PENGARUH PENGGUNAAN DUA DISTRIBUSI UAP AIR PANAS DALAM PEMBUATAN ARANG AKTIF DARI SERBUK GERGAJI KAYU CAMPURAN

(The Effect of Using Two Super Heated Steam Distributions in the Manufacture of Activated Charcoal from Sawdust of Mixed wood species)

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ABSTRACT

This study examined activated characteristics of activated charcoal from made sawdust of mixed wood species. The sawdust charcoal was priarly produced in a semi continuous carbonization kiln. Charcoal activation was accomplished by immersion in technical grade H3PO4 solution at 5% concentration for 24 hour, then drained and exposed to the ambient temperature to reach its air dry condition. The resulted charcoals were then put in a semi-pilot scale retort, and heated to 700 -800°C. To accelerate temperature increment fresh air was occasionally flown into the retort using a compressor. When the intended temperature (700 - 800°C) was achieved, super heated steam was flown into the retort with the flow rate of 1.5 - 2.5 m/s at the pressure of 4 bar for 180 minuts. The steam was generated by passing the saturated water steam through a heating chamber at 400°C.The improved process produced charcoals with yield of 56 - 78%, moisture content 1.27 - 4.68%, ash content 9.78 - 11.06%, volatile matters 8.64 - 10.84%, fixed carbon content 79.41 - 81.10%, adsorption capacity of benzene vapor 12.56 -16.91%, adsorption capacity of chloroform vapor 12,38 - 22.83%, adsorption capacity of formaldehyde vapor 9.66 - 19.28%, and adsorption capacity of iodine solution 784.59 - 821.66 mg/g.

Keywords : Wood sawdust, charcoal,process, steam distribution.

ABSTRAK

Dalam tulisan ini dikemukakan hasil penelitian pembuatan arang aktif dari arang serbuk gergaji kayu campuran. Pembuatan arang dilakukan dengan menggunakan tungku semi kontinyu. Arang yang dihasilkan direndam dalam larutan H3PO4 teknis pada konsentrasi 5% selama 24 jam, ditiriskan sampai kering udara, kemudian dimasukan ke dalam retort kapasitas 0,6 m3, selanjutnya dipanaskan pada suhu 700-800 0C. Untuk mempercepat kenaikan suhu di dalam retort, kedalamnya sewaktu-waktu dialirkan udara dari kompresor. Apabila suhu telah tercapai, dialirkan uap air panas selama 180 menit, dengan laju alir 1,5 - 2,5 m/s pada tekanan 4 bar, yang sebelumnya melewati ruang pemanas (heater chamber) pada suhu 400oC.Rendemen arang aktif yang dihasilkan sebesar 56 - 78%, dengan sifat dan kualitas : kadar air 1,27 - 4,68%, kadar abu 9,78 - 11,06%, kadar zat terbang 8,64 - 10,84%, kadar karbon terikat 79,41 - 81,10%, daya serap terhadap uap benzena 12,56 - 16,91%, daya serapterhadap uap kloroform 12,38 - 22,83%, daya serap terhadap uap formaldehida 9,66 -19,28%, dan daya serap terhadap larutan yodium sebesar 784,59 - 821,66 mg/g.

Kata kunci : serbuk gergajian kayu, arang, pembuatan, distribusi uap.