

2018年12月19日 星期三

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动物营养学报 2012, Vol. 24 Issue (2) :285-290 DOI: 10.3969/j.issn.1006-267x.2012.02.014

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## 纳米氧化锌对断奶仔猪生长性能和肠黏膜屏障的影响

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### Effect of Nano Zinc Oxide on Growth Performance and Intestinal Mucosal Barrier in Weaner Piglets

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摘要

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**摘要** 本文旨在研究纳米氧化锌对断奶仔猪生长性能和肠黏膜屏障的影响及其机理。选用96头平均体重为(5.7±0.2) kg的21日龄“杜×长×大”断奶仔猪,随机分成3组:1)对照组,饲喂基础饲料;2)氧化锌组,饲喂在基础饲料中添加3 000 mg/kg锌(氧化锌)的试验饲料;3)纳米氧化锌组,饲喂在基础饲料中添加300 mg/kg锌(纳米氧化锌)的试验饲料。每组4个重复,每个重复8头仔猪,试验期14 d。结果表明:1)与对照组相比,纳米氧化锌组断奶仔猪平均日增重提高了7.26%( $P<0.05$ ),腹泻率降低了70.82%( $P<0.05$ ),但与氧化锌组差异不显著( $P>0.05$ )。2)与对照组相比,纳米氧化锌组28和35日龄绒毛高度分别提高了12.64%和10.80%( $P<0.05$ );28日龄隐窝深度降低了15.42%( $P<0.05$ );28和35日龄绒毛高度/隐窝深度分别提高了33.61%和17.11%( $P<0.05$ );28和35日龄血浆D-乳酸含量分别降低了28.97%和20.23%( $P<0.05$ ),二胺氧化酶活性分别降低了28.61%和24.92%( $P<0.05$ )。氧化锌组和纳米氧化锌组之间各指标差异不显著( $P>0.05$ )。结果提示,断奶仔猪饲料中添加300 mg/kg锌(纳米氧化锌)可提高平均日增重,降低腹泻率,改善肠黏膜形态,降低肠黏膜通透性,其效果与添加3 000 mg/kg锌(氧化锌)相当。

**关键词:** 纳米氧化锌 断奶仔猪 腹泻率 肠黏膜屏障

**Abstract:** This experiment was conducted to study the effects of nano zinc oxide on growth performance and intestinal mucosal barrier in weaner piglets. Ninety-six 'Duroc × Landrace × Yorkshire' crossbred piglets with an average body weight of (5.7±0.2) kg were weaned at 21 days of age and randomly allocated into control group, zinc oxide group and nano zinc oxide group (4 replicates in each group and 8 piglets per replicate). A basal diet was the diet of control group, a basal diet supplemented with 3 000 mg/kg zinc as zinc oxide was the diet of zinc oxide group, and a basal diet supplemented with 300 mg/kg zinc as nano zinc oxide was the diet of nano zinc oxide group, respectively. Feeding trial lasted for 14 days. The results showed that the diet of nano zinc oxide group improved average daily gain ( $P<0.05$ ) and decreased diarrhea rate of piglets ( $P<0.05$ ) compared with the diet of control group. There was no significant difference in growth performance and diarrhea rate between the piglets of nano zinc oxide group and the piglets of zinc oxide group ( $P>0.05$ ). The piglets of nano zinc oxide group had higher villus height and villus height/crypt depth ( $P<0.05$ ), lower plasma D-lactate content and diamine oxidase activity ( $P<0.05$ ) compared with the piglets of control group. No significant difference in intestinal mucosal barrier was found between the piglets of nano zinc oxide group and the piglets of zinc oxide group ( $P>0.05$ ). The results indicate that the diet supplemented with 300 mg/kg zinc as nano zinc oxide can protect intestinal mucosal barrier, decrease diarrhea rate and improve growth performance, which is comparable to the effect of the diet supplemented with 3 000 mg/kg zinc as zinc oxide.

**Keywords:** nano zinc oxide, weaner piglets, diarrhea rate, intestinal mucosal barrier**收稿日期:** 2011-10-19;**基金资助:**

国家自然科学基金(31072039);浙江省自然科学基金(Y3100072)

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. 纳米氧化锌对断奶仔猪生长性能和肠黏膜屏障的影响[J]. 动物营养学报, 2012, V24(2): 285-290

. Effects of Nano Zinc Oxide on Growth Performance and Intestinal Mucosal Barrier in Weaner Piglets[J]. Chinese Journal of Animal Nutrition, 2012, V24(2): 285-290.

**链接本文:**[http://211.154.163.124/Jweb\\_dwyy/CN/10.3969/j.issn.1006-267x.2012.02.014](http://211.154.163.124/Jweb_dwyy/CN/10.3969/j.issn.1006-267x.2012.02.014) 或[http://211.154.163.124/Jweb\\_dwyy/CN/Y2012/V24/12/285](http://211.154.163.124/Jweb_dwyy/CN/Y2012/V24/12/285)

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