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( $R^2 > /$ )

%

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( $R^2 > /$ )

(II)

(II)

(II) ( $q_m$ )

( $R^2 > /$ )

/ /

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Aksu )

(2002; Eckenfelder 2000

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(Sternberg and Dorn 2002; Volesky 2001)

(II)  
 (Durvillaea potatorum) / / (Ecklonia radiata) (Biosorption) Dönmez et al. 1999; Figueira et al. 2000; )  
 (II) (Loukidou et al. 2003)  
 (Streptomyces rimosus) /  
 Selatnia ) ( )  
 (et al. 2004 (... (Davis et al. 2003)  
 (II)  
 (II) (II) :  
 (Biosorbent)  
 :  
 Diniz and Volesky )  
 ( 2005; Ma and Tobin 2003  
 (II) (II)  
 / / (II)  
 % (Aspergillus oryzae)  
 Kiff and Little )  
 ( ;1986  
 (II)  
 (Rhizopus nigricans)  
 (II)  
 Benguella and Benaissa)  
 KCl NaCl Cd(NO<sub>3</sub>)<sub>2</sub>.2H<sub>2</sub>O Pb(NO<sub>3</sub>)<sub>2</sub> ( ; 2002

CaCl<sub>2</sub>.2H<sub>2</sub>O MgCl<sub>2</sub>.6H<sub>2</sub>O  
 pH . ( Merck  
 pH /  
 (Mixed cellulose ester) / μm CAMLAB ) pH ( Merck  
 ((II) (II) ) ( Ltd, Model CG842  
 FAAS, Chem. Tech Analytical, Model )  
 ( ALPHA4 AZTEC ENVIRONMENTAL )  
 “Standard Methods for B (CONTROL Ltd  
 the Examination of Water and Wastewater”  
 .(APAH, AWWA and WEF 1998)  
 ( ± )  
 (II) (II)  
 ( ) ( ) (Langergren) (II) (II)  
 ( ) ( ) (Mixed-order)  

$$\ln \frac{(q_e - q)}{q_e} = -k_1 t$$
 ( )  

$$\frac{t}{q_t} = \frac{1}{k_2 q_e^2} + \frac{1}{q_e} t$$
 ( ) / / /  

$$\frac{1}{t} \ln \frac{C_0}{C_t} = -\frac{k_0}{K} - \frac{1}{K} \left( \frac{C_0 - C_t}{t} \right)$$
 ( ) pH . /  

$$\frac{1}{(q_e - q_t)} = \frac{1}{q_e} + kt$$
 ( )  
 :q<sub>e</sub> q ( ) :t  
 )  
 ) :k<sub>1</sub> (  
 ) :k<sub>2</sub> (  
 :C<sub>t</sub> C<sub>0</sub> (  
 ( ) k<sub>0</sub> ( ) t  
 :k ( ) K (II)  
 ( ) (II)  
 Azizian 2004; Benguella and )  
 .(Benaissa 2002; Metcalf and Eddy Inc 2003  
 pH . / (II) (II)

$$n \quad q_m \quad b \quad : \quad (II) \quad (II)$$

(Volesky 2003)

$$q_e = \frac{K_{RP} C_e}{1 + a_{RP} C_e^\beta} \quad ( )$$

$a_{RP} ( ) K_{RP}$   
 $( ) \beta (\beta)$   
 (Aksu 2002; Volesky 2003)

$$(II) \quad (II) \quad :$$

$$(II) \quad (II)$$

$$q_e = \frac{b q_m C_e}{1 + b C_e} \quad ( )$$

$C_e$   
 $q_m ( )$   
 $b ( )$   
 Sheng et al. 2004; Yalçinkaya et al. )

(2002

$$(II) \quad (II)$$

$$(II) \quad (II)$$

$$q_e = K_F C_e^{1/n} \quad ( )$$

$n \quad K_F$

$$(II) \quad (q_m) \quad (II)$$

Loukidou et al. )  
 (. 2004, Selatnia et al. 2004b

$$(II) \quad (II)$$

$$q_e = \frac{b q_m C_e^{1/n}}{1 + b C_e^{1/n}} \quad ( )$$

% %

(Yan and Viraraghavan 2003)

(k<sub>2</sub>)

/ : (II)

/ / /

(k<sub>0</sub>)

/ : (II)

/ / /

(*Ascophyllum nodosum*)

Kuyucak )

( ; and Volesky 1989

(II)

(k<sub>2</sub>)

(II)

/ /

/

/

% %

(II)

(k<sub>0</sub>)

/

/

(III)

/ /

%

(II)

(II)

(II)

(II)

(II)

(II)

Matheickal and )

%

(II)

(Yu 1999

(II)

pH

(R<sup>2</sup> > / )

(II)

(II)

(II)

(II)

(II)

pH (II)

pH

(II)

pH

pH

/ / /

*Aeromonas* )

(VI)

/ (II)

(*caviae*)

/ / /

pH

(II)

(II)

(II)

*Mucor* )

(II)

(*rouxii*)

Diniz and ) .

(II) (II) (III) (III) (III) ( Volesky 2005

( ) (Oscillatoria anguistissima) (Ahuja et al. 1999)

(II) pH (II) Aksu ) (II) (II) (2002) (R<sup>2</sup>> / )

(II) (II) (q<sub>m</sub>) (R<sup>2</sup>> / ) / /

(II) (II)

(II) (II)

: (II) (II) (q<sub>m</sub>) / / (q<sub>m</sub>)

(Volesky 2001)

( ... pH )

/ ... (II) (II)

Cd <sup>2+</sup>			Pb <sup>2+</sup>			Saturation						(Mm)	
R <sup>2</sup>	k (gmmol <sup>-1</sup> min <sup>-1</sup> )	q <sub>e</sub> (mmolg <sup>-1</sup> )	R <sup>2</sup>	k <sub>0</sub> (mMmin <sup>-1</sup> )	K (Mm)	R <sup>2</sup>	k <sub>2</sub> (gmmol <sup>-1</sup> min <sup>-1</sup> )	q <sub>e</sub> (mmolg <sup>-1</sup> )	R <sup>2*</sup>	k <sub>1</sub> (min <sup>-1</sup> )	q <sub>e</sub> (mmolg <sup>-1</sup> )		
/	/	/	/	/	/	/	/	/	/	/	/	Pb <sup>2+</sup>	
/	/	/	/	/	/	/	/	/	/	/	/	Pb <sup>2+</sup>	
/	/	/	/	/	/	/	/	/	/	/	/	/	Pb <sup>2+</sup>
/	/	/	/	/	/	/	/	/	/	/	/	Cd <sup>2+</sup>	
/	/	/	/	/	/	/	/	/	/	/	/	Cd <sup>2+</sup>	
/	/	/	/	/	/	/	/	/	/	/	/	/	Cd <sup>2+</sup>

:R\*

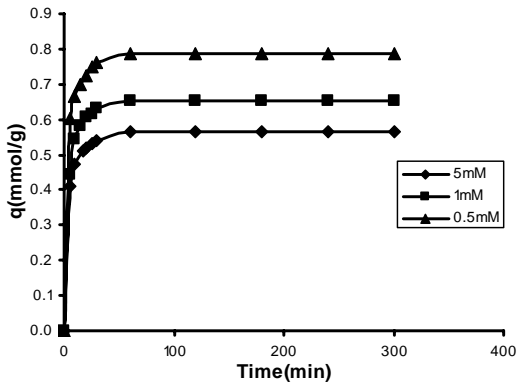
(II) (II)

R <sup>2</sup>	n	K <sub>F</sub>	R <sup>2*</sup>	b(Lmmol <sup>-1</sup> )	q <sub>m</sub> (mmolg <sup>-1</sup> )
/	/	/	/	/	(II)
/	/	/	/	/	(II)

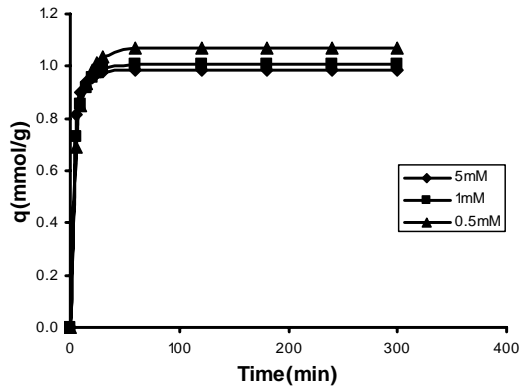
:R\*

(II)		(II)		-					
R <sup>2</sup>	β	K <sub>RP</sub> (Lg <sup>-1</sup> )	a <sub>RP</sub> (Lmmol <sup>-1</sup> ) <sup>β</sup>	R <sup>2*</sup>	n	b	q <sub>m</sub>		
/	/	/	/	/	/	/	/	(II)	
/	/	/	/	/	/	/	/	(II)	
								:R*	
		(II)		(II)		(q <sub>m</sub> )			
		(°C)	pH	q <sub>m</sub> (mmolg <sup>-1</sup> )					
Matheickal and Yu 1996		/	/	/		Ecklonia )			
Sheng et al. 2004	±			/		(radiata	Pb <sup>2+</sup>		
Sheng et al. 2004	±			/		(Ulva sp.)			
Sheng et al. 2004	±			/		(Padina sp.)			
Jalali et al. 2002		/		/		(Gracillaria sp.)			
Say et al. 2001				/		(Cladophora glomerata)			
Yan and Viraraghavan 2003				/		Phanerochaete )			
Selatnia et al. 2004b				/		(chryso sporium			
Xiangliang et al. 2005		/		/		Mucor )			
Suzuki et al. 2005		/		/		(rouxii			
Sheng et al. 2004	±	/		/		(Streptomyces rimosus)			
Sheng et al. 2004	±	/		/		(Pleurotus ostreatus)			
Sheng et al. 2004	±	/		/		(Ulva onoi)	Cd <sup>2+</sup>		
Yan and Viraraghavan 2003				/		(Ulva sp.)			
Say et al. 2001				/		(Padina sp.)			
Yalçınkaya et al. 2002				/		(Gracillaria sp.)			
Selatnia et al. 2004a				/		Mucor )			
Benguella and Benaissa 2002		/	/	/		(rouxii			
				/		Phanerochaete )			
				/		(chryso sporium			
				/		(Trametes versicolor)			
				/		(Streptomyces rimosus)			
				/		(Chitin)			





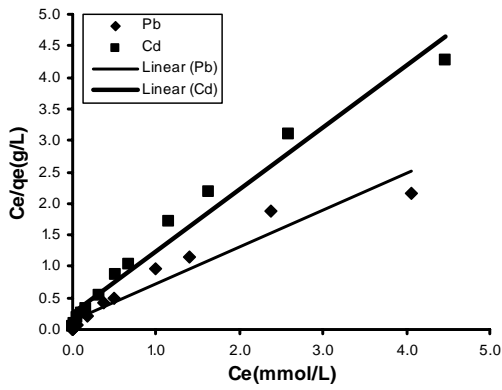
( )



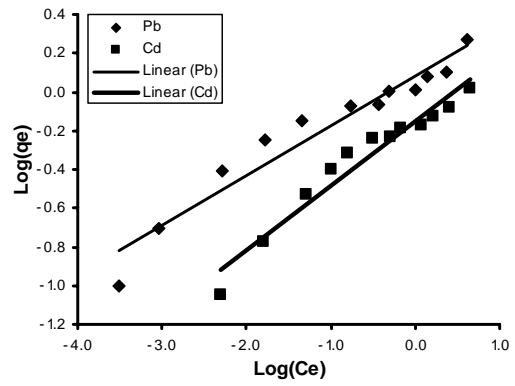
( )

( ) (II)

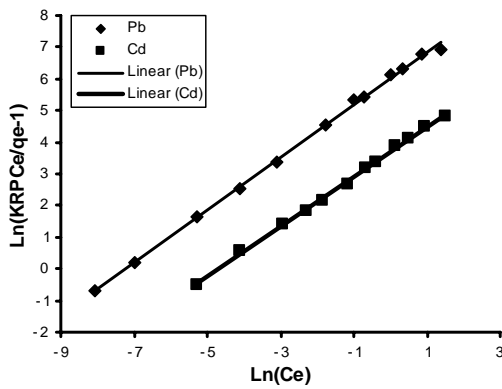
( ) (II)



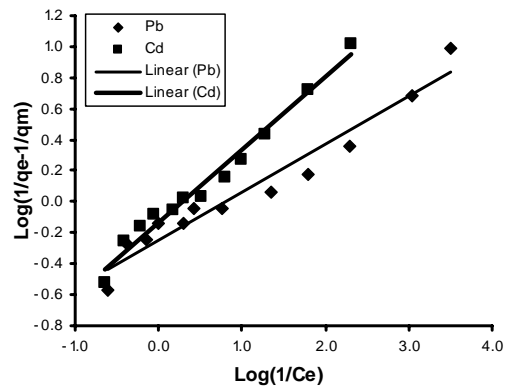
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