



Changes in the inorganic nitrogen content of the soil solution with rice straw retention in northeast China

Chao Yan^a, Tingting Du^a, Shuangshuang Yan^a, Shoukun Dong^a, Zhenping Gong^{a,*}, Zhongxue Zhang^b

^aCollege of Agriculture, Northeast Agricultural University, Harbin 150030, China, email: yanchao504@126.com

^bSchool of Water Conservancy and Civil Engineering, Northeast Agricultural University, Harbin 150030, China

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ABSTRACT

Research the effects of straw retention (SRT) and nitrogen fertilizer on nitrogen concentration in soil solution and yield during the growth period of rice. This study was conducted to explore the variation of nitrogen concentration in soil solution by continuous location plot experiment, pot experiment, and laboratory culture experiment. The results showed that the ammonium N ($\text{NH}_4^+\text{-N}$), nitrate N ($\text{NO}_3^-\text{-N}$), and mineral N contents of the soil solution gradually decreased with increasing rice growth. Moreover, the N contents of the soil solution gradually increased with an increasing rate of N fertilizer application; however, increasing the rate of N fertilizer application did not change the effect of SRT on the N content in the soil solution. Comparing SRT with straw removal (SRM), the $\text{NH}_4^+\text{-N}$ in the soil solution increased by 29.08% (0.17 mg L^{-1}) over the rice-growing period; by contrast, the $\text{NO}_3^-\text{-N}$ and mineral N contents decreased by 8.90% (0.47 mg L^{-1}) and 3.02% (0.29 mg L^{-1}), respectively. In the black soil region of Northeast China, SRT reduced the nitrate concentration in the soil solution, and the N contents mineral was lower than that of the straw. Under production conditions, SRT has the trend of increasing rice yield.

Keywords: Rice; Straw retention; Inorganic nitrogen; Soil solution

* Corresponding author.