



2022年第23期总346期

动物营养专题

本期导读

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学术文献

1. **Glycerol butyrate attenuates enterotoxigenic Escherichia coli-induced intestinal inflammation in piglets by inhibiting the NF- κ B/MAPK pathways and modulating the gut microbiota (丁酸甘油酯通过抑制NF - κ B / MAPK通路, 调节肠道菌群, 减轻肠毒素诱导的仔猪肠道炎症)**

简介: The aims of this study were to evaluate whether a diet supplemented with glycerol butyrate could attenuate the immune-inflammatory response in piglets challenged with enterotoxigenic Escherichia coli (ETEC), and to explore the mechanisms of its regulation. Eighteen weaning piglets were assigned to three diets: basal diet (CON), antibiotics diet (ATB), and 0.5% glycerol butyrate diet (GB group). Significantly lower concentrations of IL-1 β , IL-6 and TNF- α in the jejunum and IL-6 in the ileum were observed in the GB group than that in the CON group ($P < 0.05$). Moreover, a decreasing trend of IL-1 β ($P = 0.075$) and TNF- α ($P = 0.070$) was observed in the ileum in the GB group. Correspondingly, the GB group had significantly increased mRNA expression of porcine beta defensins (pBDs) in the jejunum (pBD1, pBD2, pBD114 and pBD129) and ileum (pBD2, pBD3, pBD114 and pBD129) ($P < 0.05$), and protein abundance of Claudin 1, Occludin, and ZO-1 in the jejunum and ileum ($P < 0.05$). Further research results showed that the improvement of beta defensins and tight junctions in the GB group was related to the decreased phosphorylation of the NF κ B/MAPK pathway. In addition, the results of 16S rDNA sequencing showed that glycerol butyrate supplementation altered the ileal microbiota composition of piglets, increasing the relative abundance of Lactobacillus reuteri, Lactobacillus salivarius, and Lactobacillus agilis. In summary, glycerol butyrate attenuated the immune-inflammatory response in piglets challenged with ETEC by inhibiting the NF- κ B/MAPK pathways and modulating the gut microbiota, and thus improved piglet intestinal health.

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<http://agri.ckcest.cn/file1/M00/10/04/Csgk0GKTOz6AFd9UADpneZnfyW4315.pdf>

2. **Effects of nonanoic acid on performance and hematological and biochemical parameters for weaned piglets (壬酸对断奶仔猪生产性能和血液生化指标的影响)**

简介: Nonanoic acid (NA) is one of a group of straight-chain aliphatic aldehydes, acids and their derivatives with a long and established history of use as flavors in human food and animal feed. The use of this group of flavors in feed was evaluated by the European Food Safety Authority (EFSA) in 2013 and in the absence of data in the target species, maximum safe levels were derived from available toxicology studies of 12 mg for piglets, and 20 mg for grower/finisher pigs and sows per kg complete feed containing 120 g/kg moisture. These established safe levels limit the practical use of NA as a flavoring in swine diets and the

objective of this study was to evaluate the tolerance to piglets of NA at significantly higher dietary levels that are relevant to commercial feeding practices. Three hundred eighty four (192 males, 192 females), cross bred [Tempo x (Large White x Landrace)] post-weaned piglets with an initial body weight (BW) of between 6.5 and 8.5 kg and age of 26 days were used in a 42-day tolerance study. Piglets were randomly assigned to one of 64 pens containing either 6 males or 6 females. One of 4 dietary treatments were fed to the piglets containing NA at 0, 100, 300 or 1000 mg/kg complete feed. General health and performance were monitored for the duration of the study. At day 42, blood samples were taken and piglets were sacrificed and necropsied for pathological examination of the digestive tract. NA supplementation had no effect ($P > 0.05$) on the daily feed intake (DFI), average daily gain (ADG), feed conversion ratio (FCR) or fecal consistency over the 42-day period. No treatment related effects ($P > 0.05$) on hematology or blood biochemistry parameters were reported and all values fell within normal ranges. There were no treatment-related findings from macroscopic and microscopic examination of digestive tissues. The results of the study support the tolerance to piglets of NA in feed treated with 1000 mg/kg complete feed of which 720 mg/kg was recovered, which is considerably higher than anticipated practical conditions of use as a feed flavoring.

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3. 非洲猪瘟病毒无标签p30-ELISA抗体检测方法的建立及应用

简介: 非洲猪瘟 (African swine fever, ASF) 是由非洲猪瘟病毒 (African swine fever virus, ASFV) 引起猪的一种急性、热性、出血性、高度接触性传染病, 临床症状以败血症、皮炎和关节炎为特征, 高发病率和死亡率。为建立临床检测ASFV抗体的间接ELISA检测方法, 本研究扩增了ASFV-CP204L基因, 通过pET-30a原核表达系统表达p30蛋白, 使用Ni-NTA纯化表达产物, 通过肠激酶切除外源性蛋白, 得到无His-组氨酸标签的p30蛋白, 以此为诊断抗原, 建立间接ELISA方法。结果显示: 表达的无标签p30重组蛋白大小约为30 ku, 与ASF阳性猪血清具有较好的反应原性; 确定ELISA抗原包被浓度为 $1 \mu\text{g} \cdot \text{mL}^{-1}$, 根据ROC曲线下面积确定S/P值 >0.398 判定为阳性, 批内、批间变异系数均 $<10\%$; 与PCV2、CSFV、PRV-gE、PRRSV阳性血清无交叉反应与INGENASA商品化试剂盒总符合率为97.78%。用该方法分别检测标准阳性血清、动物感染试验血清和收集的区域性临床血清644份, 该方法最低可检测到1:512倍稀释的标准阳性血清样品; 检测感染动物血清, 其中80% (4/5) 的试验动物在第10天抗体为阳性。644份临床猪血清样品中抗体阳性率为7.61%, 其中, 母猪、后备母猪、仔猪、保育猪和育肥猪抗体阳性率分别为3.03%、0%、4.94%、7.55%和28.7%。本试验建立的ASFV-p30间接ELISA方法具有良好的特异性、灵敏度和重复性, 可应用于ASFV的抗体检测, 为ASF的诊断和流行病学调查提供了技术手段。

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4. 厚朴酚对断奶仔猪营养物质表观消化率、血清生化指标、粪便主要微生物数量及其代谢产物含量的影响

简介: 本试验旨在探究饲料中添加不同水平厚朴酚对断奶仔猪营养物质表观消化率、血清生化指标、粪便主要微生物数量及其代谢产物含量的影响。试验选取体重 $[(7.91 \pm 0.00) \text{ kg}]$ 相近且健康的21日龄“杜×长×大”三元杂交断奶仔猪144头,按体重接近原则随机分为3组,每组8个重复,每个重复6头猪。对照组饲喂基础饲料,试验组分别在基础饲料中添加0.02%和0.04%厚朴酚。试验期42 d,其中预试期7 d,正试期35 d。结果显示:1)与对照组相比,饲料中添加0.04%厚朴酚显著提高了粗蛋白质表观消化率($P < 0.05$)。2)与对照组相比,饲料中添加0.04%厚朴酚显著降低了血清尿素、肌酐和甘油三酯含量($P < 0.05$),饲料中添加0.02%厚朴酚显著提高了血清葡萄糖含量($P < 0.05$)。3)与对照组相比,饲料中添加0.04%厚朴酚显著提高了粪便中乳杆菌属(*Lactobacillus*)、双歧杆菌属(*Bifidobacterium*)和瘤胃球菌属(*Ruminococcus*)数量($P < 0.05$),显著降低了大肠杆菌(*Escherichia coli*)数量($P < 0.05$);饲料中添加0.02%厚朴酚显著提高了粪便中*Lactobacillus*数量($P < 0.05$),显著降低了拟杆菌门(*Bacteroidetes*)数量($P < 0.05$)。4)与对照组相比,饲料中添加0.04%厚朴酚显著降低了粪便pH($P < 0.05$),显著提高了粪便中乙酸和总短链脂肪酸含量($P < 0.05$);饲料中添加0.02%厚朴酚显著提高了粪便中乙酸、丙酸和总短链脂肪酸含量($P < 0.05$)。5)与对照组相比,饲料中添加0.04%厚朴酚显著降低了粪便中苯酚、对甲酚、粪臭素、腐胺、尸胺和总生物胺含量($P < 0.05$),饲料中添加0.02%厚朴酚显著降低了粪便中对甲酚、粪臭素、尸胺和总生物胺含量($P < 0.05$)。综上所述,饲料中添加0.04%厚朴酚可提高断奶仔猪粗蛋白质表观消化率,调节机体代谢,同时调控微生物菌群结构,使后肠微生物偏向碳水化合物发酵模式。这提示饲料中添加0.04%厚朴酚有利于促进宿主生长,并对仔猪的肠道健康发挥潜在的积极作用。

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5. 氧化应激对断奶仔猪能量代谢和氨基酸表观消化率的影响

简介: 选取12头、21日龄、平均体质量为 $(8.10 \pm 0.89) \text{ kg}$ 的健康二元杂(杜×长)断奶仔猪,于回肠末端实施“T”形瘘管手术,随机平均分为2组,处理组和对照组均饲喂基础饲料,但处理组在基础日粮中根据每周体质量,每天拌入10g/kg剂量的D半乳糖,建立D半乳糖诱导断奶仔猪慢性氧化应激模型,探讨氧化应激对断奶仔猪血清生理生化指标、能量代谢和回肠末端氨基酸表观消化率的影响,试验期为28d。结果表明: D半乳糖处理显著降低了断奶仔猪血清中总抗氧化能力、过氧化氢酶和总氧化物歧化酶的活性,显著提高了丙二醛的浓度;氧化应激显著降低了断奶仔猪血清尿素氮水平,而其他所测血清生化指标在两组间的差异均无统计学意义;氧化应激显著提高了断奶仔猪的氧气消耗量、二氧化碳产生量、产热量、呼吸熵和粪能;氧化应激显著或极显著降低了回肠末端必需氨基酸中的赖氨酸、蛋氨酸、苏氨酸、亮氨酸和异亮氨酸的表观消化率,同时也显著或极显著降低除脯氨酸和甘氨酸外的其他非必需氨基酸的表观消化率。使用10g/kg剂量的D半乳糖建立断奶仔猪慢性氧化应激模型,断奶仔猪产生慢性氧化应

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激，不但降低了仔猪机体抗氧化酶系统活性和提高了氧化物水平，同时还抑制了仔猪能量代谢和回肠末端氨基酸消化水平，对断奶仔猪的生产产生不利影响。

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