ABSTRAK

Lailatul Fadillah, NIM 4173510008 (2017). Adsorpsi Limbah Amoniak dengan Karbon Aktif Termodifikasi Fe-Cu dari Tandan Kosong Kelapa Sawit.

Penelitian ini bertujuan mengetahui tahapan-tahapan pada proses modifikasi Fe-Cu karbon aktif tandan kosong kelapa sawit untuk adsorpsi amoniak (NH_4OH), mengetahui konsentrasi optimum terhadap adsorpsi amoniak (NH_4OH), mengetahui massa optimum karbon aktif terhadap adsorpsi amoniak (NH_4OH), dan mengetahui waktu kontak optimum karbon aktif terhadap adsorpsi amoniak (NH_4OH). Metode yang dilakukan ialah preparasi bahan baku tandan kosong kelapa sawit, karbonisasi, aktivasi dengan Fosfat (H_3PO_4) dan modifikasi logam Fe-Cu. Karakterisasi yang dilakukan pada karbon aktif dan karbon aktif modifikasi Fe-Cu ialah SEM, EDX, XRD, FTIR dan BET. Hasil morfologi karbon aktif termodifikasi Fe-Cu menggunakan uji SEM dihasilkan struktur permukaan karbon aktif lebih merata dan tidak banyak didapat pengotornya. Struktur EDX pada biosorben sebelum pencucian terdapat zat pengotor mineral seperi Ca, K, Mg, dan P. Untuk karbon aktif dan karbon aktif modifikasi beberapa pengotor sudah hilang yang disebabkan oleh karbonisasi dan aktivasi Fosfat (H_3PO_4). Pada data XRD karbon aktif modifikasi Fe-Cu mempunyai struktur amorf dengan derajat kristalinitas yang rendah jika dibandingkan dengan karbon aktif dan biosoben. Pada spectrum FTIR serapan tajam yang menunjukkan kandungan O-H, C-H, dan C-O. Pada proses adsorpsi amoniak (NH_4OH) karbon aktif dan karbon aktif modifikasi Fe-Cu didapat massa optimum ialah 2 gr dan 4 gram. Karbon aktif dan karbon aktif modifikasi Fe-Cu didapat konsentrasi optimum ialah 3 M. Sedangkan unruk karbon aktif dan karbon aktif modifikasi didapat waktu kontak optimum pada 45 menit.

Kata kunci : karbon aktif modifikasi, adsorpsi, tandan kosong kelapa sawit

ABSTRACT

Lailatul Fadillah, NIM 4173510008 (2017). Adsorption of Ammonia Waste with Fe-Cu Modified Activated Carbon from Oil Palm Empty Fruit Bunches.

This study aims to determine the steps in the process of modifying Fe-Cu activated carbon of oil palm empty fruit bunches for ammonia adsorption (NH_4OH), to determine the optimum concentration of ammonia adsorption (NH_4OH), to determine the optimum mass of activated carbon to ammonia adsorption (NH_4OH), and to determine the optimum mass of activated carbon for ammonia adsorption (NH_4OH). the optimum contact time of activated carbon on the adsorption of ammonia (NH_4OH). The method used is the preparation of raw material for oil palm empty fruit bunches, carbonization, activation with Phosphate (H_3PO_4) and modification of Fe-Cu metal. Characterizations carried out on activated carbon and modified Fe-Cu activated carbon were SEM, EDX, XRD, FTIR and BET. The results of the morphology of the modified Fe-Cu activated carbon using the SEM test resulted in a more even surface structure of the activated carbon and less impurities were obtained. The EDX structure in the biosorbent before washing contained mineral impurities such as Ca, K, Mg, and P. For activated carbon and modified activated carbon some impurities were lost due to carbonization and activation of Phosphate (H_3PO_4). In the XRD data, the modified Fe-Cu activated carbon has an amorphous structure with a low degree of crystallinity compared to activated carbon and biosoben. In the FTIR spectrum the absorption is sharp which shows the content of O-H, C-H, and C-O. In the process of adsorption of ammonia (NH_4OH) activated carbon and modified Fe-Cu activated carbon, the optimum masses were 2 g and 4 g, respectively. Activated carbon and modified Fe-Cu activated carbon obtained the optimum concentration of 3 M. While for activated carbon and modified activated carbon the optimum contact time was 45 minutes.

Keywords: modified activated carbon, adsorption, oil palm empty fruit bunches