

A win-win solution: Shredded straw can enhance soil fertility and reduce ammonia pollution

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Straw management and ammonia volatilization



Straw management and ammonia volatilization. Credit: Zhou Minghua

Straw incorporation—shredding and burying straw—has been widely promoted as an environmentally friendly method to increase soil organic carbon stocks and improve soil fertility. Scientists have also found crop straw incorporation could help reduce ammonia volatilization from fertilized fields, which contributes to the formation of fine particles

thereby resulting in serious air pollution. Still, scientists are not clear about the long-term effects, e.g. 15 years, of crop straw incorporation approaches and rates on ammonia volatilization from calcareous soils, which are hotspots for agricultural ammonia volatilization.

Recently, Dr. Zhou Minghua and his team from the Institute of Mountain Hazards and Environment, Chinese Academy of Sciences, investigated the effects of different long-term straw management practices on ammonia volatilization from calcareous agricultural soils under a subtropical climate. Their findings were recently published in *Atmospheric and Oceanic Science Letters*.

"We find long-term crop straw incorporation practices could reduce annual ammonia volatilization fluxes by 16.1% to 35.1%. The magnitude of the inhibition effect increased along with the increasing straw application rate," says Zhou, the corresponding author of the study. "The inhibition effect is likely because the high C/N ratio of crop straw can increase microbial N immobilization and enhance the ammonium transformation [e.g., nitrification]."

Zhou also points out that straw burning, a traditional practice carried out by Chinese peasants but strongly discouraged by the Chinese government owing to concerns around air pollution, resulted in one-third higher annual ammonia volatilization as compared with incorporation of the same amount of unburned crop straw.

Taking into consideration both agronomical (e.g., [soil fertility](#)) and environmental performances, this study suggests that long-term crop straw incorporation could be a wise way for reducing ammonia volatilization while sustaining agricultural development.

More information: Bowen Zhang et al, Effects of different long-term crop straw management practices on ammonia volatilization from

subtropical calcareous agricultural soil, *Atmospheric and Oceanic Science Letters* (2020). [DOI: 10.1080/16742834.2020.1736498](https://doi.org/10.1080/16742834.2020.1736498)

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