环境科学学报
ACTA SCIENTIAE CIRCUMSTANTIAE

研究报告

聂文静,李博文,郭艳杰,王小敏,韩晓莉.氮肥与DCD配施对棚室黄瓜土壤NH_3挥发损失及N_2O排放的影响[J].环境科学学报,2012,32(10):2500-2508

氮肥与DCD配施对棚室黄瓜土壤NH_3挥发损失及N_2O排放的影响

Effects of nitrogen fertilizer and DCD application on ammonia volatilization and nitrous oxide emission from soil with cucumber growing in Greenhouse

关键词：氮 DCD 氨挥发 氧化亚氮排放

基金项目：河北省国际科技合作项目(No.10397110D);农业部"948"计划项目(No.2012-Z36)

作 者 单位

聂文静 河北农业大学资源与环境科学学院,保定 071000

李博文 河北农业大学资源与环境科学学院,保定 071000

郭艳杰 河北农业大学资源与环境科学学院,保定 071000

王小敏 河北农业大学资源与环境科学学院,保定 071000

韩晓莉 河北农业大学资源与环境科学学院,保定 071000

摘要：以传统水氮管理为对照,进行了优化水氮管理条件下氮肥与DCD配施对大棚黄瓜土壤氨挥发损失及氧化亚氮排放的影响研究.试验结果表明,与传统水氮管理相比,优化水氮管理减少了氮肥用量及灌水量,但黄瓜产量并没有降低.各水氮处理的NH_3挥发速率峰值出现在施肥灌水后的第3d,添加DCD的各优化水氮处理与传统水氮处理相比,土壤氨挥发累积量分别减少55.97%、43.68%、66.47%,4次追肥后W2N2+DCD、W2N3+DCD和W2N4+DCD的氨挥发速率峰值与累积量变化范围较小.不同水氮处理的N_2O排放通量的峰值均出现在施肥灌水后的第4d,各追肥时期W2N2+DCD、W2N3+DCD和W2N4+DCD处理,土壤N_2O排放通量峰值与N_2O累计排放量均显著低于传统水氮处理W1N1,并且3个处理之间不存在显著差异,充分表明优化水氮管理中将氮肥与DCD配施对减少N_2O排放起到了显著作用.

Abstract：Effects of applying different levels of nitrogen fertilizer,water and DCD on ammonia volatilization and N_2O emission from soil were studied in greenhouse.The results illustrated that,in comparison with the conventional water and nitrogen management,cucumber yield of the optimized water and nitrogen management with less N and water applied did not increase or decrease significantly.The ammonia emissions of all treatments peaked on day 3 after N fertilizer and water was applied.Compared with the conventional water and nitrogen management,the accumulative N loss by NH_3 volatilization from the three treatments of the optimized water and nitrogen management decreased by 55.97%,43.68% and 66.47%,respectively.The peaks and cumulative fluxes of ammonia volatilization in W2N2+DCD,W2N3+DCD and W2N4+DCD did not change markedly after N top application for four times.The N_2O flux in different treatments of water and nitrogen management peaked after four days of fertilization and irrigation.The peak emission and accumulative emissions of N_2O from three treatments of DCD (W2N2+DCD,W2N3+DCD and W2N4+DCD) were all significantly less than that in W1N1 in four top dressing stages.There was no significant difference among the three treatments.It indicated that DCD in the optimized water and nitrogen management was effective in reducing N loss as N_2O emissions.

Key words：nitrogen DCD ammonia volatilization nitrous oxide emission

主办单位：中国科学院生态环境研究中心

单位地址：北京市海淀区双清路18号 邮编：100085

服务热线：010-62941073 传真：010-62941073 Email：hjkxxb@rcees.ac.cn