

ABSTRAK

PEMANFAATAN KARBON AKTIF BERBASIS SEKAM PADI SEBAGAI ADSORBEN PADA *PRETREATMENT* AIR SUMUR DI ILIR BARAT 1 DALAM PROSES *REVERSE OSMOSIS* DENGAN VARIASI LAJU ALIR DAN UKURAN PARTIKEL

(*Khania Mistabella, 2026,*)

Air sumur merupakan salah satu sumber air yang banyak digunakan masyarakat, namun kualitasnya dapat menurun akibat adanya kandungan pencemar seperti kekeruhan, zat terlarut, perubahan pH, dan logam. Salah satu metode pengolahan air yang dapat digunakan yaitu adsorpsi menggunakan karbon aktif berbasis sekam padi. Tujuan penelitian ini adalah untuk menentukan pengaruh laju alir terhadap efektivitas proses adsorpsi serta menentukan pengaruh ukuran partikel karbon aktif berbasis sekam padi terhadap kualitas air sumur sebelum proses *Reverse Osmosis* (RO). Parameter yang diamati meliputi kekeruhan, *Total Dissolved Solids* (TDS), pH, dan kadar besi (Fe). Hasil penelitian menunjukkan bahwa variasi laju alir dan ukuran partikel karbon aktif memberikan pengaruh terhadap kualitas air sumur. Laju alir 2 L/menit menghasilkan penurunan kekeruhan terbaik dengan nilai 0,70 NTU, sedangkan nilai TDS terendah diperoleh pada laju alir 1 L/menit sebesar 523,5 mg/L. Nilai pH setelah proses *pretreatment* mengalami peningkatan dari kondisi awal 6,13 menjadi 6,7–6,9 dan telah memenuhi standar kualitas air. Kadar Fe terendah diperoleh pada karbon aktif ukuran 60 mesh dengan laju alir 2 L/menit, yaitu sebesar 0,2371 mg/L. Berdasarkan hasil penelitian, karbon aktif berbasis sekam padi mampu menurunkan kekeruhan, TDS, dan kadar Fe serta meningkatkan pH air sumur. Namun, nilai TDS dan Fe masih belum memenuhi batas yang dipersyaratkan, sehingga karbon aktif berbasis sekam padi pada kondisi penelitian ini belum mampu memenuhi seluruh standar kualitas air dan dapat dimanfaatkan sebagai adsorben *pretreatment* sebelum proses *Reverse Osmosis* (RO).

Kata kunci: adsorpsi, karbon aktif, sekam padi, laju alir, ukuran partikel.

ABSTRACT

UTILIZATION OF RICE HUSK-BASED ACTIVATED CARBON AS AN ADSORBENT IN THE PRETREATMENT OF WELL WATER IN ILIR BARAT 1 FOR A REVERSE OSMOSIS PROCESS WITH VARIATIONS IN FLOW RATE AND PARTICLE SIZE

(Khanía Mistabella, 2026,)

Well water is one of the water sources widely used by the community; however, its quality can decrease due to contaminants such as turbidity, dissolved substances, pH changes, and metals. One water treatment method that can be applied is adsorption using rice husk-based activated carbon. This study aimed to determine the effect of flow rate on the adsorption effectiveness and the effect of activated carbon particle size on the quality of well water before the Reverse Osmosis (RO) process. The observed parameters included turbidity, Total Dissolved Solids (TDS), pH, and iron (Fe) concentration. The results showed that variations in flow rate and activated carbon particle size affected the quality of well water. A flow rate of 2 L/min resulted in the best turbidity reduction, with a value of 0.70 NTU, while the lowest TDS value was obtained at a flow rate of 1 L/min, at 523.5 mg/L. The pH value increased from the initial value of 6.13 to 6.7–6.9 after the pretreatment process and met the required water quality standard. The lowest Fe concentration was obtained using 60-mesh activated carbon at a flow rate of 2 L/min, with a value of 0.2371 mg/L. Based on the results, rice husk-based activated carbon was able to reduce turbidity, TDS, and Fe concentration and increase the pH of well water. However, the TDS and Fe values still did not meet the required standards, indicating that the rice husk-based activated carbon under the conditions used in this study was not yet able to meet all water quality requirements. Nevertheless, it can be utilized as an adsorbent for pretreatment before the Reverse Osmosis (RO) process.

Keywords: *adsorption, rice husk, activated carbon, flow rate, particle size.*