

饲料发酵对仔猪生长性能的影响

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摘 要

试验旨在研究发酵饲料对仔猪生长性能的影响。选取平均体重为 6.67 ± 0.18 kg的28日龄健康鲁南白猪仔猪64头, 随机分为2组, 每组32头, 每组4个重复。对照组饲喂玉米-豆粕型饲料, 试验组发酵处理的玉米-豆粕型饲料。结果表明: 植物乳杆菌发酵饲料可显著提高仔猪的生长性能, 日增重提高12.20% ($P < 0.05$), 腹泻率显著降低54.15% ($P < 0.05$)。由此可见, 仔猪饲料益生菌发酵处理有助于提高其生长性能。

关键词

猪, 发酵饲料, 生长性能

Effect of Feed Fermentation on the Growth Performance of Piglets

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Abstract

This experiment aims to investigate the effect of fermented feed on the growth performance of piglets. 64 healthy Lunan white pig piglets (28-day-old) with an average weight of 6.67 ± 0.18 kg were selected and randomly divided into 2 groups, with 32 piglets in each group and 4 replicates in each

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group. The control group was fed with corn soybean meal feed, while the experimental group was fed with fermented corn soybean meal feed. The results showed that: The fermented feed can significantly improve the growth performance of piglets, with a 12.20% increase in daily weight gain ($P < 0.05$) and a significant decrease in diarrhea rate by 54.15% ($P < 0.05$). It can be seen that the fermentation treatment of probiotics in piglet feed helps to improve its growth performance.

Keywords

Piglets, Feed Fermentation, Growth Performance

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1. 引言

仔猪早期断奶是集约化养殖的关键技术[1], 由于综合应激, 容易导致仔猪肠道微生态失衡和肠道发育性受损, 从而导致仔猪采食量低、腹泻发病率高, 严重影响仔猪生长性能[2]。在过去的几十年里, 饲料中添加抗生素以缓解应激和治疗仔猪腹泻[2][3]。抗生素滥用导致产生耐药性和抗生素残留[4]。因此, 全球范围内禁止在畜牧业中滥用抗生素[5]。益生菌是畜牧业中最常见的抗生素替代品之一, 在维持肠道屏障的完整性、抑制致病菌的生长、减少仔猪腹泻和提高生长性能方面发挥着积极作用[6][7]。

发酵饲料是根据动物营养需求将水与饲料原料或全价料以恒定的比例混合后, 经益生菌接种进行液体发酵后所制成的新型饲料[8][9]。有研究数据统计, 在荷兰和法国, 大约 30% 的生长肥育猪饲喂液体饲料[9]。Canibe 等[10]研究发现, 饲喂发酵饲料对生长育肥猪的生长性能有改善作用。因此, 本研究旨在评估植物乳杆菌等益生菌发酵饲料对断奶仔猪生长性能和腹泻率的影响。

2. 材料与方法

2.1. 试验材料

试验所用发酵饲料产品为玉米-豆粕型基础饲料, 经过植物乳杆菌等乳酸菌多级发酵而成, 活菌数 1.0×10^{10} CFU/g, 料水比 1:0.5, 发酵时间 12 h。

1.2 试验猪的选择与饲养

试验在枣庄黑盖猪养殖有限公司进行。选择出生日期相近, 体重为 6.67 ± 0.18 kg 的 28 日龄健康鲁南白猪仔猪 64 头, 随机分为 2 组, 每组 32 头, 每组 4 个重复, 每个重复一个圈舍。对照组饲喂玉米-豆粕型饲料, 试验组发酵处理的玉米-豆粕型饲料。试验期为 42 d, 试验期间自由采食、饮水, 按照猪场常规管理规程和正常免疫程序进行。试验期间以试验重复为单位记录给料量、剩余料和损耗料。对照组与试验组饲料组成及营养成分见表 1。

2.2. 生长性能指标

试验开始试验结束时于晨饲前逐头称重。根据记录的给料量、剩余料和损耗料, 根据试验猪个体重计算平均日增重(ADG)和料重比(F/G)。

2.3. 腹泻率

试验期间, 每天认真观察并记录每组每头仔猪的健康状况, 观察粪便形状及腹泻程度, 计算腹泻率。

参照 Wen 等[11]对每份仔猪粪便进行粪便评分：1 分为正常；2 分为糊状；3 分为半液体；4 分为液体，其中≥3 分记为腹泻。腹泻率计算公式如下：

腹泻率 = [腹泻猪头次总数 / (试验猪头总数 × 试验天数)] × 100

Table 1. Composition and nutrient levels of the basal feed (air-dry basis) (%)
表 1. 基础饲料组成及营养水平(风干基础) (%)

原料组成	含量	营养水平	含量
玉米	49.00	代谢能(MJ/kg) ¹⁾	12.82
膨化玉米	11.00	粗蛋白质	18.01
豆粕	23.00	钙	0.68
麸皮	5.00	有效磷	0.30
膨化豆粕	7.00	赖氨酸	0.96
预混料 ¹⁾	5.0		
合计	100		

1) 代谢能为计算值，其余营养水平为实测值。

2.4. 数据统计分析

用 SPSS 22.0 软件进行数据统计分析，使用 one-way ANOVA 进行多重比较。P < 0.05 为差异显著，P < 0.01 为差异极显著，结果均以“平均值 ± 标准差”表示。

3. 结果分析

由表 2 可见，对照组和饲料发酵组试验猪初始体重相近，无差异(P > 0.05)，试验结束时饲料发酵组试验猪的体重显著高于对照组，提高了 8.52% (P < 0.05)。饲料发酵组仔猪日增重显著高于对照组，提高 12.20% (P < 0.05)。与对照组相比，饲料发酵组仔猪的料重比和腹泻率显著降低，分别降低 7.8%、54.15% (P < 0.05)。饲料发酵组仔猪日采食量比对照组增加 3.44%，差异不显著(P > 0.05)。

Table 2. Effects of fermented feed on growth performance of weaned pigs
表 2. 饲料发酵对仔猪生长性能的影响

项目	对照组	饲料发酵组	P 值
样本数	32	32	
初始体重/kg	6.63 ± 0.18	6.71 ± 0.19	0.838
结束体重/kg	19.83 ± 0.48 ^a	21.52 ± 0.59 ^b	0.046
平均日采食量/kg	443.14 ± 10.01	458.40 ± 10.42	0.052
日增重/g	314.29 ± 9.14 ^a	352.62 ± 10.41 ^b	0.035
料重比	1.41 ± 0.03 ^a	1.30 ± 0.02 ^b	0.048
腹泻率/%	4.82 ± 0.71 ^a	2.21 ± 0.52 ^b	0.012

注：同行数据肩标小写字母不同者，表示差异显著(P < 0.05)，同行数据肩标大写字母不同者，表示差异极显著(P < 0.01)。

4. 讨论

仔猪 28 日龄断奶时由于肠道发育、免疫功能等不健全,再加上母仔猪分离、饲粮组成、饲养环境变化等因素的影响,易引起仔猪腹泻、生长发育受阻[12]-[14]。27 日龄断奶仔猪饲喂发酵饲粮后,胃肠激素分泌得到改善,仔猪日增重显著提高 8.42% ($P < 0.05$),采食量显著提高 9.09% ($P < 0.05$) [15]。植物乳杆菌和乳酸片球菌联合发酵饲料猪的日增重显著提高 6.24% [16]。饲粮中添加芽孢杆菌和酵母水解产物改善肠道屏障功能,提高断奶仔猪的日增重[17]。植物乳杆菌和枯草芽孢杆菌的联合应用显著提高紧密连接蛋白和宿主防御肽的 mRNA 表达以及肠道 sIgA 含量,并减少了促炎细胞因子的分泌,从而显著提高仔猪生长性能,日增重显著提高 9.38%,腹泻率降低[18]。本试验研究结果与前人研究结果一致,饲喂植物乳杆菌发酵饲粮后,仔猪的结束体重、日增重显著增加,腹泻率显著降低。这可能是由于发酵饲料中含有益生菌及其代谢产物,能够改善肠道健康,从而提高断奶仔猪的生长性能。

5. 结论

饲喂植物乳杆菌发酵饲粮可显著提高保育期仔猪日增重,降低腹泻率,提升仔猪健康水平。

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