

INFLUENCE OF ACTIVATION TEMPERATURE AND ACID ONCENTRATION ON SLUDGE-BASED ACTIVATED CARBON PRODUCTION

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Abstract:

This work is focus on the synthesis of activated carbon from palm oil mill effluent (POME). POME is waste from palm oil refineries and generated in large quantities, which about 2.5 tons of POME generated for every ton of palm oil production. POME usually discard in disposal pond and proceed with series of treatment. POME sludge is one of the main waste product from POME treatment and it needs a serious attention due to the significant increasing volume of waste sludge. The utilization of POME into valuable product such as activated carbon can be considered as one of the promising solutions to reduce its volume periodically. Previous researches were done on production of activated carbon from food processing industry, domestic and sewage sludge. However, the production of activated carbon from POME sludge has never been reported. Hence, this study was conducted to investigate the influence of operational parameters on activation process of POME sludge for activated carbon production. The POME sludge undergone processing steps including cutting and grinding. Then, the sample was carbonized at 400°C for 1 hours and followed by chemical activation process. The chemical activation process was carried out by impregnated with 25 wt% of phosphoric acid with impregnation ratios of 1:4 (w/w) for 24 hours. After 24 hours, the sample was filtrated and dried overnight in the oven. The sample then pyrolyzed at different temperature (500°C to 800°C) for 1 hour for activation and followed by washing. Based on the BET analysis, for low phosphoric acid concentration, the activated carbon prepared under higher activation temperature shows higher surface area (125.84 m² /g). For high activation temperature, the activated carbon impregnated with higher phosphoric acid concentration resulted in higher surface area (186.46 m² /g). Therefore, activation temperature and acid concentration are the important parameters determining the activated carbon quality.

Keywords: Pome; Sludge; Activated carbon; Operational parameter; Chemical activation; Phosphoric acid

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