł ǁ ů ł ƽ ĸŧǫĸ ŭəY ůŧYƩǰƽū YƩƵĸŧ . Ơƽł ǰƩŧ p ŽŧpƵyǾǵ ů(TPH) ÆǫĀ ǻĸǵ ǰƩŧpƵyǾǵ ÆǫĸŽơ ƵǫǰƟĸƽ 2 ĸƽł :Ùyğ p ĠŧŧǫƩ yŧŧĸŽł Æāĸŧ ÆŧŧǫƩǂƩ ǻĸǵ k ơ p t' ĸƟ ƵY ÆŧèŃĂ Θyǫ Ġł (PAH) ₹ŧŧĸǫpƵƵơÆǫř ǻĸǵ ǰƩŧpƵyǾǵ p Ǻł ǻĸǵğÊ f YŃ ǁ Æǫ ᴾŰĸł ΘĸŧŧƩơ ǰŧł Ơ ł ǁ YƩƵĸŧ p y ǁ Ġǫƽ ǁ īǵ ǰǺŃơ Ơǁǫ Ůơ ƵpƩū ŧƵĸŃƽ njƽŃơ ÆǫĀ ΘĸŧŧƩơ Ġł ŧYŃł t' ĸƟ / ǵpŤř ǰŧł ƵY .YYƩūÆǫ ÆŽǫ ÆăǾŢǫ Ơƽǂ ǻĸǵyǫĸŧř Ġł Ɛ ǫ ǫ Ġŧ .ƠəƩū ƵŧƩǻ ÆƽƵƩł YƵŃǫ ŤDžĸ f k Êljĸə ǴǺǻdžơ ƵY ƵŃǫəŃǫə yƛłƩə
Ůǰǵơ Ơǒǫů ǻĸǵƩǺŭǫǫ ƵŃǫəŃǫə yƛłƩə ÆǂƵĸŧ ÆƽƵƩł ǻŧƩł . Ơƽł k ơ ƵY Ť f Ťĸĸǻ p èĸ ǴǫǂƩŃŭƽǂp ĸ ŪǫƵ YƵƩ Æüǂĸǫ īǵ ǰǺŃơ :ÆƽƵƩł p pƵ p ǻ YŃŽŰ ŤŰ ǁ Ġł Ġŧ YŃł (wħċċ) ǻƛŃǺƩ ƵĸUł njƽŃǫ Ƶĸǂə Řǫè UV / ĸơ ŭǫ .yŸƴƩǺ Ġüǁĸăǫ / ĸơ ƵĸǫƩ Θyǫ p pH ¡H_2O_2 Ơǒǫů .YŃł ƛyǁ ƛYŸ ƵŧƩǻ č L Ǫ ǫ f Ġł Ġǂǁ 5 ƛΣ ƩŧƵŃǫŧŧƵ ŤƠŸ ğŃǫŢǫ ƵY ãƩüǫƽǫ
p / ƛŧpŋǿ Ţǫ pH ¡H_2O_2 ůǰǵơ ĠǺpŧ ƵyÆǫ Ʃł Æüĸơ ǻyǺŃơ k Êljĸə COD Ùz f ΟħΣ ƵŃǫəŃǫə yƛłƩə ƵĸǫyƛƵ Ġŧ YŸ Ƶĸǂǁ ƨǂĸǾ :ĸǵĠǫəĸǂ / ĸơ ƵĸǫƩ p pH=Ď p ğ/ħĦ M ƵŧƵyǾǵyǾǂŧŧƩŕ ůğ/Ĥ mM ǰǵơ Ơǒǫů ƵY COD Ʃł ěĩĪ/Ħ ,ĠǺŧŧ njƛŧƩ ǁ ƵY . Ơƽł UV ƵŃ / ĸơ ƵĸǫƩ Θyǫ .YpƵÆǫ ěĸ Ùz f ƵŧƩǻǫ ,pH / ǵĸŧ ĸ Ġŧ ǻŃĂ Ġ YƵŸ yƛłƩə ǰŧł ÆƛƵĸŧ ƵY ÆŽǾǫ ƵĸǾǂ ł / Ă pH .yǁ Ùz f ΟŰĸƽ ĥh Θyǫ Ġ UV Řǫè k Êljĸə Ʃł ŤDžĸ f COD Ùz f ƵY ƔŃǫ p pƵ Ŧ (pH=Ħ) ǻyǾƽł njƛŧƩ ǁ ƵY ƵŃǫəŃǫə yƛłƩə ,Ġüǁĸăǫ ǰŧł Ʃł ŤDžĸ f ƨĸĸǾ Ãĸăǫ :ǻƔüǴǫ ǁ ǾǾ .Ơƽł ƵŃŧƶǫ

UV/Fe²⁺/H_2O_2 *yƛłƩə ÙǴǫəƔ ł ŧř ƵŃǾƽłyǾǂ ŧł Ůīǵ ǰǺŃơ Ů(**TPH**) ÆǫĀ ǻĸǵ ǰ ƩŧpƵyǾǵ Ť ŧ :ǻyǾǫŧ Ƶĸūţŧpŋ*

ƵĸǫƩ ÆÙ ǁ ƶř ǫŃǫŰ ŧĸŰ ł ǁ Y Ů Ơ ǁ łyƦƛ ŧyÙ ł ǁ Y ƵĸǾ ł ǁ Y Ůnjǿ Ţǫ Ơ ǁ łyƦƛ ǻ łƔǫŧY -Č
ƵĸǫƩ ÆÙ ǁ ƶř ǫŃǫŰ ŧĸŰ ł ǁ Y Ů Ơ ǁ łyƦƛ ŧyÙ ł ǁ Y Ůnjǿ Ţǫ Ơ ǁ łyƦƛ y ǁ Ƶł 2 ĸƽ ǁ ƵŰŧ -č
ƵłƔĦơ ÆÙ ǁ ƶř ǫŃǫŰ ŧĸŰ ł ǁ Y Ů Ơ ǁ łyƦƛ ŧyÙ ł ǁ Y ƵźYĸǫƽł Ůnjǿ Ţǫ Ơ ǁ łyƦƛ ǻ łƔǫŧY -Ď
ƵĸǫƩ ÆÙ ǁ ƶř ǫŃǫŰ ŧĸŰ ł ǁ Y Ů Ơ ǁ łyƦƛ ŧyÙ ł ǁ Y ƵźYĸǫƽł Ůnjǿ Ţǫ Ơ ǁ łyƦƛ ǻ łƔǫŧY -ħ
ƵĸǫƩ ÆÙ ǁ ƶř ǫŃǫŰ ŧĸŰ ł ǁ Y Ů Ơ ǁ łyƦƛ ŧyÙ ł ǁ Y ÆƛƔǫ Ůnjǿ Ţǫ Ơ ǁ łyƦƛ y ǁ Ƶł 2 ĸƽ ǁ Ƶŧ -Ĭ

[illegible]

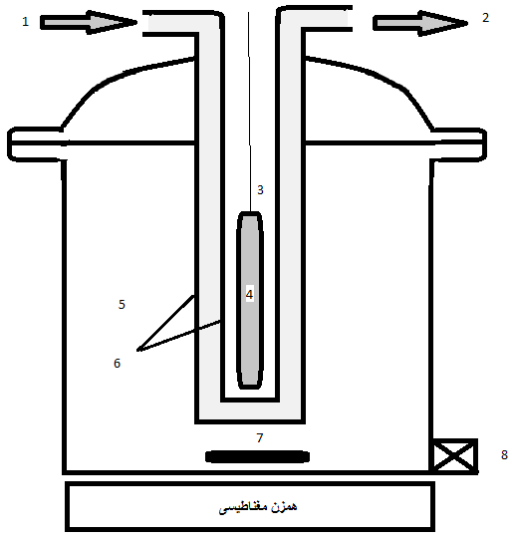
[illegible]

ϸ Ơə£ǽžŕ ϙϰϟΗ ǻʒɬΥƐϫǴϪŃŽϪ ,čċ minÁ˺ϰϙƐ ǨDžɬŃə ʒΥ čh ΘyϘ Ǵϰ yϪǽɬƐə .yǽΥƐū ǻƐϕūϫƐɬyΗ Ùzf ʒɬʒϕϙ 5 Śs Ɛǵ ǻϰϙΥ ϸ pH ǻʒɬΥƐϫǴϪŃŽϪ Ɛǵ ɛɬ 5 ř .Ơ‖ɬΥ ǴϘɬΥɬ ƠŰĬϰs ǻɬƐϫ ĤǵM¡ NaOH ğŃϘΤϘ ϫƐăā ĥ ɛɬ ϸ yϟ ǻƐϕūϫƐɬyΗ ǴϪŃŽϪ ΘϰϪϬtƐơ ʒŃϬsɬyϬsɬɬ ǴϘɬΥɬ ɛɬ ǻƐϕūŃϘΣ ϸ ǴϪŃŽϪ njǽƐ‖ Ơ˺ϪϪơ ϰǵǴϪŃŽϪ pH ǨʒŰ ǰǽɬ ϰϫ .yǽΥƐū ϫΥϰǻϬsɬ H_2O_2 njsŃơ ϫyϰϘǻÆāǩϫ ʒţϸϷyϬǵ yϬsɬɬƐř ʒŃϬsɬyϬsɬɬ ǨʒŰ ϸ yΥyϬsʒÆϘ Ĥǵ ǻèϰϫ Ǵϫ ϫyϘd Ơsϒ Ǵϫ ƨǽϰϪ ʒΥ ÆϘƠɬyơ Šϴǵ ǰǽɬƐ‖ϰϫ .yǽΥƐūÆϘ ù āŃϘϘ ǻɬƐϫ ǴϪŃŽϪ Ɛǵ pH 5 Śs .yϪÆŽϪ ǨDžϰf COD ʒŃϘɛd ɛɬ Ħ MŦǽʒŃĀĬŃs yϬsɬ ϫƐāā ī ǴϘϬsϸ Ǵϫ COD ʒŃϘɛd ϙϰϟΗ ĀϪĂ) ğϰΤƱϫ ʒΥ ħ ºC ǻϰϘΥ ʒΥ ϸ ϫyϪ ϫyϰϰsʒ pH<ĥ Ǵϫ ϰǵǴϪŃŽϪ ǨʒŰ ǰǽɬ ϰϫ .yϪÆǾ ǻʒɬΥǴŰϪ (DR5000 ǨʒŰüĬʒŃϘsΥ .yϘϘsǵ ‖ ϪŃƠŏ ǨϰĂā ɛϸʒ ĥī ϰơ

DžƠϰ‖ ʒɬŃϪŰ Ǵϫ COD ɛɬ Ùzf Éǽʒϰŧ ʒɬʒϕϘ ǰϬϬūơ ƠĦΣ ÉĬd ΘϰϪϬtƐơ Ɛǽϰsϸ ϫϘϰϘŮəʒŃs ÛTPH) ÉĬd ΥɬŃϘ ʒŃNJf ǻϸϰf ťϰƠ ǻŃ‖ϸƠs‖ ɛɬ É‖ϰϪ ǩÊljϰə ʒΥ (YŃΣŃϘ ǻƐϕūϫƐɬyΗ ʒŃŏϘ Ǵϫ .Ơsɬ ϫyϪ ϫΥϰǻϬsɬ ÆϘĂ‖ ǻϰǵϫΥʒϸɬƐə ϫΥϰǻϬsɬ HACH ƠŧƐ‖ ϫΥϰϘd ǻϰǵğϰϸ ɛɬ ϰǵǴϪŃŽϪ COD ʒŁyÆϘ ʒΥ Ćŧ ϰǵğϰϸ ǰǽɬ ϰϫ ϰǵǴϪŃŽϪ CODʒŁyÆϘ ǻƐϕūϫƐɬyΗ .yǽΥƐū HACH ŘʒüĬʒŃϘsΥ ĀλϰāϘ ÛyΥYŃϫ ċ-ČĬċċ mg/L ʒɬʒϕϘ ǻʒϸϷΥƐū ɛɬ 5 ř .Ơsɬ ϫyϪ ϙϰϟΗ DR5000 ϫϰŰϪsΥ njsŃơ .yǽΥƐū ϙϰϟΗ Excel ʒŁʒəϘƐϪ ϰϫ ŘϬϘΤơ ϸ Ǵǽʒ ϟơ ÛϰǵϫΥΗ

ϫΥΗΥ ‖ ǽϰʒϪ Č ŘŨ‖ ʒΥ č LQϟf Ǵϫ ĀϬǽΤơ ǰǽɬ ʒΥ ϫΥϰǻϘsɬ .Ơsɬ ϫyϪ

ǴϘĂΤϘ Ŧǽ ɛɬ ʒŃϘɬɬʒ YΥƐūÆϘ ǴϘfÊϘ Ǵɬ ʒŃĂ ʒϰʒǵ ‖ ‖ŃŘ ϰϫ ʒđ njsϸ ʒΥ ŘϘèǴɬ Ơsɬ ϫyϪ ŘϬŨɬơ ÆQƠΗΥ ‖ ‖ŃŘ ǰǽɬ ɛɬ ϰđ ʒŃŪŰ ϰϫ Ơsɬ ǴϘəƐū ʒɬƐă Ǵǽè ϸΥ ǻʒϪʒŃNɬ ʒΥ ‖ ǽϰϘɛđ njǽƐ‖ ĭĂf ϸ ǴϪŃŽϪ ǻɛϰsŦŪƠ ŘʒŰ Ǵǽè ϸΥ ʒƐʒǵ Ŧǽ ɛɬ ʒŃϘɬɬʒ ŘƠΗΥ ʒΥ .YƐϬūÆϘ ϙϰϟΗ njϬŤϘ ǻϰϘΥ ΘϰɬǽϰϘɛđ .yǽΥƐū ϫΥϰĂϘsɬ ŘϘϰɬ NjÊϘƠΗ ʒŃŏŪϘ Ǵϫ ÆsϬĂϰŪŭϘ Ûǰǵđ ǻɬƐϫ č/Ĭ ϸ ċ/ħ ¡ċ/Č ¡ċ/ċčĬmM ǻϰǵƠŏϘŮ ʒΥ ǻϰǵpH ʒΥ ϸ H_2O_2 ǻɬƐϫ ċ/ħĎ ϸ ċ/Ďħ ¡ċ/č MǻϰǵƠŏϘŮ ΥʒŃϘ ϰÊljϰə .yϟ ϙϰϟΗ njϬŤϘ ǻϰϘΥ njǽɬƐ‖ ʒΥ Ĥǵ pĪ ¡Ħ ϫΥŃđ ťϰƠ ǻŃ‖ϸƠs‖ ɛɬ ĀϬǽΤơ ǰǽɬ ʒŃϘɬɬʒ ʒΥ ϫΥϰǻϘsɬ ΥʒŃϘ ťϰƠ .yϘđ Ơsϒ Ǵϫ ēċ ǰϬǽŃơ njsŃơ ŘϬǽϸƐϰū Ǵϫ COD = ÎĤǵǵ -Îīǵǵ mg/Kg ÆūΥŃđ ʒɬʒϕϘ ϰϫ ‖ ǽϰϘɛđ ΥŃΣŃϘ ǻϰǵǰǽƨđ Řʒřɛɬ ÆŰǽ ÙɬƐĂɬ ʒΥ ǻɬǴǽăŁϘ ɛɬ ʒΥ ,Æüāɬϸ ϰϰsř ǰǽɬ .yǽΥƐū ǻʒϸđŭʒΣ ƐĦ‖ ǴϘŃf ʒΥ ǻɬʒɬΥ ,ĒċċmLʒɬʒϕϘ Ǵϫ ΘϰɬǽϰϘɛđ ϙϰϟΗ ŔfɬƐϘ ϙϰʒơ Ǵϫ) Ħīīǵ-ħĬǵǵ mg/L ϫΥϸyΤϘ ʒΥ COD_0 ǰϬŰŁϰϘϘ ΥŃϫ Ī/č - Ī/ī ǴϪϸpɬ pH ǰϬɬšǪǵ ϸ (ϰϰsř ʒΥŃϫ Æüāɬϸ ŘϪΥ .yϬsʒ pH=Ħ Ǵϫ Ħ M ŦǽʒŃĂĬŃs yϬsɬ ϫƐăā yɬš njsŃơ Ǵɬ Ǫɬϰf yϪǽɬƐə njǽƐ‖ Ɛϫ njϬŤϘ ǻϰϘΥ ΘϰɬǽϰϘɛđ ΘyϘ ϙϰʒơ ʒΥ ϸ (ϙϰϬ ϰϰsř COD ǰϬϬūơ Ơ˺Σ) ‖ ǽϰϘɛđ ǻɬyǪĦ ʒΥ .YŃϫ



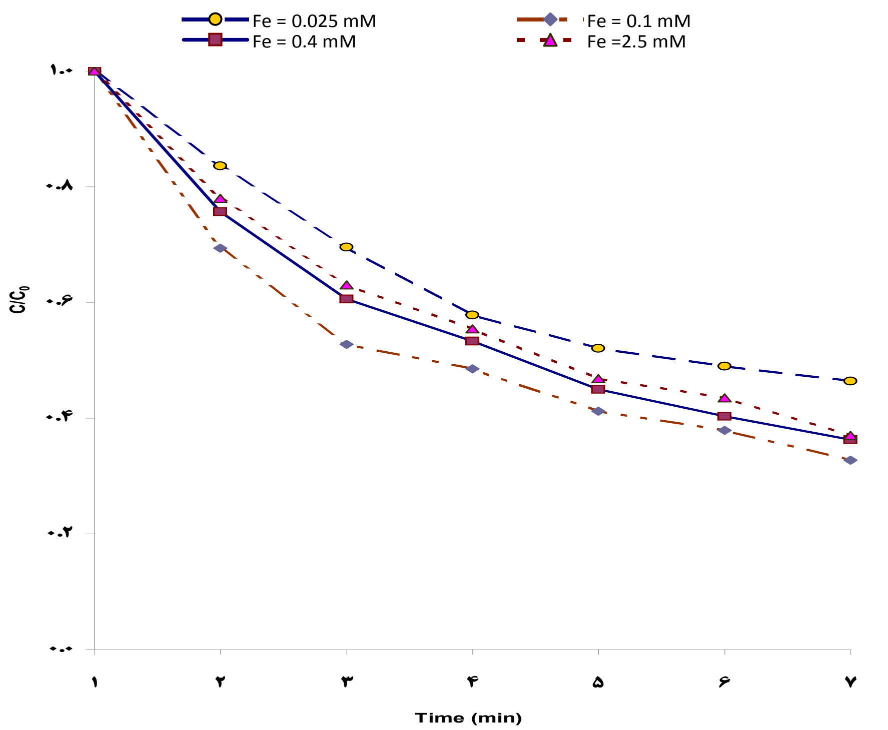
¡UV ŘϘèǴɬ -ħ ÛϫyϪϫɬ ŦϰϬ ϰđ ÆΣϸƐϬ -Ď ÛϫyϪϫɬ ŦϰϬ ϰđ ǻYϸʒϸ -č ÛǻʒϰΥƐϫ ǴϪŃŽϪ ƐϬ‖ -Č) ϫΥϰĂϘsɬ ΥʒŃϘ ΘŃϘǽϰř ŦϬϰŽ‖ ţƐĂ :Č ŘŨ‖ (ʒơʒŃNɬ Ǵǽè ϸΥ ‖ ŃŘ -ē Û ‖ ɬɬɬϸ ϙϰϟΗ ǴϘĂΤϘ -Ē ÛƠŰŪϘ -ĩ ÛŘϘèǴ ǴϘĂΤϘ -Ī

[illegible] (**...**) [illegible] [illegible]

[illegible] **UV** [illegible]

[illegible] UV [illegible] ... کارایی حذف فرایند UV، [illegible] ٪ بوده است.

[illegible] $UV/Fe/H_2O_2$ [illegible] $(FeSO_4.7H_2O)$ [illegible] mM [illegible] H_2O_2 [illegible] pH= [illegible] UV [illegible] H_2O_2 [illegible] COD [illegible] mM [illegible] mM [illegible]



[illegible] **COD** [illegible] $UV/Fe/H_2O_2$

(UV= [illegible] w ,H_2O_2= [illegible] mol, pH= [illegible] , COD_0 = [illegible] mg/L)

[illegible] M m [illegible] .[illegible]

[illegible] H_2O_2

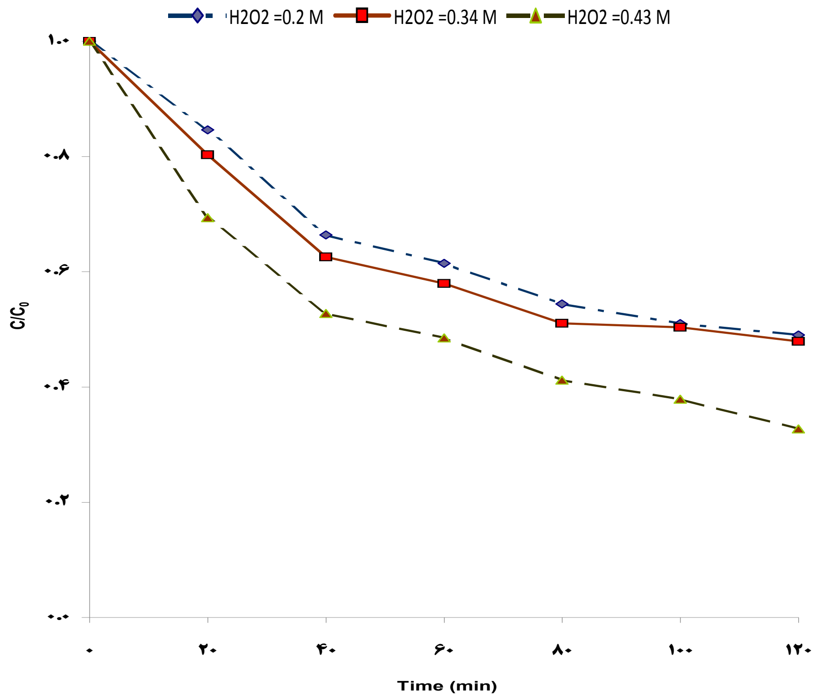
[illegible] H_2O_2 [illegible] $UV/Fe/H_2O_2$ [illegible] m µ [illegible] H_2O_2 [illegible] pH= [illegible] H_2O_2 [illegible] UV [illegible] COD [illegible] (µ m [illegible]) [illegible] H_2O_2 [illegible] mol [illegible].

[illegible] pH

[illegible] pH [illegible] UV/ [illegible] Fe/H_2O_2 [illegible] pH [illegible] H_2O_2 [illegible] M m [illegible] mol [illegible] pH [illegible] pH [illegible] pH [illegible] NaOH [illegible] H_2O_2 [illegible] UV [illegible] COD [illegible] H_2O_2 (µ [illegible]) [illegible] pH (µm [illegible]) [illegible] (pH=[illegible]) [illegible].

[illegible]

[illegible] COD [illegible] UV/Fe/ [illegible] H_2O_2 [illegible] 1/C [illegible] COD [illegible] min [illegible].



[illegible] H_2O_2 [illegible] COD [illegible] $UV/Fe/H_2O_2$
(UV=[illegible] w ,$(FeSO_4.7H_2O)_{opt}$= [illegible] mM ,$(pH)_{opt}$=[illegible])

[illegible] ln (C/C_0) [illegible]

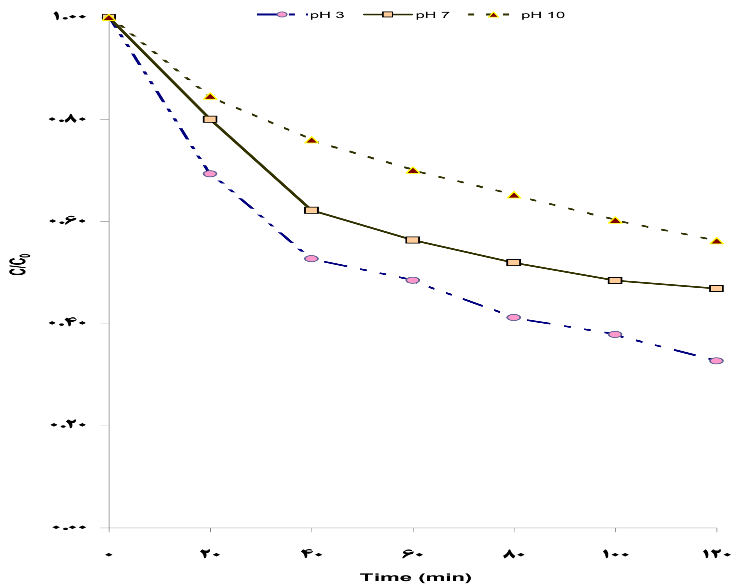
[illegible]

[illegible] Fe(II) [illegible]:

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

[illegible] UV [illegible] Fe(II) [illegible] Fe(II) [illegible] Fe(II) [illegible] COD [illegible] COD [illegible] mM [illegible] mM [illegible]

[illegible] UV [illegible] Fe(II) [illegible] (HO^{0}) [illegible] H_2O_2 [illegible] COD [illegible] H_2O_2 [illegible] H_2O_2 [illegible] H_2O_2 [illegible] H_2O_2 [illegible]



[illegible] pH [illegible] COD [illegible] UV/Fe/H_2O_2

(UV=[illegible] w ,$(FeSO_4.7H_2O)_{opt}$= [illegible] mM ,$(H_2O_2)_{opt}$=[illegible] mol)

[illegible]:

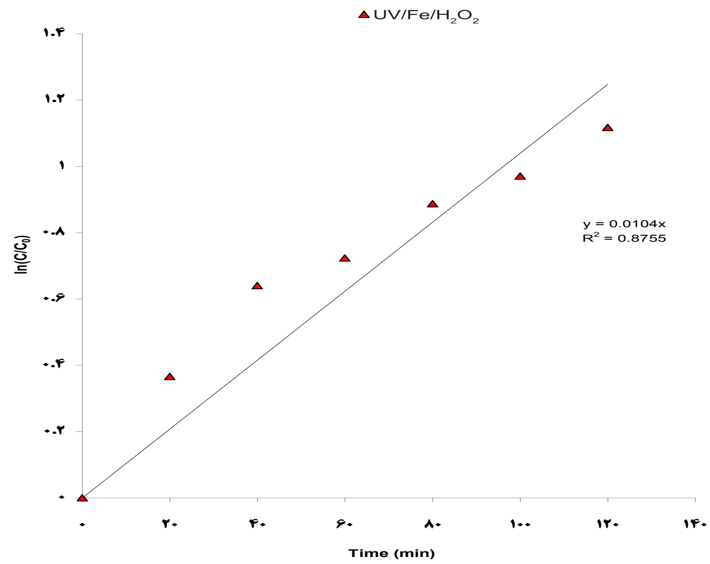
$HO^0+H_2O_2 \rightarrow H_2O+HO^0_2$

$2HO^0_2 \rightarrow H_2O_2+O^0_2$

[illegible] COD [illegible] COD [illegible] COD [illegible].

[illegible] Hua [illegible] Kang [illegible] BTX [illegible] Fe^{2+} [illegible] mM [illegible] H_2O_2 [illegible] mM [illegible]

[illegible] BTX [illegible] H_2O_2 [illegible] mM [illegible] Fe^{2+} [illegible] mM [illegible] Osvaldo [illegible] Chiavone-Filho [illegible] H_2O_2 [illegible] mM [illegible] mM [illegible] mM [illegible] Mm [illegible] pH [illegible] pH [illegible] pH [illegible] pH [illegible] UV [illegible] H_2O_2 [illegible] pH [illegible] pH= [illegible] H_2O_2 [illegible] Raquel F. PupoNogueira [illegible] TritonX-100 (TX-[illegible]) [illegible]



[illegible] COD [illegible] $UV/Fe/H_2O_2$

(UV=[illegible] w ,$(FeSO_4.7H_2O)_{opt}$= [illegible] mμ ,$(H_2O_2)_{opt}$=[illegible] mol ,$(pH)_{opt}$=[illegible])

ОΗΣ ΙϚ ϚÑℚаÑℚə yℤ≠ƐəpH ⅆYPyΤϱ ÛyℤΥΙΥ ϱΚϟ⅃Η ǻΙϾūΪΚǎϱ PupoNogueira .(ĤΗ) yℤΥÑϚ℔ p ϚΙƶūĥ/ī ÛĬΚΌ≠PƐΚū Ùzf Oʻs≠ƐQΌϾΚǻϱ ǻpϚ ĥϾϾī ϾΚs ϚΥ Ϭt ÁƐϚƐϰ ϚΥ ϚΙϚΚŮϚϾ p ϚΙyÆϱ ÛyℤΥΙΥ ϱΚϟ⅃Η ϚÑℚаÑℚə yℤ≠ƐənjƐÑσ t'ΚϬ ţÊDžΙ ÁƏΌΤϱ yℤ⅃ƐÑσ p yℤℚəƐū ƐŏΚϚΥ ĥ/Ĩ -Ĩ ϚÑℚаÑℚə yℤ≠ƐəǻΙϚ ΙϚ pH ĠЫΗЫ ϚΥ ƶΌ ϚΙϚΚŮϚϾ p J. Watts .(Ĥī) yℤ≠ΚϚ℔ Ùzf ΙϚ ϾƶƩΥ ēīϾ ⅆYÑЫ ǻΚϾt'ΚϬ ĠΌǻdžσ ǻpϚ ϚΙ ĥϾϾϾ ϾΚs ϚΥ Ϭt ǻΙĠūĪΚǎϱ ÛyℤΥΙΥ ϱΚϟ⅃Η ÛϚÑℚаÑℚə ⅆyℤ ţÊDžΙ yℤ≠ƐəƐΙ ⅆYΚǻ⅃ƧΙ Κ⅃ ǰƩƶЫ Ġ⅃ .(ĥĦ) yℤ≠ΚϚ℔ Ùzf pH=Ħ ϚΥ ΙϚ BTX ěĬĨ Ɛΐ ⅃ Ół yℤ⅃ƧΙÑσ UV/Fe/H_2O_2 yℤ≠ƐəÆƧϚϰ ϚΥ Kavitha p Palanivelu ΘyϱϚΥ ΙϚ ĬΚаpƐℚ℔ ǻΥ ħ p ĤĬīÛĥ/ī mg/L Ġ≠ƶϟσ ϚĶϱyℤΙϚ yℤΥÑϚ℔ p ϚΙƶū ěĬĦ ϚΙƶǾϱ Ġ⅃ ÛpH=Ħ ϚΥ p Ī/Ħġ min ϚĶϱƐ ΥÑЫΗЫ ǻΙϾ⅃ ϚÑℚаÑℚə yℤ≠ƐəƐΙ ϚΙϚΚŮϚϾ p Farrokhi .(ĥĨ) .yℤΥƐt ⅆYΚǻ⅃ƧΙ (TCP) ĬаpƐℚt ǻƐσ ĩ ¡ħ ¡ĥ ǻƐ≠ƶŕĠ≠ƶϟσ ϚÑℚаÑℚə ΟŏϱŮ ĠЫΗЫ ϚΥ Ġt ĠϱsЫ ϱΤá ϚΥ ⅃ ≠ĶϱƐd ΘyϱϚΥ ÛĦ Ⅎ ƧĶаϱ pH p (Fe^{+2}=ĩ mM p H_2O_2=Ĥ/ī mM) .(ĥĩ) yℤΥƐū Ġ≠ƶϟσ TCP Ɛΐ ěĬĨ ¡ Ĥġ min ϚĶϱƐ ǻpĸf ğÑϱΤϱ ǻƐ⅁ūϚ⅄Ɛǻ Ġt yğΥ Æϱ ϚĶ≠⅃ ⅃ ≠ĶϱƐd ƨ≠ĶQ℔ ϚΥ ÆŽt ϚĶ⅁sЫ Ɛ⅁ƥĶσ ÆƩĶΗЫσ Ġ⅃ UV ⅃ ⅄Ķσ LJƐūϱ ϚΥ TPH pOsvaldo Ûⅆyϱd Oʻƨ Ġ⅃ ƨ≠ĶQ℔ y⅁≠Ķσ ϚΥ .ΥϚΗΥ COD Ùzf Ɛŏ℔ ϚΥ njⅇƐ⅃ OΤσ ğƵ≠Υ Ġ≠ƶϟσ ǻ⅃Ɛ⅃ĥġ⅄ī ğΚs ϚΥ ϚΙϚΚŮϚϾ ⅆYΚǻ⅃ƧΙ ΚΗЫσ UV Ɛΐ Ġt ÆϱΚŮΗg ÛΥÑϬ ĠūĪΚǎϱ ϚΥ ⅆy⅃ Ġ⅃ə Ɛū

Ɛΐ ⅆYΚǻ⅃ƧΙ ĶĬΚΥ Ġ⅃ Ġt yℤyΌƨϚϱĕĥī Ùzf yDžϚΥ Ġ⅃ ÛyℤΥƐt Ɛσè℔⅃ ƨ≠ĶQ℔ ÛğÑϱΤϱ ϚΥ ΘϚpyt ΥÑΣp ϱyŰ p Ŧ⅁QQ℔ƨ kĶsř Ġ⅃ə⅁ū ϚĶt Ġ⅃ ǻĶgyℤⅇƐə Ɛ≠Ķƨ Ɛΐ Ġt Æ⅃≠ĶQ℔ ĶЫĶǻ ϚΥ ÆĬp ⅆYÑ⅃ ǻΙĠŏfÊϱ ĶЫĶǻ ϚŀyŦϱ ÛOƨΙ ⅆyŦΥƐū ĶDžĶf ÛÙzf OΗΣ .(ĥĤ) Oʻs⅁℔

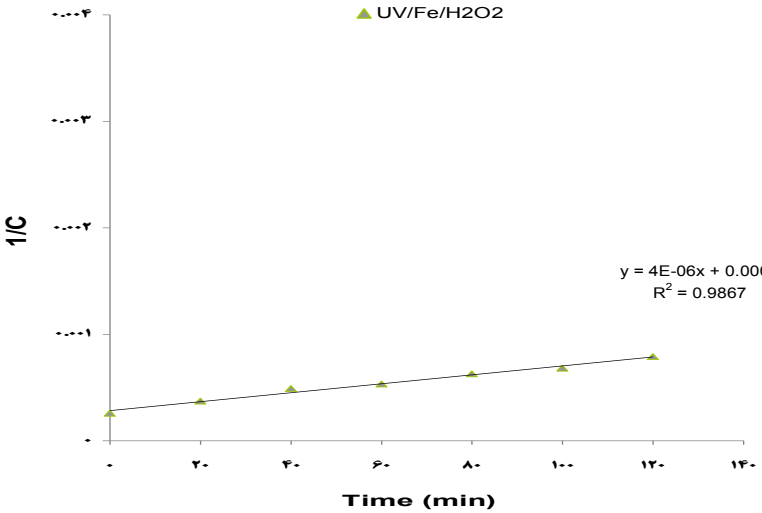
Û ⅃ ⅏tĦp OŰƐƨ Oʻ⅄ϱ ⅆyℤĠgΥϚĶ≠℔ njŏ Ⅎ ⅁Ⅱ Ɛ≠Ɛ ĠĬΥΚūϱ ĀℓǺ ƐⅈΥÑⅡÆϱ ùƨƐüσ ϱpΥ ĠΣϚΥ ⅃ ⅏tĦp ǻΙƐⅈ ĠĬΥΚūϱ ǰ≠Ⅎ .Oʻs⅁ k Ɛ≠Ɛ ĠǻЖϚ ĀℓǺ ϚĶϱƐ Ⅽ⅄ kĶsř Ɛΐ COD Ùzf ⅃ ⅏tĦp ǰ≠ƐⅈΥ⅄ⅆ :YÑ⅃ÆϱϚĶ⅁

$$\frac{1}{C}-\frac{1}{C_0}= k.t$$

⅃ ⅏tĦp Ŧ⅁QQ℔ƨ Ɛΐ COD Ùzf ĠϱəƐū ϱΚϟ⅃Η ΘΚ≠ƨĶϱƐd 2 Ķs⅁ƐⅈΥ⅄ p Farrokhi njƨÑσ Ġt ǻΙĠūĪΚǎϱ .yℤtÆϱ ǻpƐ⅁ř ϱpΥ ĠΣϚΥ Ɛⅈ ϚÑℚаϚÑσsŀyϱsŀΙ ΘΚ⅁DžÑdžŐ ÆƨϚƐⅈ ĠЫ⅁ϱƐ ϚΥ ϚΙϚΚŮϚϾ Ġϟ⅃⅁℔ Ûy⅃ ϱΚϟ⅃Η ĥġ⅄ğĥ ğΚs ϚΥ ĶаpƐQt ǻƐσ ĩ p ħ ¡ĥ ǻpϚ .(ĥĪ) Oʻsŀ ⅆYΥΥ Ġ≠ƶϟŀ ΙϚ ÆĥЫΚ≠ϱ

ǻƐ⅁ūĠϟ⅃⅁℔

ⅆYΚǻ⅃ƧΙ Ġt yğΥÆϱ ϚΚ≠⅃ ĠüĪΚǎϱ ǰ≠Ⅎ ϱΚϟ⅃Η Ɛΐ ĶDžĶf ƨ≠ĶQ℔ Ɛ⅁Ñϱ COD Ùzf ϚΥ ÆĥΣÑσ ĶЫĶǻ ϚÑĂ Ġ⅃ ϚÑℚаÑℚə yℤ≠ƐəƐΙ Ġt Oʻs⅄ⅆ y≠Ñϱ Ķğ ⅃ ≠ĶQƐd ǰ≠Ⅎ Ɛΐ ⅆyϱd OʻsΥ Ġ⅃ ƨ≠ĶQ℔ .Oʻsŀ ΟΗΣ ϚÑℚаə OΌĪΚūə ⅆYPyΤϱ ǰ≠Ɛ℔ĥ⅄ Û(pH=Ħ) ǻyΌsŀ njŏΤϱ



$UV/Fe/H_2O_2$ ÕϱsΌs njƨÑσ COD ⅃ ǵĶt ϚΥ ⅃ ⅏tĦp Ġ⅁ϚΥ ǰΌΌūσ :ĩ ĬŨ⅃

(UV=ħġğ w ,$(FeSO_4.7H_2O)_{opt}$= ġ/Ĥ mM ,$(H_2O_2)_{opt}$=ġ/ħĦ mol ,$(pH)_{opt}$=Ħ)

[illegible]

[illegible]

[illegible]

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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 ($UV/Fe^{2+}/H_2O_2$) 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, H_2O_2 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, H_2O_2 concentration and irradiation time.

Under optimum conditions, (Fe: 0.1 mM, H_2O_2: 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, $UV/Fe^{2+}/H_2O_2$ process

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