

不同促腐条件下玉米秸秆直接还田的生物学效应研究

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Biological effect of maize stalk return to field directly under different accretion decay conditions

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摘要 通过2年田间定位试验,研究了冀东地区小麦—玉米轮作制度下,不同促腐条件下玉米秸秆配施化肥直接还田的生物学效应。结果表明,秸秆配施化肥并调节其C/N条件下,施用促腐剂较未施用处理增产达显著水平,作物各生育期土壤微生物量、酶活性均表现出高于未施用处理的趋势。以土壤微生物量、酶活性及氮、磷动态变化综合评判,秋季玉米秸秆直接还田在施用氮磷钾化学肥料作基肥的基础上,调节秸秆C/N:15:1~35:1范围内,不同C/N未影响秸秆的转化进程;在调节秸秆C/N的前提下,施用促腐剂则促进了秸秆的快速腐解,使秸秆转化过程中氮素的净释放和磷素再次进入净释放的时间提前,利于作物生长发育和产量形成。

关键词: 小麦-玉米轮作 秸秆还田 促腐条件 生物学效应 小麦-玉米轮作 秸秆还田 促腐条件 生物学效应

Abstract: The transformation after returning of stalk to field was a complicated biochemical process. Investigating the (dynamic) change rule of soil biochemical properties after returning of stalk to field was of great significant to evaluate the (effect) of technical measures of stalk return to the field since the biological effect it produced had an effect on the transformation of soil interior matter and energy. A 2-years experiment was conducted on cinnamon soil rotated by winter wheat and summer maize at eastern parts of Hebei province to study the biological effect of maize stalk return to field under (different) decay conditions on the yield of wheat and maize. The soil chemical properties was: 15.47g/kg of organic matter, 86.7mg/kg of alkali-hydrolysable N, 14.4 mg/kg of available P, and 68.5 mg/kg available K and 6.7 of pH. (Accretion) decay biologicals, which contained *Streptomyces microflavus*, *Aspergillus niger* and other microorganisms, was prepared by our research team. In time of application, the residue of mushroom medium was used as dispersed carrier without nutrient. The application rate of the residue of mushroom medium was 30 kg/ha, and it was mixed thoroughly with fined soil before applying. The results were as following: under the condition of combining maize stalk with chemical fertilizer and adjusting C/N, applying accretion decay biologicals could raise yield with statistical significant level compare with control. Soil microbial biomass and soil enzyme activities also was promoted at each growth duration. Stalk (return) to field directly with sitting in integrated judgment on soil microbial biomass, enzyme activities, N and P dynamic change, NPK fertilizer as basal fertilizer, and adjusting the proportion of C/N from 15:1 to 35:1, the dynamic changes of soil microbial biomass and soil enzyme activities and N nutrient and P nutrient contents had no remarkably different. On the basis of adjusting the proportion of stalk C/N, application effective microorganisms quickened the process of stalk's transformation, and advanced the date of the N net release and the P net release again. And it did good to crop growth and field formation.

Keywords:

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