

RINGKASAN

Keberadaan senyawa fenolik dalam air dan air limbah perlu dikendalikan karena bersifat toksik dan karsinogenik. Senyawa ini berasal dari air limbah industri seperti : industri plastik, industri tekstil, industri kertas, industri kendaraan bermotor, kilang minyak bumi dan industri yang menggunakan fenol sebagai bahan dasar atau sebagai produk sampingan.

Penelitian ini bertujuan untuk mengetahui kemampuan karbon aktif dalam mengadsorpsi o-Kresol sebagai salah satu senyawa fenolik dan penggunaan isoterm Freundlich serta isoterm Langmuir dalam menginterpretasikan hasil penelitian.

Luas permukaan diukur dengan metoda adsorpsi zat warna Metilen Biru Klorida dan proses adsorpsi o-Kresol dilakukan dengan variasi berat karbon aktif.

Empat jenis karbon aktif, MKR_g, INDb, MKR_b dan MRC yang telah dipanaskan pada 105 °C selama 4 jam dapat mengadsorpsi 76,5%, 83,3%, 70,0% dan 69,1% larutan o-Kresol. Luas permukaan karbon aktif tersebut masing-masing $S_{MKR_g} = 147,949 \text{ m}^2/\text{g}$, $S_{IND_b} = 232,603 \text{ m}^2/\text{g}$, $S_{MKR_b} = 221,609 \text{ m}^2/\text{g}$, $S_{MRC} = 185,964 \text{ m}^2/\text{g}$. Penurunan volume rongga setelah proses adsorpsi adalah $\Delta V_{RMKR_g} = 6,92\%$, $\Delta V_{RIND_b} = 14,93\%$, $\Delta V_{RMKR_b} = 4,15\%$, $\Delta V_{RMRC} = 3,14\%$. Sedangkan kenaikan berat jenis setelah proses adsorpsi adalah $\Delta BJ_{MKR_g} = 8,7\%$, $\Delta BJ_{IND_b} = 18,0\%$, $\Delta BJ_{MKR_b} = 5,9\%$ dan $\Delta BJ_{MRC} = 0,0\%$. Dari isoterm Freundlich diperoleh besarnya konstanta K_F masing-masing $K_{FMKR_g} = 0,3347$, $K_{FIND_b} = 0,2855$, $K_{FMKR_b} = 0,2579$, $K_{FMRC} = 0,1509$. Konstanta n masing-masing $n_{MKR_g} = 0,3531$, $n_{IND_b} = 0,1823$, $n_{MKR_b} = 0,1701$, $n_{MRC} = 0,0117$. Dan dari isoterm Langmuir diperoleh besarnya konstanta Q° masing-masing, $Q^{\circ}_{MKR_g} = 0,2389$, $Q^{\circ}_{IND_b} = 0,2662$, $Q^{\circ}_{MKR_b} = 0,2202$, $Q^{\circ}_{MRC} = 0,1504$, konstanta b masing-masing $b_{MKR_g} = 14,0530$, $b_{IND_b} = 16,5342$, $b_{MKR_b} = 28,8705$ dan $b_{MRC} = 275,889$.

Dari hasil penelitian ternyata karbon aktif cukup bagus untuk digunakan sebagai adsorben terhadap larutan o-Kresol. Tes isoterm dapat digunakan untuk; menyatakan penghilangan suatu adsorbat dapat dilakukan atau tidak, mengetahui kapasitas adsorpsi suatu adsorben serta merupakan metoda sederhana untuk membandingkan jenis karbon aktif yang berbeda.

SUMMARY

The existence of phenolic compounds in water and waste water have to be controlled, because of its toxic and carcinogenic characteristic. These compounds come from industrial waste water, such as plastic industry, textile industry, paper industry, vehicles industry, etc which use phenol as a basic material or even as a by product.

This research aims to learn the ability of active carbon in adsorbing o-Cresol as one of the phenolic compounds. This research use the Freundlich isotherm and also Langmuir isotherm in interpreting the result of research.

Surface area measured by adsorption method of Methylene Blue Chloride and the use of active carbon heavy variation in adsorption process of o-Cresol.

There are four kinds of active carbon, MKRg, INDb, MKRb and MRC that have been heated on 105 °C for four hours, can adsorb 76,5%, 83,3%, 70,0% and 69,1% o-Cresol solution. Each surface area are $S_{MKRg} = 147,949 \text{ m}^2/\text{g}$, $S_{INDb} = 232,603 \text{ m}^2/\text{g}$, $S_{MKRb} = 221,609 \text{ m}^2/\text{g}$, $S_{MRC} = 185,964 \text{ m}^2/\text{g}$. The decrease of pore volume after the adsorption process are $\Delta V_{RMKRg} = 6,92\%$, $\Delta V_{RINDb} = 14,93\%$, $\Delta V_{RMKRb} = 4,15\%$, $\Delta V_{RMRC} = 3,14\%$, and the increase of density after the adsorption process are $\Delta BJ_{MKRg} = 8,7\%$, $\Delta BJ_{INDb} = 18,0\%$, $\Delta BJ_{MKRb} = 5,9\%$ and $\Delta BJ_{MRC} = 0,0\%$. From the Freundlich isotherm the gained constance are $K_{FMKRg} = 0,3347$, $K_{FINDb} = 0,2855$, $K_{FMKRb} = 0,2579$, $K_{FMRC} = 0,1509$, $n_{MKRg} = 0,3531$, $n_{INDb} = 0,1823$, $n_{MKRb} = 0,1701$, $n_{MRC} = 0,0117$. And from the Langmuir isotherm, the gained constant are $Q^{\circ}_{MKRg} = 0,2389$, $Q^{\circ}_{INDb} = 0,2662$, $Q^{\circ}_{MKRb} = 0,2202$, $Q^{\circ}_{MRC} = 0,1504$, $b_{MKRg} = 14,0530$, $b_{INDb} = 16,5342$, $b_{MKRb} = 28,8705$ dan $b_{MRC} = 275,889$.

According to the result of research, it's been proved that active carbon act good enough as an adsorbent on o-Cresol. The isotherm test can be used to determined the deletion of an adsorbat and measure the adsorption capacity of an adsorbent. This test is also a simple method to compare different kinds of active carbon.