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长期施肥条件下灰漠土磷的吸附与解吸特征

Phosphorus adsorption and desorption characteristics of gray desert soil under long-term fertilization

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中文摘要:

通过等温吸附与解吸试验,研究了长期施肥条件下不同水平的灰漠土耕层0~20 cm土壤磷素吸附与解吸特征。结果表明,在实验浓度范围内,不同Olsen-P水平的灰漠土土壤,随外源磷量的增加,磷的吸附量、解吸量及解吸率均逐渐增大,吸附率逐渐减小。土壤Olsen-P含量水平与土壤磷素吸附饱和度(DPS)的大小呈正相关关系。处理间比较,土壤最大吸附量(Xm)值为CK>NPK≈NPKM>PK≈NPKS,且处理间达到极显著差异水平;NPK处理的吸附常数(K)值与土壤最大缓冲容量(MBC)值均极显著地大于CK、PK、NPKM和NPKS处理。该4个处理间比较:K值无显著差异,MBC值CK极显著大于PK和NPKS处理、CK与NPKM、PK与NPKS处理间差异不显著。化肥配施有机肥或秸秆的处理土壤易解吸磷(RDP)值极显著大于单施化肥的处理,释磷效果以化肥有机肥配施为最优。

Abstract:

Phosphorus sorption and desorption characteristics of gray desert soil (0~20 cm) under long-term fertilization as affected by phosphorus content level were studied through an isothermal P adsorption and desorption experiment. Results show that within the range of P concentrations set for the experiment, in all the gray desert soil samples, regardless of Olsen-P level, P adsorption, P desorption and P desorption rate gradually increased and P adsorption rate gradually decreased, with the increasing amount of extraneous phosphorus added. A positive correlation was observed between Olsen-P content and phosphorus sorption saturation (Xm) in the soil. In terms of soil maximum adsorption capacity (Xm), the treatments of the experiment followed a decreasing order of CK NPK ≈ NPKM > PK ≈ NPKS, and the differences between the treatments were extremely significant; Treatment NPK was much higher than CK and Treatments PK, NPKM and NPKS in adsorption constant (K) and maximum buffer capacity (MBC). And the comparison between last four treatments showed no significant difference in K value, and CK was extremely higher than Treatments PK and NPKS; MBC value, but the difference between CK and Treatment NPKM, and between Treatments PK and NPKS was not significant. Treatment NPKM and NPKS were significantly higher than Treatments NK and NPK in RDP, and Treatment NPKM was the highest in P desorption