

## 猪粪、木屑混合物蚯蚓堆制处理中蚓体Cu、Zn富集的影响因素

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## Factors Affecting Cu and Zn Accumulation in Earthworms in Vermicomposting Pig Dung and Sawdust Mixture

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摘要

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摘要 采用室内接种法,以赤子爱胜蚓(*Eisenia fetida*)构建生物反应器,研究猪粪、木屑混合物的蚯蚓堆制处理中,蚓体的生长状况及影响其Cu、Zn富集的主要因素。结果表明,接种密度为 $40 \text{ mg} \cdot \text{g}^{-1}$ 、湿度为75%同时有利于蚯蚓生长和基质消耗;温度为 $15^\circ\text{C}$ 对蚓体质量增加最有利,而温度为 $20^\circ\text{C}$ 最利于基质消耗; $m$ (猪粪): $m$ (木屑)为6:4可同时利于蚓体质量增加和基质消耗。适宜的接种密度( $48 \text{ mg} \cdot \text{g}^{-1}$ )、湿度(70%)、温度( $15^\circ\text{C}$ )及较高比例的碳源辅料[ $m$ (猪粪): $m$ (木屑)为6:4]有利于蚓体对Cu的吸收和富集;低接种密度和高比例碳源辅料有利于蚓体对Zn的吸收,湿度和温度对蚓体Zn含量无显著影响,但蚓体Zn富集量分别在接种密度 $48 \text{ mg} \cdot \text{g}^{-1}$ 、 $m$ (猪粪): $m$ (木屑)为6:4、湿度75%和温度 $15^\circ\text{C}$ 条件下达最大。

关键词: 猪粪 蚯蚓堆制 Cu Zn 富集

Abstract: Vermireactors were set up containing pig dung and sawdust mixture inoculated with *Eisenia fetida* indoors to investigate factors affecting growth of and Cu or Zn accumulation in earthworms during the course of vermicomposting. Results demonstrate that earthworm growth and substrate consumption were both boosted when the inoculation density and humidity was set at  $40 \text{ mg} \cdot \text{g}^{-1}$  and 75%, respectively; the optimal temperature for earthworm growth was  $15^\circ\text{C}$ , and for matrix consumption,  $20^\circ\text{C}$ ; pig dung/sawdust ratio of 6:4 was conducive to both earthworm growth and substrate consumption. Cu uptake and accumulation by earthworms were facilitated in the context of appropriate inoculation density ( $48 \text{ mg} \cdot \text{g}^{-1}$ ), humidity (70%), temperature ( $15^\circ\text{C}$ ) and a higher proportion of carbon source materials in the mixture (pig dung/sawdust ratio, 6:4). Lower inoculation density and a higher proportion of carbon source materials were advantageous to earthworm Zn uptake, whereas humidity and temperature exerted little effects on earthworm Zn concentration. Earthworm Zn accumulation was the highest in the treatment with  $48 \text{ mg} \cdot \text{g}^{-1}$  in inoculation density, 6:4 in pig dung/sawdust ratio, 70% in humidity and  $15^\circ\text{C}$  in temperature.

Keywords: pig dung vermicomposting Cu Zn accumulation

Received 2011-10-16; published 2012-01-25

Fund:

浙江省自然科学基金(Y306160); 杭州师范大学中青年培育基金(2010QN17); 杭州师范大学国家级一般项目培育基金(2010PYjj18); 杭州市属高校重点实验室科技创新项目(20090233T14)

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引用本文:

胡安, 梅凌斐, 张志, 单监利, 贾秀英, 朱维琴. 猪粪、木屑混合物蚯蚓堆制处理中蚓体Cu、Zn富集的影响因素[J]. 生态与农村环境学报, 2012, V28(1): 77-81

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