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包膜控释尿素与普通尿素配施对冬小麦生长发育及土壤硝态氮的影响

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Effects of coated controlled release urea combined with conventional urea on winter wheat growth and soil NO_3^--N.

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摘要

应用大田试验研究了不同用量的包膜控释尿素（PCU60，释放期为60 d）与普通尿素（U）配合基施（10% PCU60+90%U，PU_1；20% PCU60+80% U，PU_2；30% PCU60+70% U，PU_3；40% PCU60+60% U，PU_4）对冬小麦产量、氮肥利用率等生物学性状及土壤硝态氮累积的影响，并对PCU60氮素田间溶出特征及25 ℃静水溶出特征进行了比较分析.结果表明：在施氮量相等的条件下，与习惯施肥处理相比，PU_4处理冬小麦各项指标均显著提高: 增产5.6%、氮肥利用率提高14.6%、氮素总累积量提高7.2%、成熟期总茎数提高2.6%、成熟期地上部总生物量提高7.5%、经济效益增加984.3元·hm^{-2}.各处理0～100 cm土层硝态氮总累积量在39.70～49.93 kg·hm^{-2}，其中，PU_4处理总累积量最低，为39.70 kg·hm^{-2}.埋袋试验表明，释放期为60 d的包膜控释尿素氮素释放规律与小麦氮素吸收特性基本吻合.

关键词： 冬小麦 包膜控释尿素 生长发育 硝态氮

Abstract:

Field experiments were conducted to study the effects of different dosages coated controlled release urea (PCU60, 60 d release duration) combined with conventional urea (U) used as basal on the winter wheat grain yield, nitrogen (N) recovery rate, and soil NO_3^--N content, *etc*. Five treatments were installed, *i.e*., U (CK), 10% PCU60+90 %U (PU_1), 20% PCU60+80% U (PU_2), 30% PCU60+70% U (PU_3), and 40% PCU60+60% U (PU_4). In the meantime, a comparative analysis was also carried out on the PCU60 N release characteristics under field condition and in 25 ℃ static water. At the same N dosage, all the test indices in treatment PU_4 were significantly higher, with the grain yield, N recovery rate, total N accumulation amount, total tiller number and aboveground biomass at ripening stage, and economic benefit increased by 5.6%, 14.6%, 7.2%, 2.6%, 7.5%, and 984.3 yuan·hm^{-2}, respectively, compared with those in treatment U. The accumulation amount of NO_3^--N in 0-100 cm soil layer in all treatments ranged in 39.70-49.93 kg·hm^{-2}, and was the lowest (39.70 kg·hm^{-2}) in treatment PU_4. The N release pattern of PCU60 under field condition better fitted the N absorption characteristics of winter wheat.

Key words: winter wheat coated controlled release urea growth and development NO_3^--N

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