

Utilization of activated carbon produced from Sago hampas (*Metroxylon sagu*) to reduce ammonia loss from urea.

ABSTRACT

Surface-applied urea contributes to NH_3 loss of N through ammonia volatilization, especially in warm and humid regions. Ammonia loss has been a major problem confronting farmers because additional urea is applied to compensate for the loss which increases cost of fertilization. Activated carbon (AC) produced from Sago hampas (SH) could be capable of absorbing N in the form of NH_4^+ to minimize ammonia volatilization. The objective of this study was to determine if AC produced from SH could be used to retain ammonium as well as minimizing ammonia loss from urea. Activated carbon was produced from SH by using concentrated H_2SO_4 and $(\text{NH}_4)_2\text{S}_2\text{O}_8$. There were three types of AC produced using different volumes of H_2SO_4 (AC30, AC40 and AC50). The charred product was used as a treatment together with the raw material in order to observe the reduction of ammonia loss using closed-dynamic air flow system for 7 days. The daily loss of NH_3 was observed and the NH_4^+ and NO_3^- retention in the soil were determined using standard procedures. Activated carbon produced from SH had a higher CEC and it increased from AC30 to AC50. The treatments did not contribute to the reduction of ammonia loss; however, there was a significant increase in the retention of NH_4^+ in the soil compared to urea alone. The AC was observed to be a better absorbent than SH. AC50 was a better absorbent compared to other treatments due to high acidity and CEC. However, the treatment did not contribute to reduction of ammonia loss, but there was a significant increase of NH_4^+ retention in the soil.

Keyword: Activated carbon; Ammonia; Ammonia volatilization; Ammonium; *Metroxylon sagu*; Sago hampas; Urea.