

## DAFTAR PUSTAKA

- Abutani, S.A., Darlis, Yusrizal, Monica, M., dan Sugihartono, M., 2011, Penerapan Pola Usaha Tani Terintegrasi Tribionik sebagai Upaya Peningkatan Pendapatan Petani, *Jurnal Pengabdian pada Masyarakat*, 52, 8-12.
- Adamson, A.W., 1990, *Physical Chemistry of Surfaces*, 5<sup>th</sup> Edition, John Wiley and Sons, New York.
- Agus, F., dan Subiksa, I.G., 2008, *Lahan Gambut : Potensi untuk Pertanian dan Aspek Lingkungan*, Badan Penelitian dan Pengembangan Pertanian, Bogor.
- Aiken, G.R., McKnight, D.M., Wershaw, R.L., dan MacCarthy, 1985, *Humic Substances in Soil Sediment and Water : Geochemistry, Isolation, and Characterization*, John Wiley & Sons, New York.
- Asing, J., Wong, N.C., dan Lau, S., 2009, Optimization of Extraction Method and Characterization of Humic Acid Derived From Coals and Composts, *J. Trop. Agric. And Fd. Sci.*, 37, 2, 211-223.
- Azzouzi, M. El., Bouhaouss, A., dan Ferhat, M., 2000, *Proceedings IHSS 10* Vol. 1, pp 607-609, 24-28 July 2000, Toulouse, France.
- Barot, N.S., dan Bagla, H.K., 2009, Extraction of Humic Acid from Biological Matrix – Dry Cow Dung Powder. *Green Chem. Lett. and Reviews*, 2, 4, 217-221.
- Basso, M.C., Cerrella, E.G., dan Cukierman, A.L., 2002, Activated Carbons Developed from a Rapidly Renewable Biosource for Removal of Cadmium(II) and Nickel(II) Ions from Dilute Aqueous Solutions, *Ind. Eng. Chem. Res.*, 41, 180-189.
- Bird, T., 1985, *Physical Chemistry*. Jakarta : Gramedia.
- Biyantoro, D., Sukirno, dan Basuki, K.T., 2005, Kinetika Reaksi Proses Adsorpsi Cs-137 dalam Asam Humat dan Senyawa Humat, *Prosiding PPI-PDIPTN Batan*, 12 Juli 2005, Yogyakarta.
- Buhani, dan Suharso, 2006, The Influence of pH towards Multiple Metal Ion Adsorption of Cu(II), Zn(II), Mn(II), and Fe(II) on Humic Acid, *Indo. J. Chem.*, 6, 1, 43-46.
- Burhan, A.H., 2014, Studi Adsorpsi Kompetitif Cadmium(II) dan Seng(II) dengan Green Adsorben-Asam Humat Tinja Sapi, *Tesis*, FMIPA, Universitas Gadjah Mada, Yogyakarta.

- Canellas, L.P., Zandonadi, D.B., Busato, J.G., Baldotto, M.A., Simoes, M.L., Neto, L.M., Facanha, A.R., Spaccini, R., dan Piccolo, A., 2008, Bioactivity and Chemical Characteristics of Humic Acids from Tropical Soil Sequence, *Soil Sci.*, 173, 9, 624-637.
- Congeevaram, S., Dhanarani, S., Park, J., Dexilin, M., Thamaraiselvi, K., 2007, Biosorption of Chromium and Nickel by Heavy Metal Resistant Fungal and Bacterial Isolates, *J. Hazard. Mater.*, 146, 270-277.
- Das, N., Karthika, P., Vimala, R., Vinodhini, V., 2008, Use of Natural Products as Biosorbent of Heavy Metals : An Overview, *Nat. Prod. Radiance*, 7, 2, 133-138.
- Flaig, W., 1988, *Generation of Model Chemical Precursors : Humic Substances and Their Role in the Environment*, Wiley, Chichester.
- Gaffney, J.S., Marley, N.A., dan Clack, S.B., 1996, *Humic and Fulvic Acid : Isolation, Structure, and Environmental Role*, American Chemical Society, Washington DC.
- Goenadi, D.H., Darmono, T.W., dan Away, Y., 2000, Biodekomposisi Limbah Padat Organik Perkebunan dengan Aktivator OrgaDec dalam Produksi Pupuk Organik dari Kompos Bioaktif, *Laporan ARMP*, Unit Penelitian Bioteknologi Perkebunan 44 pp, Bogor.
- Goenadi. D.H., 1997, *Interaksi Mineral Tanah dengan Organik Alami dan Mikroba*, (diterjemahkan dari Huang,, P.M., dan Schnitzer, M., 1986, *Interaction of Soil Minerals with Natural Organic and Microbes*), Gadjah Mada University Press, Yogyakarta.
- Greeg, S.J., dan Sing K.S.W., 1967, *Adsorption, Surface Area, and Porosity*, Academic Press, London.
- Hastuti, B., Mudasir, Siswanta, D., dan Triyono, 2013, The Synthesis of Carboxymethyl Chitosan-Pectin Film as Adsorbent for Lead(II) Metal, *Int. J. Chem. Eng. Appl.*, 4, 6, 349-353
- Hizal, J., dan Apak, R., 2006, Modeling of Copper(II) and Lead(II) Adsorption on Kaolinite-Based Clay Minerals Individually and in the Presence of Humic Acid. *J. Colloid Interface Sci.*, 295, 1-13.
- Huheey, J.R., 1993, *Inorganic Chemistry "Principle of Structure and Reactivity*, Second Edition, Happer and Row Publisher.Inc., New York.
- Januarita, R., dan Herdiansyah, 2003, Adsorpsi Cr(VI) pada Air Hitam, *Indo. J.Chem.*, 3, 3, 169-175.
- Kerndorff, H., dan Schnitzer, M., 1980, Sorption of Metals on Humic Acid, *Geochim. Cosmochim. Acta*, 44, 1577-1581.

- Komulski, M., 2009, pH Dependent Charge Surface Charging and Point of Zero Charge, *J. Colloid Interface Sci.*, 3337, 439-448.
- Kristianingrum, S., 2006, Metode Alternatif untuk Mengurangi Pencemaran Logam Berat dalam Lingkungan, *Prosiding Seminar Nasional Kimia dan Pendidikan Kimia 2006*, 18 November 2006, Yogyakarta.
- Kusuma, I.D.G.D.P., Wiratini, N.M., Wiratma, I.G.L., 2014, Isoterm Adsorpsi  $\text{Cu}^{2+}$  oleh Biomassa Rumpun Laut *Euchema Spinosium*, *e-Jur. Kimia Visvitalis Pendidikan Ganesha Jurusan Pendidikan Kimia*, 2,1.
- Leckie, J.O. dan James, R.O., 1974, *Control Mechanisms for Trace Metals in Natural Waters*, Ann Arbor, Mich.
- Lesbani, A., 2001, Peranan Mekanisme Pertukaran Ion dan Pembentukan Kompleks dalam Adsorpsi Seng(II) dan Kadmium(II) pada Adsorben Cangkang Kepiting Laut (*Portunus pelagicus* Linn), *Tesis*, FMIPA, Universitas Gadjah Mada, Yogyakarta.
- Lesbani, A., Yusuf, S., dan Iswani, Y., 2013, Studi Kompetisi Interaksi Besi(II) dengan Seng(II) pada Asam Humat, *JPS.*, 16, 1.
- Martin, D., Srivastava, P.C., Ghosh, D., dan Zech, W., 1998, Characterization of Humic Substance in Cultivated and Natural Forest Soils of Sikkim, *Geoderma*, 83, 345-362.
- Mujiyanti, D.R., 2007, Adsorpsi Multilogam Ag(I), Pb(II), Cr(III), Cu(II), dan Ni(II) pada Hibrida Merkapt-Silika dari Abu Sekam Padi, *Tesis*, FMIPA, Universitas Gadjah Mada, Yogyakarta.
- Mulyono, D., 2000, Pemanfaatan Kotoran Ternak sebagai Sumber Energi Alternatif dan Peningkatan Sanitasi Lingkungan, *Jurnal Teknologi Lingkungan*, 1, 1, 27-32.
- Muzakky, Taftazani, A., dan Sukirno, 2003, Optimasi Ekstraksi Asam Humat dari Na-Humat dan Karakterisasinya dengan FTIR, *Ganendra*, 6, 2, 15-20.
- Nugroho, M.D. dan Annur, M.D.R., 2014, Pemanfaatan Kotoran Sapi untuk Material Konstruksi dalam Upaya Pemecahan Masalah Sosial serta Peningkatan Taraf Ekonomi Masyarakat, *Jurnal Siosioteknologi*, 13, 2, 101-109.
- Nurhasni, Hendrawati, dan Saniyyah, N., 2010, Penyerapan Ion Logam Cd dan Cr dalam Air Limbah Menggunakan Sekam Padi, *Valensi*, 1, 6, 310-318.
- Nurmayanti, Y., 2014, Ekstrak Humat Tinja Sapi untuk Adsorpsi Kompetitif ion Logam Pb(II) dan Ni(II) dalam Larutan, *Tesis*, FMIPA, Universitas Gadjah Mada, Yogyakarta.
- Oscik, J., 1982, *Adsorption*, John Wiley, Chichester.

- Pearson, R.G., 1986, Hard and Soft Acids and Bases, HSAB, Part II : Underlying Theories, *J. Chem. Educ.*, 45, 10, 643.
- Permanasari, A., Siswaningsih, W., dan Wulandari, I., 2010, Uji Kinerja Adsorben Kitosan-Bentonit terhadap Logam Berat dan Diazinon Secara Simultan, *J. Sains dan Teknologi Kimia*, 1, 2, 121-134.
- Petrus, A.C., Ahmed, O.S., Muhammad, A.M.N., Nasir, H.M., Jiwan, M., dan Banta, M.G., 2009, Chemical Characteristics of Compost and Humic Acid from Sago Waste (*Metroxylon sagu*), *Am. J. Appl. Sci.*, 6, 11, 1880-1884.
- Prasasti, D., Juari, S., dan Sudiono, S., 2012, Studi Kapasitas Adsorpsi-Reduksi Ion Au(III) pada Asam Humat Hasil Isolasi dari Tanah Gambut Rawa Pening, *JIF.*, 2, 2, 141-151.
- Qiu, W., dan Zeng, Y., 2009, Removal of Lead, Copper, Nickel, Cobalt, and Zinc from Water by a Cancrinite-type Zeolite Synthesized from Fly Ash, *Chem. Eng. J.*, 145, 483-488.
- Rahmawati, A., dan Santosa, S.J., 2012, Studi Adsorpsi Logam Pb(II) dan Cd(II) pada Asam Humat dan Medium Air, *Alchemy*, 2, 1, 46-67.
- Rupiasih, N.N., dan Vidyasagar, P.B., 2009, Analytical Study of Humic Acid from Various Sources Commonly Use as Fertilizer : Emphasis on Heavy Metal Content, *Int. J. Des. Nat. Ecodyn.*, 4, 1, 32-46.
- Saadi, P., Rusdiarso, B., dan Arryanto, Y., 1995, Kajian Tentang Pemanfaatan Gambut sebagai Adsorben Senyawa Merkuri (II) Anorganik dari Larutan. *Tesis*, FMIPA, Universitas Gadjah Mada, Yogyakarta.
- Samat, dan Lesbani, A., 2012, Studi Interaksi Seng(II) pada Asam Humat Muara Kuang serta Aplikasinya terhadap Limbah Industri Pelapisan Seng, *JPS.*, 15, 1, 22-25.
- Santi, L.P., Goenadi, D.H., Widiastuti, H., dan Mardiana, N., 2000, Extraction and Characterization of Humic Acid from Plantation's Solid Organic Waste Compost, *Menara Perkebunan*, 62, 2, 1-9.
- Santoso, U.T., Santosa, S.J., Siswanta, D., Rusdiarso, B., dan Shimazu, S., 2010, Characterization of Sorbent Produced Through Immobilization of Humic Acid on Chitosan Using Glutaraldehyde as Cross-Linking Agent and Pb(II) Ion as Active Site Protector, *Indo. J. Chem.*, 10, 3, 301-309.
- Senesi, N., 1992, *Metal-Humic Substances Complexes in the Environment : Molecular and Mechanistic Aspects by Multiple Spectroscopic Approach*. Dalam Adriano, D.C., *Biogeochemistry of Trace Metals*, Lewis Publishers, Boca Raton.

- Setyowati, D., dan Ulfin, I., 2007, Optimasi Kondisi Penyerapan Ion Aluminium Oleh Asam Humat, *Akta Kimindo*, 2, 2, 85-92.
- Shaw, D.J., 1991, *Introduction to Colloid and Surface Chemistry*, Butterworth-Heinemann, Boston.
- Sheng, G., Yang, S., Sheng, J., Zhao, D., dan Wang, X., 2011, Influence of Solution Chemistry on the Removal of Ni(II) from Aqueous Solution to Titanate Nanotubes, *Chem. Eng. J.*, 168, 178-182.
- Sihotang, B., 2010, Kandungan Senyawa Kimia pada Pupuk Kandang Berdasarkan Jenis Binatangnya, *Buletin Peternakan*, 36, 1, 40-47.
- Spark, K.M., Wells, J.D., dan Johnson, B.B., 1997, The Interaction of Humic Acid with Heavy Metals, *Aus. J. Soil Res.*, 35, 89-101.
- Stevenson, F.J., 1994, *Humus Chemistry : Genesis, Composition, Reactions*, Second Edition, John Wiley & Sons Inc., New York.
- Stumm, W., dan Morgan, J.J., 1996, *Aquatic Chemistry : Chemical Equilibria in Natural Water.*, 3<sup>rd</sup> ed., John Wiley and Sons, New York.
- Sudiono, S., Narsito, dan Santosa, S.J., 2001, Studi Interaksi Asam Humat dengan Cu(II) dan Ni(II), *Prosiding Seminar Nasional Kimia IX*, 21 Mei 2001, Yogyakarta.
- Sundari, S., 2005, Immobilisasi Asam Humat pada Kitin dan Aplikasinya untuk Adsorpsi Cu(II), *Tesis*, FMIPA, Universitas Gadjah Mada, Yogyakarta.
- Suyanta, Sudiono, S., dan Santosa, S.J., 2004, Determination of Rate Constant and Stability of Adsorption in Competitive Adsorption of Cr(III) and Cd(II) on Humic Acid by Using The New Model of Kinetic Formulation, *Indo. J. Chem.*, 4, 3, 161-167.
- Suyono, 2002, Karakterisasi Fisikokimia, Kapasitas Ikat, dan Pola Ikat Asam Humat Tinja Sapi terhadap Kation Timbal, *Disertasi*, Universitas Airlangga, Surabaya.
- Swift, R.S., 1989, *Molecular Weight, Size, Shape, and Charge Characteristics of Humic Substance: Some Basic Considerations*, John Wiley and Sons, Chichester.
- Tan, K.H., 1993, *Principle of Soil Chemistry*, Marcel Dekker Inc., New York.
- Tan, K.H., Lobartini, J.C., Himmelsbach, D.S., dan Asmunen, L.E., 1991, Composition of Humic Acid Extracted under Air and Nitrogen Atmosfer, *Commun. Soils Sci. Plant Anal.*, 22, 861-877.

- Thomas, W.J., dan Crittenden, B.D., 1998, *Adsorption Technology and Design*, Butterworth-Hienemann, Oxford.
- Triyono, 2013, *Keseimbangan Kimia*, Gadjah Mada University Press, Yogyakarta.
- Velasco, M.I., Campitelli, P.A., Ceppi, S.B., dan Havel, J., 2004, Analysis of Humic Acid from Compost of Urban Wastes and Soil by Flourescence Spectroscopy, *Agriscientia*, 12, 1, 31-38.
- Wang, S., Hu, J., Li, J., dan Dong, Y., 2009, Influence of pH, Soil Humic/Fulvic Acid, Ionic Strength, Foreign Ions and Addition Sequences on Adsorption of Pb(II) onto GMZ Bentonite, *J. Hazard. Mater.*, 167, 44-51.