PENURUNAN KESADAHAN AIR MENGGUNAKAN SERBUK SEKAM PADI PERLAKUAN DENGAN NaOH

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RINGKASAN

Kesadahan merupakan salah satu parameter tentang kualitas air bersih, karena kesadahan menunjukkan ukuran pencemaran air oleh mineral-mineral terlarut seperti Ca^{2+} dan Mg^{2+}. Salah satu upaya dalam mengurangi tingkat kesadahan dalam air tanah dengan memanfaatkan limbah material alam dengan cara adsorpsi. Sekam padi sebagai limbah pertanian masih memungkinkan untuk dimanfaatkan dengan adanya kandungan bahan-bahan organiknya. Senyawa utama dinding sel sekam padi adalah polisakarida yaitu serat kasar atau selulosa, lignin, dan hemiselulosa yang memiliki gugus hidroksil (OH) yang dapat berperan dalam proses adsorpsi.

Pada penelitian ini serbuk sekam padi direndam dalam NaOH selama 3 x 24 jam dengan variasi konsentrasi 10%, 20%, 30%, 40%, 50%, 60% dan 70%, dan digunakan untuk mengadsorpsi Ca^{2+} dan Mg^{2+} dishaker dengan kecepatan 250 rpm dan variasi waktu kontak selama 30, 60, 90, 120 dan 150 menit. Perendaman serbuk sekam padi dalam NaOH memungkinkan terjadinya swelling (pemekaran) sehingga meningkatkan porositas polisakarida dalam serbuk sekam padi.

Hasil menunjukkan bahwa adorpsi ion Ca^{2+} dan Mg^{2+} optimum pada perendaman serbuk sekam padi 40% dan waktu kontak 120 menit yaitu masing-masing sebesar 12,18 mg/g dan 11,84 mg/g.

SUMMARY

Hardness is one of the water quality parameter, because hardness represent contamination grade of water for example dissolve minerals in water like Ca^{2+} and Mg^{2+}. One of the effort in to decrease hardness in ground water with natural material waste by adsorption. Rice husk as agriculture wastes are enable to be exploited with the existence of its organic materials content. Especial compound of cell wall rice husk is harsh fibril or cellulose that are polysaccharides, lignin, and hemi cellulose owning bunch of hydroxyl (OH) which can process of adsorption.

This research, rice husk soaked in sodium hydroxide (NaOH) during 3 x 24 hour with variation concentration of NaOH were 10%, 20%, 30%, 40%, 50%, 60% and 70%, and used for adsorption of Ca^{2+} and Mg^{2+} with speed of 250 rpm and variation time of 30, 60, 90, 120 and 150 minutes. Solvation rice husk in NaOH condutive the swelling, so that improve porosity of polysaccharides in the rice husk

Result of this research, adsorption of Ca^{2+} and Mg^{2+} optimum at solvation rice husk in NaOH 40% and time contact of 120 minutes that were 12.18 mg/g and 11.84 mg/g respectively

DAFTAR PUSTAKA

Alaerts, G., Santika, SS., 1984, *Metode Penelitian Air*, PN Usaha Nasional: Surabaya.

Arifin, Bastian, 2006, *Adsorpsi Merkuri Dalam Air Oleh partikel kayu,* Department of Enviromental Engineering, ITB: Bandung

Atkins, P.W., 1990, *Kimia Fisik*, Jilid 1, Edisi Keempat, Erlangga: Jakarta.

El-Shafey, E.I., 2006, *Sorption of Cd(II) and Se(IV) from aqueous solution using modified rice husk,* Chemistry Department, Faculty of Science, Mansoura University: Mansoura

Fengel, D. G., Wegener, 1995, *Kayu: kimia, Ultrastruktur, Reaksi-reaksi.* Terjemahan Hardjono Sastrohamidjoyo, Gajahmada University Press: Yogyakarta

Fessenden dan Fesenden, 1999, *Kimia Organik,* Penerbit Erlangga: Jakarta

Harjadi, W., 1993, *Ilmu Kimia Analitik Dasar*, PT. Gramedia Pustaka Utama: Jakarta.

Hartono, Ymv., Baraba, widad, Suparta, A.R., Jumadi & Supomo, 2000, *Pembuatan SiC Dari Sekam Padi*, Balai besar Penelitian dan Pengembangan Industri Keramik Departemen Perindustrian dan Perdagangan: Bandung.

Harsono, Heru, 2002, *Pembuatan Silika Amorf dari Limbah Sekam Padi,* Jurnal Ilmu Dasar, Vol. 3 No.2,: 98-103 98

Haryanto, 1998, *Proses Pengolahan Air Sadah Dengan Menggunakan Koagulan Tawas dan PAC*, Skripsi S-1, Kimia FMIPA UGM: Yogyakarta.

Hassler, J. W., 1963., *Activated carbon.,* Chemical Publishing Co. Inc.: New York. Pp 174-176.

Hefny, M. N. T. Abdel Ghani, G. A. F. El-Chaghaby, 2006, *Removal of lead from aqueous solution using low cost abundantly available adsorbents,* Department of Chemistry, Faculty of Science, Cairo University, Giza: Egypt

Khopkar, S.M., 1990, *Konsep Dasar Kimia Analitik*, Alih Bahasa: Saptoraharjo A, Cetakan Pertama, UI Press: Jakarta, hlm 274-277.

Kumar, Upendara, 2006, *Agricultural Products and by-Products as a Low Cost Adsorbent for heavy Metal removal frm Water and Wastewater: a review,* Departement of Civil Engenering, National Institute of Technology: India

Lembang, J.T., Seleng, T., 1995, *Pemanfaatan Sekam Padi dalam Industri*, Balai Penelitian Ujung Pandang: Ujung Pandang

Middleton, Richard, 2001, *Air bersih: Sumber Daya yang Rawan*, Tim Penerjemah IKIP Malang: Malang

Oscik, J., 1992, *Adsorption*, John Wiley & Sons, Chichester, pp 80.

Pandede, Dayan, J., 2001, *Pengaruh Perendaman Sekam Padi dalam KOH terhadap Adsorpsi* Pb^{2+}, Jurusan Kimia, Universitas Diponegoro: Semarang

Robinson, J. B., 1966, *Atomic Absorption Spectroscopy* , Elsevier Publishing Co.: New York.

Saepudin, Suwarsa, 1998, *Penyerapan Zat Warna Tekstil BR Red HE 7B Oleh Jerami Padi*, Jurusan Kimia FMIPA , ITB JMS Vol. 3 No. 1, hal. 32 – 40.

Sasongko, S.B., 1990, *Beberapa Parameter Kimia Sebagai Analisis Air*, Edisi ke empat, Reaktor: Semarang, hlm 80-95.

Shaliza Ibrahim, Nasim Ahmad Khan, and Piarapakaran Subramaniam ,2004, *Elimination of Heavy Metals from Wastewater Using Agricultural Wastes as Adsorbents*, Department of Civil Engineering, Faculty of Engineering, University of Malaya: Malaysia.

Shevla, G., 1982, *Vogel's Text Book of Macro and Semimicro Qualitative Inorganic Analysis*, edisi ke-5, Longman: London

Sjostrom, E., 1995, Kimia Kayu: Dasar dan Penggunaan. Alih Bahasa: Sastrohamidjono, H., dari Wood Chemistry: Fundamental and Application, (1993), Universitas Gajah Mada Press, Jogjakarta

Soon-An Ong, Chye-Eng Seng, Poh-Eng Lim, 2006. *Kinetics Of Adsorption Of Cu(II) And Cd(II) From Aqueous Solution On Rice Husk And Modified Rice Husk*, Universiti Sains Malaysia, Penang: Malaysia

Susatyo, E.B., 1997, *Penggunaan Sekam Padi untuk Mengurangi Konsentrasi Ion Logam Cu(II), Cd(II) dalam air*, ITB: Bandung

Sutrisno, 1991, *Teknologi Penyediaan Air Bersih*, Penerbit Rineka Cipta: Jakarta, hlm 36-38.

Suhendrayatna, 2001, *Bioremoval Logam Berat dengan Menggunakan Mikroorganisme: Suatu kajian kepustakaan*, Departement of Apllied Chemistry and Chemical Enginering, Kagoshima University: japan

Utami, S.W., 1996, *Pengurangan Kadar Ion Ca^{2+}, Mg^{2+}, dan Fe^{2+} dalam Air Tanah Memakai Biji Kelor*, Skripsi S-1, Kimia FMIPA UNDIP*:* Semarang.

Thomas.D.W,. 1984, *Principles of Water Quality*, Enviromental Healty Laboratory, Hebrey Unoversity. Hadassar Medical School, Jerusalem: Israel

Williams, R.B., Culp, G.L., 1986, *Handbook of Public Water Systems*, Van Nostrand Reinhold: New York, pp 661-669.

Winarno, F.G., 1992, *Kimia Pangan Dan Gizi*, Gramedia Pustaka Utama, Jakarta.

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