

## KOMPOSIT KARBON AKTIF/MAGNESIUM(II) DALAM PENURUNAN KADAR BAHAN ORGANIK AIR GAMBUT

### Abstrak

Air gambut mengandung bahan organik yang tinggi ditandai dengan warna merah kecoklatan, sehingga tidak layak untuk dikonsumsi. Telah dilakukan penelitian untuk mengurangi kadar bahan organik pada air gambut dengan menggunakan komposit KA/Magnesium(II). Penelitian ini bertujuan untuk menentukan karakteristik adsorben KA/Magnesium(II) serta mengetahui kapasitas adsorpsi dan isoterm adsorpsi terhadap penurunan kadar bahan organik air gambut. Karbon aktif dipreparasi dari tandan kosong kelapa sawit yang merupakan limbah namun mengandung lignoselulosa tinggi sebagai sumber karbon. Karbon dibuat melalui proses karbonisasi kemudian diaktivasi dengan  $\text{CH}_3\text{COONa}$ . Karbon aktif dikompositkan dengan magnesium nitrat heksahidrat melalui teknik *in-situ* dalam suasana basa menggunakan NaOH. Adsorben komposit KA/Magnesium(II) yang telah dibuat dikarakterisasi menggunakan FTIR menunjukkan adanya ikatan Mg-O muncul pada serapan bilangan gelombang  $403,12 \text{ cm}^{-1}$ . Kadar air adsorben KA/Magnesium(II) lebih rendah dari karbon aktif yaitu 1,298%. Hasil penelitian menunjukkan massa adsorben terbaik adalah 2 g KA/Magnesium(II) dengan kapasitas adsorpsi 2,2576 mg/g dan persentase adsorpsi bahan organik sebesar 14,41%. Sedangkan waktu kontak terbaik adalah 15 menit dengan kapasitas adsorpsi 2,4242 mg/g dan persentase adsorpsi bahan organik 17,1522%. Mekanisme adsorpsi yang terjadi pada komposit KA/Magnesium(II) dengan bahan organik air gambut mengikuti persamaan isoterm adsorpsi Langmuir yang membentuk lapisan monolayer.

Kata Kunci: air gambut, bahan organik, karbon aktif, Magnesium(II), tandan kosong kelapa sawit

## **ACTIVE CARBON/MAGNESIUM(II) COMPOSITE IN DEDUCTIONS IN PEAT ORGANIC MATERIAL**

### **Abstract**

Peat water contains high organic matters shown by a brownish red color, therefore it is not suitable for consumption. A study has been carried out to reduce the organic matter content in peat water by using KA/Magnesium(II) composites. This study aims to determine the characteristics of the adsorbent KA/Magnesium(II) and to determine the adsorption capacity and adsorption isotherm in order to decrease the organic matter content of peat water. Activated carbon is prepared from empty fruit bunches of oil palm which is a waste but contains high lignocellulose as a carbon source. Carbon is made through the carbonization process and then activated with  $\text{CH}_3\text{COONa}$ . Activated carbon was composited with magnesium nitrate hexahydrate through an in-situ technique under alkaline conditions using NaOH. The KA/Magnesium(II) composite adsorbent that had been prepared was characterized using FTIR showing the presence of Mg-O bonds appearing at the absorption wave number of  $403.12\text{ cm}^{-1}$ . The water content of the adsorbent KA/Magnesium(II) is lower than that of activated carbon, namely 1.298%. The results showed that the best mass of adsorbent was 2 g KA/Magnesium(II) with an adsorption capacity of 2.2576 mg/g and the percentage of adsorption of organic matter was 14.41%. While the best contact time is 15 minutes with an adsorption capacity of 2,4242 mg/g and the percentage of adsorption of organic matter is 17,1522%. The adsorption mechanism that occurs in the KA/Magnesium(II) composite with peat water organic matter follows the Langmuir adsorption isotherm equation which forms a monolayer.

Keywords: peat water, organic material, active carbon, Magnesium(II), oil palm empty fruit bunches.