



DAFTAR PUSTAKA

- An, J.H. and Dultz, S., 2007, Adsorption of tannic acid on chitosan-montmorillonite as a function of pH and surface charge properties. *Appl. Clay Sci.*, 36; 256–264.
- Anal, A.K. and Stevens, W.F., 2005, Chitosan-alginate multilayer beads for controlled release of ampicillin. *Int. J. Pharm.*, 290; 45–54.
- Anirudhan, T.S. and Suchithra, P.S., 2007, Adsorptive characteristics of tannin removal from aqueous solutions and coir industry effluents using calcined and uncalcined hydrotalcites. *Ind. Eng. Chem. Res.*, 46; 4606–4613.
- Bajpai, S.K. and Tankhiwale, R., 2006, Investigation of dynamic release of vitamin B2 from calcium alginate/chitosan multilayered beads: Part II. *React. Funct. Polym.*, 66; 1565–1574.
- Bensalah, N., Chair, K., and Bedoui, A., 2017, Efficient degradation of tannic acid in water by UV/H₂O₂ process. *Sustain. Environ. Res.* 1–11.
- Chang, M.Y. and Juang, R.S., 2004, Adsorption of tannic acid, humic acid, and dyes from water using the composite of chitosan and activated clay. *J. Colloid Interface Sci.*, 278; 18–25.
- Cui, X., Dai, X., Khan, K.Y., Li, T., Yang, X., and He, Z., 2016, Removal of phosphate from aqueous solution using magnesium-alginate/chitosan modified biochar microspheres derived from *Thalia dealbata*. *Bioresour. Technol.*, 218; 1123–1132.
- Esmaeili, A. and Khoshnevisan, N., 2016, Optimization of process parameters for removal of heavy metals by biomass of Cu and Co-doped alginate-coated chitosan nanoparticles. *Bioresour. Technol.*, 218; 650–658.
- Gotoh, T., Matsushima, K., and Kikuchi, K.I., 2004, Preparation of alginate-chitosan hybrid gel beads and adsorption of divalent metal ions. *Chemosphere*, 55; 135–140.
- Hamdaoui, O., 2006, Batch study of liquid-phase adsorption of methylene blue using cedar sawdust and crushed brick. *J. Hazard. Mater.*, B135; 264–273.
- Jung, C., Phal, N., Oh, J., Chu, K.H., Jang, M., and Yoon, Y., 2015, Removal of humic and tannic acids by adsorption-coagulation combined systems with activated biochar. *J. Hazard. Mater.*, 300; 808–814.
- Kumari, S., Mahapatra, S., and Das, S., 2017, Ca-alginate as a support matrix for



- Pb(II) biosorption with immobilized biofilm associated extracellular polymeric substances of *Pseudomonas aeruginosa* N6P6. *Chem. Eng. J.*, 328; 556–566.
- Kwon, O.H., Kim, J.O., Cho, D.W., Kumar, R., Baek, S.H., Kurade, M.B., and Jeon, B.H., 2016, Adsorption of As(III), As(V) and Cu(II) on zirconium oxide immobilized alginate beads in aqueous phase. *Chemosphere*, 160; 126–133.
- Lakkakula, J.R., Matshaya, T., Werner, R., and Krause, M., 2017, Cationic cyclodextrin/alginate chitosan nano flowers as 5- fluorouracil drug delivery system. *Mater. Sci. Eng. C.*, 70; 169–177.
- Lertsutthiwong, P., Rojsitthisak, P., and Nimmannit, U., 2009, Preparation of turmeric oil-loaded chitosan-alginate biopolymeric nanocapsules. *Mater. Sci. Eng. C.*, 29; 856–860.
- Li, H., Huang, G., An, C., Hu, J., and Yang, S., 2013, Removal of Tannin from Aqueous Solution by Adsorption onto Treated Coal Fly Ash: Kinetic, Equilibrium, and Thermodynamic Studies. *Ind. Eng. Chem. Res.*, 52; 15923–15931.
- Li, J., Jiang, C., Lang, X., Kong, M., Cheng, X., Liu, Y., et al., 2016, Multilayer sodium alginate beads with porous core containing chitosan based nanoparticles for oral delivery of anticancer drug. *Int. J. Biol. Macromol.*, 85; 1–8.
- Lin, J., Zhan, Y., Zhu, Z., and Xing, Y., 2011, Adsorption of tannic acid from aqueous solution onto surfactant-modified zeolite. *J. Hazard. Mater.*, 193; 102–111.
- Liu, F., Guo, Z., Zheng, S., and Xu, Z., 2012, Adsorption of tannic acid and phenol on mesoporous carbon activated by CO₂. *Chem. Eng. J.*, 183; 244–252.
- Liu, K., Li, H., Wang, Y., Gou, X., and Duan, Y., 2015, Adsorption and removal of rhodamine B from aqueous solution by tannic acid functionalized graphene. *Colloids Surfaces A Physicochem. Eng. Asp.*, 477; 35–41.
- Madala, S., Nadavala, S.K., Vudagandla, S., Boddu, V.M., and Abburi, K., 2017, Equilibrium, kinetics and thermodynamics of Cadmium (II) biosorption on to composite chitosan biosorbent. *Arab. J. Chem.*, 10; S1883–S1893.
- Mandal, S., Senthil Kumar, S., Krishnamoorthy, B., and Basu, S.K., 2010, Development and evaluation of calcium alginate beads prepared by sequential and simultaneous methods. *Brazilian J. Pharm. Sci.*, 46; 785–793.
- Martins, A.F., Bueno, P.V.A., Almeida, E.A.M.S., Rodrigues, F.H.A., Rubira, A.F.,



- and Muniz, E.C., 2013, Characterization of N-trimethyl chitosan/alginate complexes and curcumin release. *Int. J. Biol. Macromol.*, 57; 174–184.
- Martins, A.F., Facchi, S.P., Monteiro, J.P., Nocchi, S.R., Silva, C.T.P., Nakamura, C. V., et al., 2015, Preparation and cytotoxicity of N,N,N-trimethyl chitosan/alginate beads containing gold nanoparticles. *Int. J. Biol. Macromol.*, 72; 466–471.
- Masalova, O., Kulikouskaya, V., Shutava, T., and Agabekov, V., 2013, Alginate and chitosan gel nanoparticles for efficient protein entrapment. *Phys. Procedia*, 40; 69–75.
- Nadavala, S.K., Swayampakula, K., Boddu, V.M., and Abburi, K., 2009, Biosorption of phenol and o-chlorophenol from aqueous solutions on to chitosan-calcium alginate blended beads. *J. Hazard. Mater.*, 162; 482–489.
- Ngah, W.S.W. and Fatinathan, S., 2008, Adsorption of Cu(II) ions in aqueous solution using chitosan beads, chitosan-GLA beads and chitosan-alginate beads. *Chem. Eng. J.*, 143; 62–72.
- Ngah, W.S.W. and Fatinathan, S., 2010, Pb(II) biosorption using chitosan and chitosan derivatives beads: Equilibrium, ion exchange and mechanism studies. *J. Environ. Sci.*, 22; 338–346.
- Nguyen, M.L., Huang, C., and Juang, R.S., 2016, Synergistic biosorption between phenol and nickel(II) from Binary mixtures on chemically and biologically modified chitosan beads. *Chem. Eng. J.*, 286; 68–75.
- Ribeiro, A.J., Silva, C., Ferreira, D., and Veiga, F., 2005, Chitosan-reinforced alginate microspheres obtained through the emulsification/internal gelation technique. *Eur. J. Pharm. Sci.*, 25; 31–40.
- Seth, A., Lafargue, D., Poirier, C., Péan, J.M., and Ménager, C., 2014, Performance of magnetic chitosan-alginate core-shell beads for increasing the bioavailability of a low permeable drug. *Eur. J. Pharm. Biopharm.*, 88; 374–381.
- Sharma, G., Naushad, M., Al-Muhtaseb, A.H., Kumar, A., Khan, M.R., Kalia, S., et al., 2017, Fabrication and characterization of chitosan-crosslinked-poly(alginic acid) nanohydrogel for adsorptive removal of Cr(VI) metal ion from aqueous medium. *Int. J. Biol. Macromol.*, 95; 484–493.
- Takka, S. and Gürel, A., 2010, Evaluation of Chitosan / Alginate Beads Using Experimental Design: Formulation and In Vitro Characterization. *AAPS PharmSciTech*, 11; 460–466.



- Vijaya, Y., Popuri, S.R., Boddu, V.M., and Krishnaiah, A., 2008, Modified chitosan and calcium alginate biopolymer sorbents for removal of nickel (II) through adsorption. *Carbohydr. Polym.*, 72; 261–271.
- Wang, J., Ji, Y., Ding, S., Ma, H., and Han, X., 2013, Adsorption and desorption behavior of tannic acid in aqueous solution on polyaniline adsorbent. *Chinese J. Chem. Eng.*, 21; 594–599.
- Wang, J., Li, A., Xu, L., and Zhou, Y., 2009, Adsorption of tannic and gallic acids on a new polymeric adsorbent and the effect of Cu(II) on their removal. *J. Hazard. Mater.*, 169; 794–800.
- Wang, Q., Xie, X., Zhang, X., Zhang, J., and Wang, A., 2010, Preparation and swelling properties of pH-sensitive composite hydrogel beads based on chitosan-g-poly (acrylic acid)/vermiculite and sodium alginate for diclofenac controlled release. *Int. J. Biol. Macromol.*, 46; 356–362.
- Wang, Y., Chen, H., Wang, J., and Xing, L., 2014, Preparation of active corn peptides from zein through double enzymes immobilized with calcium alginate-chitosan beads. *Process Biochem.*, 49; 1682–1690.
- Xu, Y., Zhan, C., Fan, L., Wang, L., and Zheng, H., 2007, Preparation of dual crosslinked alginate-chitosan blend gel beads and in vitro controlled release in oral site-specific drug delivery system. *Int. J. Pharm.*, 336; 329–337.
- Yu, K., Ho, J., McCandlish, E., Buckley, B., Patel, R., Li, Z., and Shapley, N.C., 2013, Copper ion adsorption by chitosan nanoparticles and alginate microparticles for water purification applications. *Colloids Surfaces A Physicochem. Eng. Asp.*, 425; 31–41.