

李荣华,张广杰,秦睿,李晓龙,肖然,沈锋,张增强.添加钝化剂对猪粪好氧堆肥过程中理化特性的影响[J].环境科学学报,2012,32(10):2591-2599

添加钝化剂对猪粪好氧堆肥过程中理化特性的影响

Influence of heavy metal passive agents on the compost physicochemical properties during the swine manure composting

关键词: [猪粪](#) [好氧堆肥](#) [钝化剂](#) [理化特征](#)

基金项目: [陕西省攻关项目资助\(No.2010K01-01\)](#)

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摘要: 以猪粪和玉米秸秆粉为堆肥原料,通过添加不同用量的重金属钝化剂(粉煤灰、风化煤或膨润土)进行90d的好氧堆肥,研究钝化剂的种类和添加比例对堆肥理化特性的影响.结果表明:所有处理的堆体温度均能迅速升至近70℃,并维持在55℃以上超过一周;随着堆肥时间的延长,各处理堆体含水量逐渐降低,并在90d后达到30%左右,但添加膨润土能减少一次发酵期水分的损失;添加风化煤会导致堆体pH呈现较强的碱性,而添加膨润土会显著提高堆体EC值;随着堆制时间的延长,堆体Cu、Zn含量逐渐增加,但DTPA提取态Cu、Zn所占的比例则逐渐减小;对照处理和添加风化煤的各处理中,雪里蕻种子的发芽率最终均达到90%以上,GI约1.0左右;而在添加膨润土和粉煤灰的各处理中,到90d堆肥结束,发芽率最高仅达80%,仅有2.5%和5.0%添加比例(质量分数,下同)的处理中GI大于0.5,且GI的增加趋势随着膨润土和粉煤灰的添加比例增加而降低.研究表明,钝化剂的添加比例和种类对猪粪好氧堆肥中堆体温度和含水率变化无显著影响;虽然堆肥过程添加重金属钝化对堆肥重金属Cu、Zn有良好的钝化作用,但对堆体的pH和EC影响较为剧烈,对雪里蕻种子的根系生长也有一定的影响.在堆肥中应合理选择钝化剂的种类和添加比例.

Abstract: In order to study the effects of passive agents and the adding proportion on the change of compost physicochemical properties during the aerobic composting process, swine manure and corn stalk powder were selected as the raw materials and mixed with different amounts of fly ash, discarded weathered coal or bentonite for 90 days of aerobic composting. The results showed that the pile temperature of all the treatments could rise to nearly 70℃ quickly and maintained above 55℃ for more than a week. The moisture content gradually reduced with the composting time extension and was around 30% after 90 days composting for all the treatments. Adding fly ash would present a strong alkaline composting environment, while adding bentonite could significantly increase the compost water soluble salinities and the increase was significantly correlated with the amount of bentonite. The total Cu and Zn concentration in compost piles were elevated during the composting process, while the percentages of DTPA-extractable Zn and Cu in compost piles decreased. The *Potherb mustard* seeds germination rate reached 90% after 90 days composting in the control and weathered coal adding treatment, and the germination index were above 1.0. While for the bentonite and fly ash-adding treatments, after 90 days of composting the germination index were lower than 0.5 except 2.5% and 5.0% treatments. The results implicated that adding passive agents had no notable effect on compost temperature and moisture content. pH, EC and *Potherb mustard* roots growth were strongly influenced by the variety and adding proportion of the passive agents, although Cu and Zn could be stabilized by adding the passive agents during the composting. The passive agent selection and dosage control should be considered in the pig manure aerobic composting process.

Key words: [swine manure](#) [aerobic compost](#) [passive agents](#) [physicochemical properties](#)

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