Combined effect of sugarcane trash mulch, slurry properties and tropical climatic conditions on ammonia volatilization after pig slurry application

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Context :

→ In Réunion Island, in the tropics, sugarcane is grown on large areas (26 000 ha, 57% of the island’s total farmland) and pig slurry output is applied on the sugarcane fields (Chabalier et al., 2006).

→ Plant mulches:
  ✓ tend to increase organic matter content, which usually provides for a high infiltration rate (Findeling et al., 2003)
  ✓ can store significant amounts of water, so reducing the amount of rain reaching the soil, which might influence slurry infiltration and thus ammonia volatilization.

Objectives :

→ Characterize ammonia volatilization under tropical area
→ Explore the effects of a sugarcane trash mulch on volatilization

METHODS / APPROACH

→ Two experiments (● on the map) were carried out: in August-September 2000 and late October 2001, designed to compare two treatments: pig slurry application (i) on bare soil, (ii) on sugarcane trash mulch.

→ Field measurement of ammonia volatilization using the micrometeorological mass balance method (Misselbrook et al., 2005).

RESULTS

→ With the bare soil treatments, emissions were rather similar:
  34% (exp. 1) and 47% (exp. 2) of applied ammoniacal nitrogen

→ With the mulch treatments, sharply contrasting results were obtained:
  10% (exp. 1) and (exp. 2) 108% of applied ammoniacal nitrogen

CONCLUSIONS

As a conclusion, on bare soil, slurry would be best applied under conditions as cool and windless as possible, and preferably before a rainfall event. In case of slurry application on sugarcane trash mulch, slurries with low dry matter content would be preferable. An efficient method would be to inject the slurry under the mulch.

BIBLIOGRAPHY