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

%

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

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

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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 )			) ( )
(II)		.(et al. 2004	(...
(II)	(II)	(II)	:(Davis et al. 2003)
			(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

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:

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/

(Mixed cellulose ester) / μm

CAMLAB ) pH

( Merck

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( Ltd, Model CG842

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FAAS, Chem. Tech Analytical, Model )

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( ALPHA4

AZTEC ENVIRONMENTAL )

“Standard Methods for B

(CONTROL Ltd

the Examination of Water and Wastewater”

(.APAH, AWWA and WEF 1998)

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( ) ( ) (Langergren)

(II) (II)

( ) (Mixed-order)

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/

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

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

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

pH .

/

$$\frac{1}{(q_e - q_t)} = \frac{1}{q_e} + kt \quad ( )$$

:q<sub>e</sub> q ( ) :t

pH

)

) :k<sub>1</sub> (

) :k<sub>2</sub> (

:C<sub>t</sub> C<sub>0</sub> (

( ) k<sub>0</sub> ( ) t

:k ( ) K

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Azizian 2004; Benguella and )

(.Benaissa 2002; Metcalf and Eddy Inc 2003

pH .

/

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

.(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; Yalçınkaya et al. )  
(2002

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

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

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

$$(II)$$

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

$n \quad K_F$

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

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pH

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

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(II)

pH (II)

pH

(II)

pH

*Aeromonas* )

(VI)

pH / / /

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/ / /

(*caviae*)

/ (II)

/ / /

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)

-

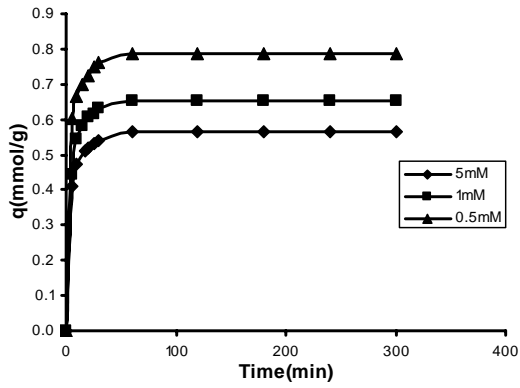
$R^2$	$\beta$	$K_{RP}$ ( $Lg^{-1}$ )	$a_{RP}$ ( $Lmmol^{-1}$ ) $^\beta$	$R^{2*}$	n	b	$q_m$	(II)
/	/	/	/	/	/	/	/	(II)
/	/	/	/	/	/	/	/	(II)

:R\*

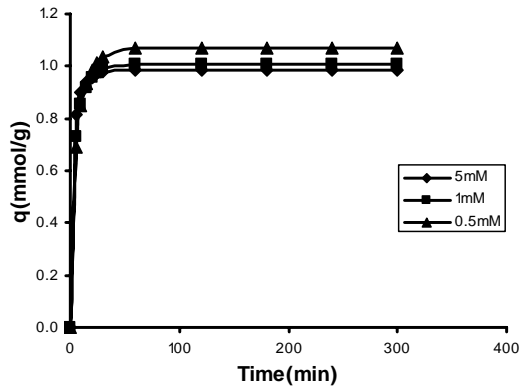
(II) (II) ( $q_m$ )

	(°C)	pH	$q_m$ ( $mmolg^{-1}$ )		
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)	





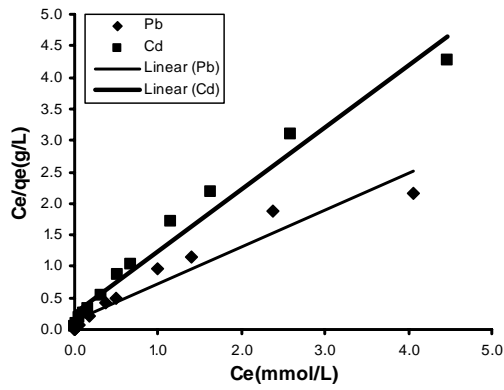
( )



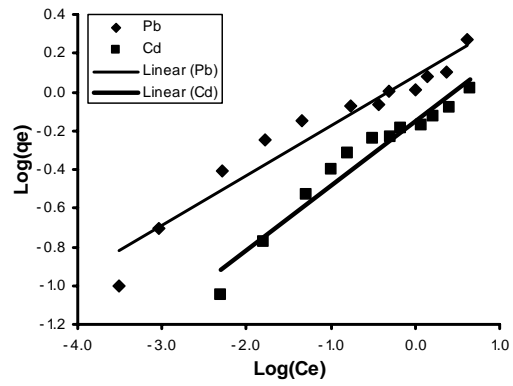
( )

( ) (II)

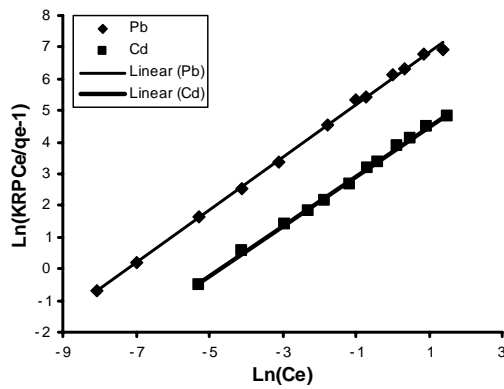
( ) (II)



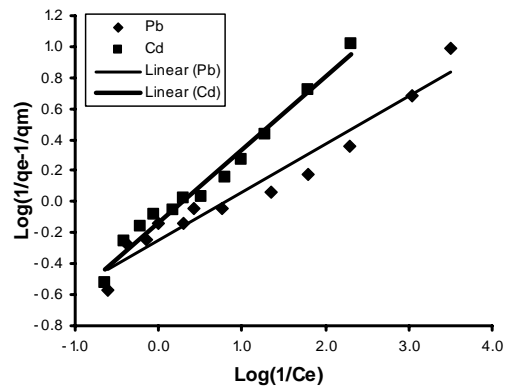
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