

小麦秸秆腐解对自身锌释放及土壤供锌能力的影响

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Effects of application of wheat straw on straw Zn release and soil Zn supply capacity during the decomposition

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摘要

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摘要 为探讨秸秆在土壤中腐解对其本身所含锌的释放及其对土壤原有锌、外源施入锌形态转化以及对微生物量锌 (Mic-Zn) 含量的影响, 进行了为期42 d的小麦秸秆腐解室内培养试验。结果表明, 秸秆在土壤中腐解时CO₂-C累积释放量和土壤微生物量碳 (Mic-C) 随着秸秆添加量的增加而显著增加, 而秸秆自身锌含量高低以及外源施锌对其均无明显影响。土壤中无论是否添加秸秆, 施入外源锌均明显增加了土壤Mic-Zn和土壤有效锌 (DTPA-Zn) 含量, 土壤交换态锌 (Ex-Zn) 和松结有机态锌 (Wbo-Zn) 含量也明显增加; 与低锌秸秆相比, 高锌秸秆在土壤中腐解可明显增加土壤Mic-Zn和DTPA-Zn含量, 提高土壤Ex-Zn和Wbo-Zn比例; 秸秆腐解本身释放的锌主要转化为有效性较高的Ex-Zn。因此, 增加秸秆还田量以及使用高锌秸秆还田能显著增加土壤Wbo-Zn比例, 提高土壤有效锌含量, 从而增强土壤供锌能力。

关键词: 秸秆腐解 土壤微生物量Zn Zn形态 土壤供Zn能力

Abstract: An incubation experiment was carried out for 42 days to study the effects of straw decomposition on Zn release from straw, the changes of Zn fractions and the content of soil microbial biomass Zn (Mic-Zn). The results show that the cumulative amount of CO₂-C evolution and the content of soil microbial biomass C (Mic-C) are significantly increased with the increase of the straw amount, and these increases are affected by Zn concentration in straw and the inorganic Zn application. Moreover, whether the straw is added in soil or not, the contents of soil Mic-Zn, DTPA-Zn, exchangeable Zn (Ex-Zn) and loosely organic bound Zn (Wbo-Zn) are significantly increased when organic Zn fertilizer is added, and these four Zn fractions are also increased to some extent when high Zn concentration straw is added to soil compared to the low Zn concentration straw application. In conclusion, the addition of higher amount of straw as well as using straw with high Zn concentration can significantly increase the content of Wbo-Zn in soil, and increase the content of available Zn and soil Zn supplying capacity as well.

Keywords: straw decomposition soil microbial biomass Zn fractions of Zn soil Zn-supplying capacity

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