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(II)

(Chemical Oxygen Demand)

(OH

).( Glaze et al.1987)

OH

(AOPs)

Advanced Oxidation Processes

COD

2,4-DCP

• Oxidation – Reduction Potential (ORP)

$E^\circ = + 3.06 \text{ V}$

Fe<sup>2+</sup> H<sub>2</sub>O<sub>2</sub>

2,4-DCP

• OH

)

(

• (Freeman 1998)

• H<sub>2</sub>O<sub>2</sub> /

( ) AOPs

• UV /

DCP

• H<sub>2</sub>O<sub>2</sub>/ UV /

COD BOD<sub>5</sub>

• UV/H<sub>2</sub>O<sub>2</sub>

BOD<sub>5</sub>/COD

• Fe<sup>2+</sup>/ H<sub>2</sub>O<sub>2</sub>

H.J.H Fenton

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(Fenton Reaction)

( Fenton Reagent)

.(Nesheiwat et al. 2000)

OH

H<sub>2</sub>O<sub>2</sub>

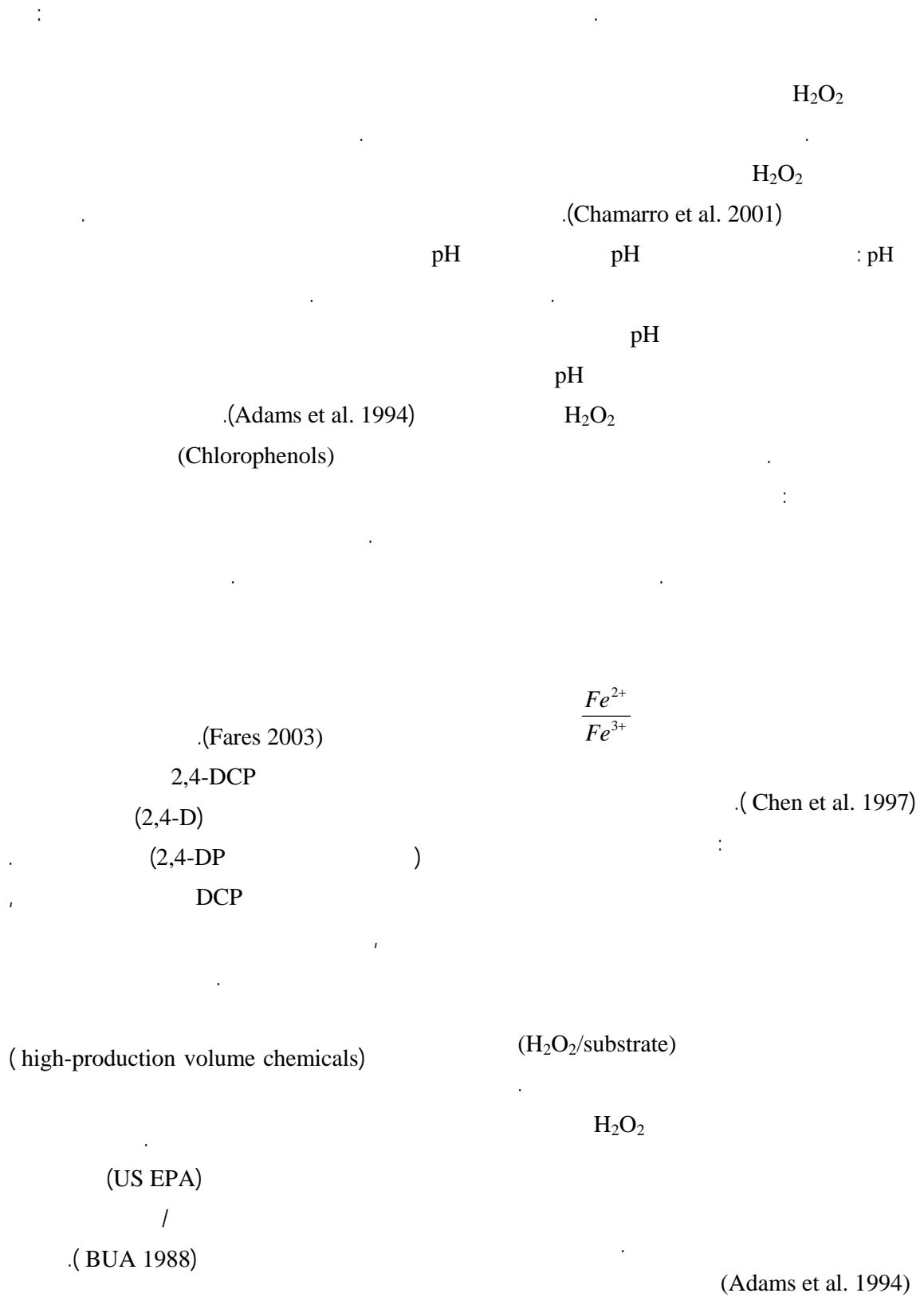
2,4- )

( DCP

.( Bigda 1995)

2,4-DCP

( )



Fe=15 mg/L

2,4-DCP=100 mg/L

pH

mg/L

2,4-DCP

pH=3

Fe=15 mg/L

(II)

( ) H<sub>2</sub>O<sub>2</sub>H<sub>2</sub>O<sub>2</sub>

Fe=15 mg/L

pH

)

2,4-DCP=50 mg/L

pH (

2,4-DCP=100 mg/L

pH

H<sub>2</sub>O<sub>2</sub>H<sub>2</sub>O<sub>2</sub>H<sub>2</sub>O<sub>2</sub> (II)H<sub>2</sub>O<sub>2</sub>

COD

.(Chamaro et al. 2001)

H<sub>2</sub>O<sub>2</sub> =50 mg/LBOD<sub>5</sub> CODH<sub>2</sub>O<sub>2</sub>

COD

.(APHA 1998)

(II)

H<sub>2</sub>O<sub>2</sub>=50 mg/L

COD %

Fe(II) =5 mg/L H<sub>2</sub>O<sub>2</sub>=50 mg/L

COD %

COD

%

COD

COD

Fe(II) =5 mg/L

2,4-DCP=100 mg/L

BOD<sub>5</sub>H<sub>2</sub>O<sub>2</sub>=50, 75, 100 mg/L

mg/L		COD		COD	
BOD <sub>5</sub>	/ /	/ /	mg/L	H <sub>2</sub> O <sub>2</sub>	H <sub>2</sub> O <sub>2</sub>
/ / /	mg/L				
			( )	COD	
	COD				% % %
	COD %				
BOD <sub>5</sub> /COD				COD	(II) H <sub>2</sub> O <sub>2</sub>
	/				
COD					
				(II)	H <sub>2</sub> O <sub>2</sub> = 100 mg/L
	Fe=15 mg/L	H <sub>2</sub> O <sub>2</sub> =100 mg/L		COD	
	BOD <sub>5</sub> /COD				%
	( )	/			5 mg/L
				%	COD
	BOD <sub>5</sub> /COD				
				H <sub>2</sub> O <sub>2</sub> = 100 mg/L	
				10 min	Fe(II) = 5 mg/L
				%	COD
BOD <sub>5</sub> /COD	Fe=10 mg/L	H <sub>2</sub> O <sub>2</sub> =50 mg/L		COD	
/	2,4-DCP=50 mg/L				
					( )
	H <sub>2</sub> O <sub>2</sub> =100 mg/L	Fe=15 mg/L			
	/	BOD <sub>5</sub> /COD			H <sub>2</sub> O <sub>2</sub>
	( )			COD %	%
	BOD <sub>5</sub> /COD			COD	(II)
	Fe=15 mg/L				
Fe=15 mg/L				H <sub>2</sub> O <sub>2</sub> =75 mg/L	
	BOD <sub>5</sub> /COD				Fe(II) = 10 mg/L
				COD	2,4-DCP=100 mg/L
	BOD <sub>5</sub> /COD				

	H <sub>2</sub> O <sub>2</sub>			
pH	(II)		2,4-DCP=100 mg/L	
	/ / /	/		
	.( )	pH	2,4-DCP=100 mg/L	BOD <sub>5</sub> /COD
		pH		/
pH		2,4-DCP=100 mg/L	H <sub>2</sub> O <sub>2</sub> =100 mg/L	
				Fe=15 mg/L
	Fe=10 mg/L	H <sub>2</sub> O <sub>2</sub> =75 mg/L		, H <sub>2</sub> O <sub>2</sub>
	COD			( BOD <sub>5</sub> /COD )
		Fe H <sub>2</sub> O <sub>2</sub>		
	pH		Fe <sup>2+</sup>	H <sub>2</sub> O <sub>2</sub>
pH			/	
				.( ) /
				BOD <sub>5</sub> /COD
				(II)
	%			
	%		H <sub>2</sub> O <sub>2</sub>	
		.(Ma et al. 2000)	H <sub>2</sub> O <sub>2</sub>	
		pH		
.(Bum et al. 1999)				BOD <sub>5</sub> /COD
			pH=3-4	pH
			pH	
	.( Chamarro et al. 2001)		NaOH	pH
				pH
				pH 2,4-DCP=50 mg/L

%

)

COD

( )

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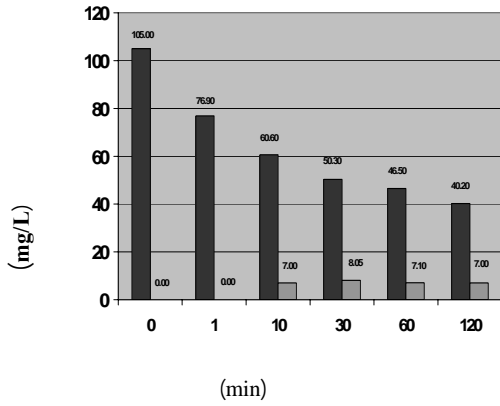
Fe(II)=10 mg/L	H <sub>2</sub> O <sub>2</sub>		2,4-DCP=50 mg/L				$\frac{BOD_5}{COD}$		BOD <sub>5</sub> , COD			
	Fe=10 mg/L											
	H <sub>2</sub> O <sub>2</sub> =100 mg/L			H <sub>2</sub> O <sub>2</sub> =75 mg/L			H <sub>2</sub> O <sub>2</sub> =50 mg/L					
$\frac{BoD_5}{COD}$	BOD <sub>5</sub> mg/L	COD	COD mg/L	$\frac{BoD_5}{COD}$	BOD <sub>5</sub> mg/L	COD	COD mg/L	$\frac{BoD_5}{COD}$	BOD <sub>5</sub> mg/L	COD	COD mg/L	min
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Fe(II)=15 mg/L	H <sub>2</sub> O <sub>2</sub>		2,4-DCP=50 mg/L				$\frac{BOD_5}{COD}$		BOD <sub>5</sub> , COD			
	Fe=15 mg/L											
	H <sub>2</sub> O <sub>2</sub> =100 mg/L			H <sub>2</sub> O <sub>2</sub> =75 mg/L			H <sub>2</sub> O <sub>2</sub> =50 mg/L					
$\frac{BoD_5}{COD}$	BOD <sub>5</sub> mg/L	COD	COD mg/L	$\frac{BoD_5}{COD}$	BOD <sub>5</sub> mg/L	COD	COD mg/L	$\frac{BoD_5}{COD}$	BOD <sub>5</sub> mg/L	COD	COD mg/L	min
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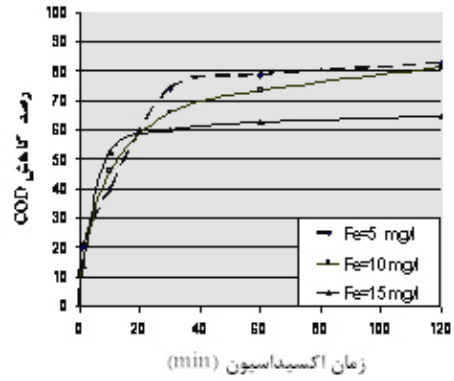
/ ...

Fe(II)=10 mg/L	H <sub>2</sub> O <sub>2</sub>		2,4-DCP=100 mg/L				$\frac{BOD_5}{COD}$		BOD <sub>5</sub> · COD			
	Fe=10 mg/L											
	H <sub>2</sub> O <sub>2</sub> =100 mg/L			H <sub>2</sub> O <sub>2</sub> =75 mg/L			H <sub>2</sub> O <sub>2</sub> =50 mg/L					
$\frac{BoD_5}{COD}$	BOD <sub>5</sub> mg/L	COD	COD mg/L	$\frac{BoD_5}{COD}$	BOD <sub>5</sub> mg/L	COD	COD mg/L	$\frac{BoD_5}{COD}$	BOD <sub>5</sub> mg/L	COD	COD mg/L	min
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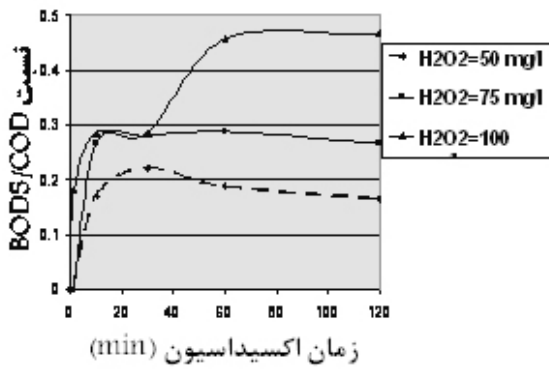
Fe(II)=15 mg/L	H <sub>2</sub> O <sub>2</sub>		2,4-DCP=100 mg/L				$\frac{BOD_5}{COD}$		BOD <sub>5</sub> · COD			
	Fe=15 mg/L											
	H <sub>2</sub> O <sub>2</sub> =100 mg/L			H <sub>2</sub> O <sub>2</sub> =75 mg/L			H <sub>2</sub> O <sub>2</sub> =50 mg/L					
$\frac{BoD_5}{COD}$	BOD <sub>5</sub> mg/L	COD	COD mg/L	$\frac{BoD_5}{COD}$	BOD <sub>5</sub> mg/L	COD	COD mg/L	$\frac{BoD_5}{COD}$	BOD <sub>5</sub> mg/L	COD	COD mg/L	min
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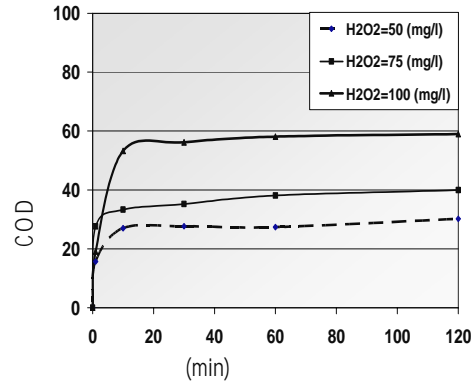
**BOD<sub>5</sub> COD**  
 2,4-DCP=100 mg/L  
 Fe=10(mg/L) H<sub>2</sub>O<sub>2</sub>=75(mg/L)



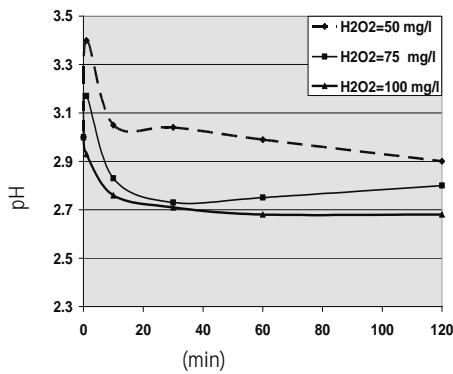
**COD Fe(II)**  
 H<sub>2</sub>O<sub>2</sub>=50 mg/L 2,4-DCP=50 mg/L



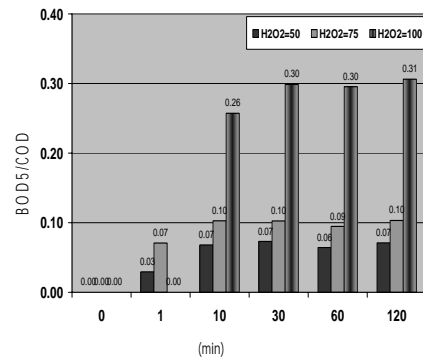
**BOD<sub>5</sub>/COD**  
 Fe=15 mg/L H<sub>2</sub>O<sub>2</sub> 2,4-DCP=50 mg/L



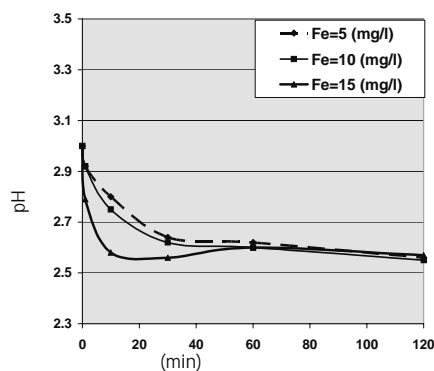
**COD H<sub>2</sub>O<sub>2</sub>**  
 Fe(II)=15 mg/L 2,4-DCP=100 mg/L



**pH**  
 2,4-DCP=100 mg/L  
 Fe(II)=10 mg/L



**BOD<sub>5</sub>/COD**  
 2,4-DCP=100 mg/L  
 Fe=15 mg/L H<sub>2</sub>O<sub>2</sub>



pH :  
2,4-DCP=100 mg/L

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