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Referências Bibliografica

DELLE.S, **Factors affecting sorption of organic compounds in natural sorbent/ water systems and sorption coefficients for selected pollutants.** A review, Journal of Physical and Chemical Reference Data 30 (2001), pp 187–439.

Nefedov, J. Grabis, H. ZABEL **X-ray resonant magnetic scattering on noncollinearly coupled Fe/Cr superlattices.** Physica B: Condensed Matter, (2005); pp 22-26

Selatnia A. Madani, M.Z. Bakhti, L. Kertous, Y. Mansouri, R. Yous **Biosorption of Ni²⁺ from aqueous solution by a NaOH-treated bacterial dead Streptomyces rimosus biomass.** Sep Purif Technol (2004); pp 903–911

APEL, M.L., BRIERLEY, C.L. **Biohydrometallurgical Technologies.** Mineral, Metal and Materials Society, Warrendale, (2000); pp 125– 132.

AKSU Z, ÇADATAY SS. **Investigation of biosorption of Gemazol Turquoise Blue-Greactive dye by dried Rhizopus arrhizus in batch and continuous systems.** Sep Purif Technol (2006); pp 24–35.

AMIT, A, BHATNAGARA,B, A.K. MINOCHAA, MIKA SILLANPAAB **Adsorptive removal of cobalt from aqueous solution by utilizing lemon peel as biosorbent. and precipitation.** Water Sci. Technol; (1999); pp 135–138.

CAMBIELL, A, ORTEA, E, GUILLERMO, R, JOSÉ M BENITO, CARMEN, P, COCA. J. **Treatment of oil-in-water emulsions: Performance of a sawdust bed filter** Journal of Hazardous Materials; (2006); pp 195-199

ATKINSON, B. W, BUX F, KASAN HC. **Considerations for application of biosorption technology to remediate metal-contaminated industrial effluents.** Water SA (1998); pp129–35.

MAMBAA, N.P. DLAMINI, A.F. MULABA, B. **Biosorptive removal of copper and cobalt from aqueous solutions: Shewanella spp. put to the test** (2009) pp 841–849.

BAE W, CHEN W, MULCHANDANI A, MEHRA RK. **Enhanced bioaccumulation of heavy metals by bacterial cells displaying synthetic phytochelatins.** Biotechnol Bioeng, (2000);pp 518–24.

BEVERIDGE TJ, MURRAY RGE. **Sites of metal deposition in the cell wall of *Bacillus subtilis*.** J Bacteriol (1980);pp 876–87.

BOROWITZKA L.J., **Micro-algal technology.** Cambridge university press; (1988); pp 456–65.

BORROK D, FEIN JB. **Distribution of protons and Cd between bacterial surfaces and dissolved humic substances determined through chemical equilibrium modeling.** Geochim Cosmochim Acta (2004); pp 3043–53.

BORROK DM, FEIN JB. **The impact of ionic strength on the adsorption of protons, Pb, Cd, and Sr onto the surfaces of Gram negative bacteria: testing nonelectrostatic, diffuse, and triple-layer models.** J Colloid Interface Sci (2005); pp 110–26

Braile, P. M. e Cavalcanti, J. E. W. A. **Manual de tratamento de águas residuárias industriais,** São Paulo, CETESB, (1999) pp 105-115

BROWN, M., LESTER, J.N., 1982. **Role of bacterial extracellular polymers in metal uptake in pure bacterial culture and activated sludge.** Water Res; pp 1539– 1560.

CRINI G. **Non-conventional low-cost adsorbents for dye removal: a review.** Biores Technol (2006);pp 1061–85.

CUNHA, S. B.; GUERRA, A. J. T. **Avaliação e perícia ambiental.** Rio de Janeiro: (2000) pp 100- 120.

MARTINS, D.L, ANTÔNIO, E.C **estudo da flotação de minério silicatado de zinco sem a etapa de deslamagem,** Belo Horizonte, (2007).

DAUGHNEY CJ, FEIN JB. **The effect of ionic strength on the adsorption H⁺, Cd²⁺, Pb²⁺ and Cu²⁺ by *Bacillus subtilis* and *Bacillus licheniformis*: a surface complexation model.** J Colloid Interface Sci (1998); pp 53–77

DIVISION OF ENVIRONMENTAL AND CHEMICAL ENGINEERING, **Research Institute of Industrial Technology, Chonbuk National University, Chonju** Sep Purif Technol (2007) pp 561-756

DÖNMEZ G, AKSU Z. **Removal of chromium(VI) from saline wastewaters by *Dunaliella* species.** Process Biochem (2002); pp 751–62.

DOYLE RJ, MATTHEWS TH, STREIPS UN. **Chemical basis basis for selectivity of metal ions by the *Bacillus subtilis* cell wall.** Journal Bacteriol (1980); pp 471–80

KORNGOLD, N. BELAYEV, L. ARONOV, **Removal of chromates from drinking water by anion exchangers,** Sep. Purif. Technol. 33 (2) (2003) 179–187. Eng. 127 (3) (2001) pp 196–202.(2002) pp 255–260.

ESPOSITO A, PAGNANELLI F, LODI A, SOLISIO C, VEGLIÒ F. **Biosorption of heavy metals by *Sphaerotilus natans*: an equilibrium study at different pH and biomass concentrations.** Hydrometallurgy (2001); pp 129–41.

ESPOSITO A, PAGNANELLI F, VEGLIÒ F. **PH-RELATED EQUILIBRIA models for biosorption in single metal systems.** Chem Eng Sci (2002); pp 307–13.

VEGLIO F. Beolchini **Removal of metals by biosorption: a review** Hydrometallurgy,(1997), pp 301-316

DOYLE, Z.D. LIU, **The effect of triethylenetetraamine (trien) on the ion flotation of Cu^{2+} and Ni^{2+} .** J Coll. Int. Sci. 258 (2003) pp 396–403.

FEIN JB, DAUGHNEY CJ, YEE N, DAVIS TA. **A chemical equilibrium model for metal adsorption onto bacterial surfaces.** Geochim Cosmochim Acta (1997); pp 3319–28.

G. VÁZQUEZ, J. GONZÁLEZ-ALVAREZ, A.I. GARCÍA, M.S. FREIRE, G. **ANTORRENA Adsorption of phenol on formaldehyde-pretreated *Pinus pinaster* bark: Equilibrium and kinetics** Bioresource Technology, (2007); pp 1535-1540

Araújo, G.C.L. Lemos, S.G. .Ferreira A.G Freitas. **Nogueira Effect of pre-treatment and supporting media on Ni(II), Cu(II), Al(III) and Fe(III) sorption by plant root material** Chemosphere, 2007, pp 537-545

CHEN, G.H. **Electrochemicals technologies in wastewater treatment** Sep. Purif. Technol. (2004) pp 11–41.

AYOUB, L. SEMERJIAN, A. ACRA, M. EL FADEL, B. KOOPMAN, **Heavy metal removal by coagulation with seawater liquid bittern**, J. Environ. (1998) pp 105 -115

GADD, G.M. review **of scientific of rationale, environmental importance and significance for pollution treatment**. (1999) pp 115 -135

GOLAB Z, BREITENBACH M. **Sites of copper binding in Streptomyces pilosus**. Water Air Soil Pollut (1995) pp 713–21.

ALVAREZ-V, B. JEFFERSON, S.J. JUDD, **Membrane bioreactors vs.conventional biological treatment of landfill leachate: a brief review**, J.Chem. Technol. Biotechnol. 79 (2004) 1043–1049.

CHOI, K. ZHANG, D.D. DIONYSIOU, D.B. OERTHER, G.A. SORIAL, **effect of permeate flux and tangential flow on membrane fouling for wastewater treatment**, Sep. Purif. Technol. 45 (2005) 68–78.

OZAKI, K. SHARMA, W. SAKTAYWIN, **Performance of an ultra-lowpressure reverse osmosis membrane (ULPROM) for separating heavy metal: effects of interference parameters**, Desalination 144 (2002) 287–294.

HABASHI, F., 1997. **Handbook of Extractive Metallurgy**,, New York (2000) pp 115 - 150

HUGHES, M.N., POOLE, R.K., 1989. **Metals and Microorganisms**. Champan & Hall, London. 1989 pp 100-120

DOBREVSKY, M. TODOROVA-DIMOVA, T. PANAYOTOVA, **Electroplating rinse wastewater treatment by ion exchange**, Desalination (1996) pp 277–280.

IQBAL M, SAEED A. **Production of an immobilized hybrid biosorbent for the sorption of Ni(II) from aqueous solution**. Process Biochem (2007); pp 148–57.

BOHDZIEWICZ, M. BODZEK, E. W²ASIK, **The application of reverse osmosis and nanofiltration to the removal of nitrates from groundwater**, Desalination 121 (1999) pp 139–147.

FERREIRA, D.A. FUNGARO , A. ABRÃO , F.M.S. CARVALHO **recuperação de valores em baterias níquel-hidretos metálicos exauridas ICTR – instituto de ciência e tecnologia em resíduos e desenvolvimento sustentável** Santa Catarina 2004 pp 150 - 155.

LAINE, D. VIAL, P. MOULART, **Status after 10 years of operation—overview of UF technology today**, *Desalination* 131 (2000) pp 17–25.

HENRIQUE, B. C, MAURÍCIO. L. T **Flotação bioassortiva de níquel e alumínio usando a cepa *Rhodococcus opacus*** - dissertação de mestrado RJ. 159 f 2008.

LEE .J .D Química inorganica não tão concisa 1 edição ed edgard bucher (1999) pp 50- 60

JONATHAN. F, ALINE.N.K, JAKA.S, YI-HSU.J, NANI.I, SURYADI.I, **Equilibrium and kinetic studies in adsorption of heavy metals using biosorbent: A summary of recent studies** *Review Journal of Hazardous Materials* 162 (2009) pp 616–645

Chandra.S, Subramanian, J. M. Modak, K. A. Natarajan **Removal of metal ions using an industrial biomass with reference to environmental control** *International Journal of Mineral Processing*, (1998), pp 107-120

Glucina, J.M.Laine L. Durand-**Bourlier Assessment of filtration mode for the ultrafiltration membrane process** *Desalination*, (1998), pp 205-211

VIJAYARAGHAVAN, YEOUNG-SANG YUN **Bacterial biosorbents and biosorption Biotechnology** *Advances* 26 (2008) pp 266–291

VIJAYARAGHAVAN, T.V.N. PADMESH, K. PALANIVELU, M. VELAN, **Biosorption of nickel(II) ions onto *Sargassum wightii*: application of two-parameter and three-parameter isotherm models**, *Journal of Hazardous Materials* (2006) pp 304–308.

Matis, A.I. Zouboulis, G.P. Gallios, T. Erwe, C. Blöcher, **Application of flotation for the separation of metal-loaded zeolite**, (2004) pp 65–72.

VIJAYARAGHAVAN, YEOUNG-SANG **Bacterial biosorbents and biosorption** *Development of a new cleaner production process for producing chromic oxide from chromite ore. Chinese Academy of Sciences*, (2004) pp 65 - 72

KADIRVELU, C. NAMASIVAYAM, **Activated carbon from coconut coirpith as metal adsorbent: adsorption of Cd(II) from aqueous solution**; (2003) pp 471–478.

KANG S-Y, LEE J-U, KIM K-W. **Biosorption of Cr(III) and Cr(VI) onto the cell surface of *Pseudomonas aeruginosa***. *Biochem Eng J*; (2007); pp 548- 558

KAPOOR, A., VIRARAGHAVAN, T., 1998. **Biosorption of heavy metals on *Aspergillus niger*: effect of pretreatment.** Bioresour. Technol; (2000) pp 109–113.

KAZY SK, DAS SK, SAR P. **Lanthanum biosorption by a *Pseudomonas* sp. equilibrium studies and chemical characterization.** J Ind Microbiol Biotech; (2000) pp 115 - 150

KELLY SD, KEMNER KM, FEIN JB, FOWLE DA, BOYANOV MI, BUNKER BA, YEE N. **x-ray absorption fine structure determination of pH-dependent U-bacterial cell wall interactions.** Geochim Cosmochim Acta (2002);pp 855–71.

SALAZA, MARCIA K. MCNUTT, **mineral commodity summaries United States Government** Printing Office, Washington: 2010 47-48

CHARERNTANYARAK, **Heavy metals removal by chemical coagulation and precipitation,** Water Sci. Technol, (1999); pp 135–138.

MARDER, A.M. BERNARDES, J.Z. FERREIRA, **cadmium electroplating wastewater treatment using a laboratory-scale electrodialysis system,** Sep. Purif. Technol. (2003); pp 247–255.

SEMERJIAN, G.M. AYOUB, **High-pH-magnesium coagulation–flocculation in wastewater treatment,** Adv. Environ; (2003) pp 389–403.

LU W-B, SHI J-J, WANG C-H, CHANG J-S. **Biosorption of lead, copper and cadmium by an indigenous isolate *Enterobacter* sp. J1** possessing high heavy-metal resistance. J Hazard Mater 2006; pp 80–6.

DUNDAR, C. NUHOGLU, Y. NUHOGLU, **Biosorption of Cu(II) ions onto the litter of natural trembling poplar forest,** Journal of Hazardous Materials; (2008) pp 86–95.

EDWARDS, **Chemistry of arsenic removal during coagulation and Fe–Mn oxidation,** J. AWWA; (1994); pp 64–78.

ISIK, **Biosorption of Ni(II) from aqueous solutions by living and non-living ureolytic mixed culture,** Colloids and Surfaces, (2008) pp 97–104.

MALIK A. **Metal bioremediation through growing cells.** Environ Int (2004) pp 261–78.

MESQUITA L.M.S., **Bioflotação de Hematita e Quartzo** – Um Estudo de Seletividade. Tese de Doutorado, PUC-Rio, RJ, Brasil. 2000. 93p.

MOORE, S., 2007. **Between rock and salt lake**. Ind. Miner. (2000), 58- 69

SHAMMAS, N.K (Eds.), **Physicochemical Treatment Processes**, vol. 3, Humana Press, New Jersey, (2004), pp. 103–140.

TUNAY, O, N.I. KABDASLI, **Hydroxide precipitation of complexed metals** Water Res. (1994) pp 2117–2124.

Cheng, S. Liang, H.C. Wang, M.D. Beuhler, **Enhanced coagulation for arsenic removal**, J. AWWA (1994) pp 79–90.

Ruey-Shin Juang, Huey-Jen Shao **A simplified equilibrium model for sorption of heavy metal ions from aqueous solutions on chitosan** Water Research, (2002), pp 2999-3008

AHMED, S. CHUGHTAI, M.A. KEANE, **The removal of cadmium and lead from aqueous solution by ion exchange with Na–Y zeolite**, Sep. Purif. Technol. 13 (1998) pp 57–64.

RENGARAJ, K.H. YEON, S.H. MOON, **Removal of chromium from water and wastewater by ion exchange resins**, J. Hazard. Mater. (2001) pp 273–287.

VIGNESWARAN, H.H. NGO, D.S. CHAUDHARY, Y.T. HUNG, **Physico-chemical treatment processes for water reuse**, in: L.K. Wang, Y.T. Hung, N.K. Shamas (Eds.), **Physicochemical Treatment Processes**, Humana Press, New Jersey, (2004), pp. 635–676.

SABLANI, M.F.A. GOOSEN, R. AL-BELUSHI, M. WILF, **Concentration polarization in ultrafiltration and reverse osmosis: a critical review**, Desalination 141 (2001) pp 269–289.

SAD Y, ATACOGU I, KUTSAL T. **Equilibrium parameters for the single- and multicomponent biosorption of Cr(VI) and Fe(III) ions on R. arrhizus in a packed column**. Hydrometallurgy (2000); pp 165–179.

SELATNIA , A. MADANI, M.Z. BAKHTI, L. KERTOUS, Y. MANSOURI, R. YOUS **Biosorption of Ni²⁺ from aqueous solution by a NaOH-treated bacterial dead Streptomyces rimosus**. (2004) pp 150 -160

SELATNIA A, BOUKAZOULA A, KECHID N, BAKHTI MZ, CHERGUI A, KERCHICH Y. **Biosorption of lead (II) from aqueous solution by a bacterial dead *Streptomyces rimosus* biomass.** J Biochem Eng (2004) pp127–35.

SELATNIA, A. MADANI, M.Z. BAKHTI, L. KERTOUS, Y. MANSOURI, R. YOUS **Biosorption of Ni^{2+} from aqueous solution by a NaOH-treated bacterial dead *Streptomyces rimosus* biomass** (2004) pp 150 -160

SISCA O. LESMANAA, NOVIE FEBRIANAA, FELYCIA E. SOETAREDJOA, JAKA SUNARSOB, SURYADI ISMADJIA **water Studies on potential applications of biomass for the separation of heavy metals from and wastewater Research review** (2008) pp 150 – 160

TANGAROMSUK J, POKETHITIYOOK P, KRUATRACHUE M, UPATHAM ES. **Cadmium biosorption by *Sphingomonas paucimobilis* biomass.** Biores Technol (2002) pp 103–150.

TATIANA, G. P. V, TOREM, L. M, MESQUITA, L. M. S **Estudo da Captação e Remoção de Cd e Zn Contido em Efluentes Líquidos por Biossorção e Bioflotação com *Rhodococcus opacus*** Dissertação de mestrado PUC RJ, (2005)

AGUSTIONO, T, KURNIAWAN, GILBERT Y.S. CHAN, WAI-HUNG , BABEL, **Physico–chemical treatment techniques for wastewater laden with heavy metals** Chemical Engineering Journal (2006) pp 83–98

TOSHIHIKO, O, TAKUO, O Yoshida. T Sakamoto, F Naofumi. K, Eiichi.W, Arokiasamy .J. Francis, Haruyuki. L; **Mechanisms of uranium mineralization by the yeast *Saccharomyces cerevisiae*** Geochimica et Cosmochimica Acta, (2005), pp 5307-5316

TUNALI S, ÇABUK A, AKAR T. **Removal of lead and copper ions from aqueous solutions by bacterial strain isolated from soil.** Chem Eng J (2006); pp 203–211.

UMAR. F JANUSZ.A. KOZINSKI, MISBAHUL. A, KHAN, MAKSHOOF. A **Biosorption Bioresource Technology.** (2010), pp 5043-5053

VANNELA R, VERMA SK. **Cu^{2+} removal and recovery by SpiSORB: batch stirred and up-flow packed bed columnar reactor systems.** Bioprocess Biosyst Eng (2006) pp 7–17.

VEGLIÒ F, BEOLCHINI F. **Removal of metals by biosorption: a review. Hydrometallurgy.** (1997) pp 301–316.

VIJAYARAGHAVAN K, YUN YS. **Chemical modification and immobilization of *Corynebacterium glutamicum* for biosorption of Reactive black 5 from aqueous solution.** Ind Eng Chem Res (2007); pp 608–17.

WANG, Y.T. HUNG, N.K. SHAMMAS (Eds.), **Physicochemical Treatment Processes**, vol. 3, Humana Press, New Jersey, (2004), pp 431–500.

Y. BENITO, M.L. Ruiz, **Reverse osmosis applied to metal finishing wastewater**, Desalination 142 (2002) pp 229–234.

Y. HO, **Isotherms for the sorption of lead onto peat: comparison of linear and non-linear methods**, Polish Journal of Environmental Studies (2006) pp 81–86.

YANG J, VOLESKY B. **Modeling the uranium-proton ion exchange in biosorption.** Environ Sci Technol (1999) pp 80–85.

YEE N, FEIN J. **Cd adsorption onto bacterial surfaces: a universal adsorption edge?** Geochim Cosmochim Acta (2001); pp 37–42.

Z. Ujang, G.K. Anderson, **Application of low-pressure reverse osmosis membrane for Zn²⁺ and Cu²⁺ removal from wastewater**, Water Sci. Technol (1996) pp 247–253.

Anexos

Tabela 35 – Dados de peso seco.

Peso do cadinho-massa da amostra	Concentração (g/L)	Desvio padrão
0,12; 0,065; 0,063	8,2	0,032
0,059 ; 0,15; 0,062	9,0	0,05
0,061; 0,12; 0,092	9,1	0,029
0,063; 0,082; 0,092	7,9	0,014
0,064; 0,092; 0,089	8,2	0,016
0,063; 0,095; 0,072	8,2	0,017
0,079; 0,069; 0,12	7,1	0,002
0,065; 0,093; 0,069	7,5	0,015
0,16; 0,635; 0,092	10,5	0,049
0,093 0,062; 0,065	8,3	0,018
0,061; 0,093; 0,065	7,3	0,017
0,065; 0,95; 0,068	7,6	0,016
0,062; 0,099; 0,063	7,7	0,019
0,069; 0,063; 0,15	9,4	0,048



Figura 52 – *Rhodococcus Opacus* após cultivo em meio líquido