

SISTEM FILTRASI DENGAN KARBON AKTIF KAYU SENGON, KERIKIL AKTIF SUNGAI KRASAK, DAN PASIR AKTIF PANTAI INDRAYANTI PADA AIR SUMUR DI LPPMP UNY SEBAGAI AIR MINUM

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ABSTRAK

Penelitian ini bertujuan untuk mengetahui: (1). Pengaruh volume absorben dan jenis absorben terhadap intensitas transmisi cahaya, total dissolved solid (TDS) / total zat padat terlarut, dan pH dalam proses filtrasi sampel air sumur di LPPMP UNY. (2) Pengaruh jenis absorben terhadap kadar Fe dalam proses filtrasi sampel air sumur di LPPMP UNY. (3) Pengaruh variasi jenis absorben terhadap Intensitas transmisi cahaya, TDS, pH, dan kadar Fe dalam proses filtrasi sampel air sumur di LPPMP UNY. (4) Pengaruh daya serap sistem FAS (*Filtrasi, Absorpsi, Sedimentasi*) terhadap penurunan kadar total *coliform* dalam proses filtrasi sampel air sumur di LPPMP UNY.

Penelitian ini menggunakan sistem penjernihan air FAS (Filtration, Absorption, and Sedimentation water purification system). Sistem ini menggunakan 5 kolom pipa dan air dialirkan melalui pipa pralon. Filtrasi dan absorpsi terjadi pada semua pipa, sedangkan sedimentasi terjadi saat air mengalir ke atas. Pada saat itu logam berat yang massa jenisnya lebih besar dengan air mengalami sedimentasi. Absorben yang digunakan dalam penelitian ini adalah karbon aktif kayu sengon, kerikil aktif Sungai Krasak, dan pasir aktif Pantai Indrayanti. Hasil proses filtrasi air sumur dari *groundtank* LPPMP UNY ini diukur menggunakan alat transmisi cahaya lux meter untuk uji kejernihan air, dengan TDS meter digital untuk uji total zat padat terlarut, pH meter digital untuk uji derajat keasaman, dan uji kadar Fe dan uji total *coliform* di Laboratorium STTL.

Hasil penelitian menunjukkan bahwa: (1) Efisiensi transmisi cahaya untuk variasi volume tertinggi adalah karbon aktif kayu sengon (92 ± 1) %. TDS untuk variasi volume yang terbaik yaitu karbon aktif kayu sengon 150 ppm. Hasil pengukuran pH adalah sama yaitu pH 6,9. (2) Efisiensi penyerapan kadar Fe tertinggi yaitu karbon aktif kayu sengon ($96,88 \pm 0,32$)%. (3) E_T pada variasi komposisi yang tertinggi adalah variasi karbon-karbon-pasir-pasir (90 ± 1)%. TDS pada variasi komposisi yang terbaik adalah variasi komposisi karbon-karbon-pasir-pasir 151 ppm. Hasil pengukuran pH sebelum proses FAS dan setelah proses FAS adalah sama yaitu 6,9. E_p tertinggi untuk variasi komposisi absorben adalah variasi komposisi karbon-pasir-pasir-kerikil dan karbon-pasir-kerikil-kerikil yaitu ($93,75 \pm 0,09$)%. (4) Hasil untuk total coliform yang diujikan pada variasi volume dan variasi komposisi absorben yang mempunyai efisiensi penyerapan kadar besi (Fe) paling baik dan efisiensi transmisi cahaya paling baik adalah absorben jenis karbon aktif kayu sengon sebesar (43 MPN/100mL sampel).

Kata Kunci: karbon aktif kayu sengon, kerikil aktif sungai krasak, pasir aktif pantai indrayanti, filtrasi, absorpsi.

FILTRATION SYSTEM WITH USING ACTIVE CARBON OF SENGON WOOD, ACTIVE GRAVEL OF KRASAK RIVER, AND ACTIVE SAND OF INDRAYANTI BEACH AT WELL WATER IN THE LPPMP UNY AS THE MINERAL WATER

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ABSTRACT

This research aims to know: (1) Effect of the absorbent volume and the types of it, to the intensity of light transmission, total dissolved solid (TDS), and PH in filtration process of well water sample in LPPMP UNY. (2) Effect of the types of absorbent Fe levels in filtration process of well water sample in LPPMP UNY. (3) Effect of the variation of absorbent types to the intensity of light transmission, TDS, PH, and the levels of FE in filtration process of well water in LPPMP UNY. (4) Effect of the absorption on FAS (*Filtrasi, Absorpsi, Sedimentasi*) system to decrease the levels of total *coliform* in filtration process of well water in LPPMP UNY.

This research uses water purification of FAS (filtration, absorption, and sedimentation water purification system). This system uses 5 pipe columns and the water is flowed by the pipe. Filtration and absorption occurs at all pipes, while, the sedimentation occurs when the water flowed upward. At the time, the heavy metals that its density is greater with the water, will happen sedimentation. The absorbent that used in this research are the active carbon of sengon wood, the active gravels of Krasak river, and the active sand of Indrayanti beach. The result of this filtration process was measured by the light transmission lux meter for test the clarity of water, with the digital meter for test the similarity of degree, and assay the Fe and to test the total of *coliform* at STTL laboratory.

The result of this research showed that: (1) Efficiency of the light transmission for the highest volume variation is the active carbon of sengon wood (92 ± 1)%. TDS for the best volume variation are the active carbon of sengon wood 150 ppm. The result of pH measurement are the same, namely pH 6.9 (2) Efficiency of the highest Fe levels absorbent are the active carbon of sengon wood ($96,88 \pm 0,32$)%. (3) E_T at the highest composition variation is the variation of carbon-carbon-sand-sand. TDS at the best variation composition is the variation of carbon-carbon-sand-sand 151 ppm. The result of pH measurement, before and after of the process FAS are the same 6,9, the highest E_p for absorbent composition variation is the variation of composition of carbon-sand-gravel and carbon-sand-gravel, that are ($92,75 \pm 0,33$)%. (4) The result for total *coliform* were tested on volume variations and absorbent variations composition that have the absorption efficiency levels of iron (Fe) kindest most excellent the light transmission efficiency is absorbent type of the active carbon of sengon wood (43 MPN/100ml sampel).

Keyword: the active carbon of sengon wood, the active gravel of Krasak river, the active sand of indrayanti beach, filtration, absorption