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# 耕作措施对华北地区冬小麦田N2O排放的影响

# Influences of tillage methods on N2O emission from winter wheat field in North China Plain

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**中文关键词:** 排放控制 温室气体 土壤 N2O 耕作 碳氮比 充水孔隙度 充气孔隙度

**英文关键词:** emission control greenhouse gases soils N2O tillage C/N ratio water-filled porosity space air-filled porosity

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**中文摘要:**

为研究不同耕作措施对冬小麦田N2O排放的影响以及探明N2O排放季节性波动的原因，该研究选取河北栾城县中国科学院农业生态系统试验站不同耕作处理下冬小麦田为研究对象，利用静态箱法测定翻耕秸秆还田（CT）、旋耕秸秆还田（RT）和免耕秸秆还田（NT）下冬小麦田N2O的排放。结果表明，耕作初期72 h翻耕、旋耕及免耕处理N2O排放总量分别为3.83、10.27、10.55 mg/m2。秸秆还田条件下，不同耕作措施冬小麦田N2O季节排放总量为：CT＞RT＞NT。CT、NT处理下N2O排放通量与0～20 cm各层次土壤温度呈极显著正相关。CT、NT处理表层0～5 cm土壤N2O排放通量与土壤充气孔隙度显著性负相关。NT处理土壤具有较高的C/N比，可能有利于减少N2O的排放。因此，华北冬小麦田采用NT能有效减少N2O排放。

**英文摘要:**

To determine the effects of tillage practice on N2O emission from winter wheat field and the cause of seasonal emission variation in the emission, a field experiment was carried out at Luancheng Agroecosystem Experiment Station, Chinese Academy of Sciences, in Hebei province. The experimental design consisted of conventional tillage (CT), rotary tillage (RT) and no tillage (NT) treatments. The N2O emissions were measured in the winter wheat growing season with the static close chamber method. The results showed that, during 72 hours after seeding, the N2O cumulative emission of CT, RT and NT were 3.83, 10.27 and 10.55 mg/m2, respectively. Under the condition of straw returning, the seasonal cumulative N2O emission of winter wheat field demonstrated as CT>RT>NT. The N2O emission significantly positively correlated with soil temperature at 0 – 20 cm soil layer under CT and NT treatment, while negative correlation was found between the N2O emission and soil air-filled porosity at 0 – 5 cm soil layer. With a higher C/N ratio in soil treatment, NT was more likely to reduce the emission of N2O. Generally, NT would be a better choice to reduce the N2O emission effectively in the Northeast Plain.

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