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新型缓释尿素对削减温室气体、NH₃排放和淋溶作用的研究

Effects of controlled release urea on greenhouse gases, NH₃ emissions and eluviation

关键词: [缓释尿素](#) [普通尿素](#) [温室气体](#) [淋失率](#)

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摘要: 温室气体(CO₂、CH₄、N₂O)和NH₃的排放及水体污染带来的环境问题日益突出,其中,化肥的施用等农业排放是重要来源之一.本实验评价了新型缓释化肥对温室气体排放和水体污染的影响,采用密闭箱法,在饱和田间持水量(WFPS) 60%的条件下,检测恒温(23℃)环境中土壤温室气体(CO₂、CH₄、N₂O)和NH₃挥发.结果表明,30 d内缓释尿素组比普通尿素组释放的CO₂、CH₄、N₂O平均排放通量分别降低24.69%、3.01%、26.75%,NH₃排放量减少24.36%;模拟降雨条件的淋溶实验(15 d)显示,缓释尿素组的淋失率明显低于普通尿素组,总氮减少6.97%,尿素氮减少4.75%,缓释尿素和普通尿素组淋出水样中尿素氮和总氮量所占比重均在淋溶第1 d最大,缓释尿素组尿素氮和总氮量分别为36.1%和41.23%,普通尿素组尿素氮和总氮量分别为48.7%和72.4%.结果表明,缓释尿素较普通尿素在削减温室气体排放和氨排放有明显的效果.

Abstract: The environmental risks caused by emissions of greenhouse gases, NH₃ and sewage disposal are becoming increasingly prominent. In particular, emission of fertilizer and other agricultural disposal is one of the important sources. In this study, we evaluated the effects of late-model fertilizer on greenhouse emissions and water pollution. By using the closed chamber method under 60% water-filled porespace (WFPS), the emissions of CO₂, CH₄, N₂O and NH₃ were examined at 23℃. Our results showed that the average emissions of CO₂, CH₄ and N₂O obtained from slow release urea were reduced by 24.69%, 3.01% and 26.75%, respectively, comparing to the regular urea. The emission of NH₃ was reduced by 24.36%. In the experiment of simulated rainfall (15 d), the leaching rate of slow release urea was significantly lower than the regular urea, with 6.97% reduction of total nitrogen and 4.75% reduction of urea nitrogen. In both the slow release urea and regular urea, the leaching of total nitrogen and urea nitrogen were detected mainly on the first day. The content of total urea nitrogen and total nitrogen for the slow release urea were 36.1% and 41.23%, respectively, significantly less than 48.7% and 72.4% for the regular urea. Our results demonstrated a significant benefit of slow release urea in reducing the emission of greenhouse gases and NH₃, comparing to the regular urea.

Key words: [slow release urea](#) [regular urea](#) [greenhouse gases](#) [leaching rate](#)

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