

Sunan Narkkorn 2012: Ammonia Removal from The King's Royally Initiated Leam Phak Bia Environmental Research and Development Project Wastewater by Powder and Sheets Palm Shell Charcoal. Master of Science (Environmental Science), Major Field: Environmental Science, College of Environment. Thesis Advisor: Associate Professor Nipon Tungkananuruk, Ph.D. 107 pages.

The objective of this research was to study the feasibility of using powder treated palm shell and sheets palm shell to adsorb ammonia in wastewater. Factors affecting the ammonia adsorption were examined including pH (5-12), mixing speed (0-200 rpm), shaking time (10-120 min), contact time (10-120 min), concentration of standard ammonia solution (5-50 mg/L) and adsorbent dose (20-240 g/L). The results showed that optimal conditions for ammonia adsorption by 4 g of palm shell charcoal powder and 10 g of palm shell charcoal sheet were pH 11, 100 rpm of mixing speed, 10 min of shaking time, 10 and 90 min of contact time respectively, 50 mL of 40 and 20 mg / L of the standard ammonia solution, respectively. Under such conditions, the two types of adsorbents can adsorb ammonia 74.13% and 65.68% respectively. The model adsorption of both adsorbents in batch experiment were conformed with Freundlich Isotherm. The removal performance of ammonia in the King's Royally Initiated Leam Phak Bia Environmental Research and Development Project wastewater using palm shell charcoal powder and palm shell charcoal sheet by batch method were 83.68 % and 75.49 % respectively. Continuous flow experiment was conducted and found that 40 mL/min was the suitable flow rate to remove ammonia. The break point of 540 g of palm shell charcoal powder was found to be 0.60 L for both of the standard ammonia solution and wastewater from Leam Phak Bia project. Exhaustion point was found at 4.2 and 3.6 L respectively. Furthermore, the batch condition were done at 400 g of palm shell charcoal sheet and 20 L of the standard ammonia solution and wastewater from Leam Phak Bia project and were found that the removal efficiency at 16.34% and 37.21% respectively. And also shown that palm shell charcoal powder had higher adsorption in continuous process than palm shell charcoal sheet in batch process at the same weight and same concentration of ammonia. In addition batch and continuous conditions method can also be applied to remove ammonia from the King's Royally Initiated Leam Phak Bia Environmental Research and Development Project wastewater.

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Thesis Advisor's signature