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## ▶ 前沿资讯

### 1. 猪遗传育种创新团队解析了中国香猪肉的代谢组特征

**简介:** 近日,中国农业科学院北京畜牧兽医研究所猪遗传育种创新团队开展了中国香猪肉优质风味的代谢组解析,揭示了中国香猪肉的代谢组特征,为优质猪肉的遗传机理研究和育种提供了新依据。相关研究结果发表于《国际食品研究(Food Research International)》期刊。据张龙超研究员介绍,剑河白香猪是我国香猪品种之一,其肉质风味极佳,肌肉脂肪含量高达7%,肉色鲜红。但关于我国地方香猪品种优良肉质性状形成的机制研究较为缺乏。该研究选取了剑河白香猪为研究对象,以纯种大白猪为对照,利用液相色谱-质谱联用(LC-MS)技术获取了脂类代谢物和亲水代谢物特征指纹图谱。分析发现,剑河白香猪中与优质风味密切相关的甘油三酯、单不饱和脂肪酸和糖类物质含量更高,有益的高不饱和度磷脂显著高于大白猪。研究筛选了100个脂质分子和118个亲水代谢物作为优质猪肉的生物标记物。本研究加深了我们对中国香猪肉品质的认识,为探讨影响猪肉品质和风味的因素提供了参考。该研究由国家重点研发计划、国家生猪产业技术体系和中国农科院科技创新工程等项目支持。硕士研究生张润、杨曼和助理研究员侯欣华为文章共同第一作者,王立贤研究员和张龙超研究员为通讯作者。

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## ▶ 学术文献

### 1. 不同纤维原料对断奶仔猪生长性能和血清生化指标的影响

**简介:** 为研究不同纤维原料对断奶仔猪生长性能、血清生化指标和经济效益的影响,试验选取72头体重相近、健康的断奶仔猪随机分为三组,对照组(CON组)饲喂基础饲料,试验I组、II组分别饲喂基础饲料+1%YWS(可溶性膳食纤维为主原料)、1%饲用竹粉(不可溶性膳食纤维为主原料),试验期为14 d。结果发现:试验I组和试验II组断奶仔猪平均日增重分别比对照组提高21.43%、12.99%,料肉比分别降低16.77%、10.56%,但均未达到显著水平( $P>0.05$ ),增重经济效益分别比对照组提高6.21、3.87元/头。试验I组和试验II组断奶仔猪血清总胆固醇含量分别比对照组提高67.2%( $P>0.05$ )、87.6%( $P<0.05$ );血清尿素氮分别比对照组降低25.24%、17.31%,但未达到显著水平( $P>0.05$ )。上述结果表明,断奶仔猪饲料中添加1%YWS或饲用竹粉可能通过促进脂类和蛋白质代谢对生长性能和经济效益发挥一定改善作用。

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### 2. Early weaning leads to the remodeling of lipid profile in piglet jejunal crypt cells during post-weaning days (早期断奶导致断奶后仔

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### 猪空肠隐窝细胞脂质结构的重塑)

简介: Reportedly, proteins involved in lipid metabolism change significantly in the jejunal crypt cells of early-weaned piglets, but the exact lipid profile change remains uncertain. In the present study, 32 piglets weaned at 21 d of age were randomly divided into 4 groups with 8 replicates. The jejunal crypt cells of a group of piglets on the post-weaning day (PWD) 1, 3, 7, and 14 were isolated per time point. Crypt cell lipid profiles were analyzed using ultra-high-performance liquid chromatography coupled with hybrid quadrupole time-of-flight mass spectrometry. This study showed that piglets suffered the greatest weaning stress on PWD 3 in terms of the lowest relative weight of the small intestine, the highest relative weight of the spleen, and the highest levels of malondialdehyde, cholesterol, and low-density lipoprotein cholesterol. The lipid profile of jejunal crypt cells including carnitine, sulfatide, sphingomyelin, hexosylceramide, and ceramide greatly changed after weaning, especially between PWD 3 and 14 ( $P < 0.05$ ). The differential lipid species between these 2 d were mainly involved in the glycerophospholipid metabolism pathway. In addition, potential lipid biomarkers for weaning stress in crypt cells such as phosphatidylcholine (PC) (9:0/26:1), PC (17:0/18:2), carnitine (24:0), carnitine (22:0), sphingomyelin (d14:1/22:0), PC (P-18:0/18:4), phosphatidylethanolamine (P-16:0/20:4), phosphatidylinositol (15:1/24:4), and dihexosylceramide (d14:1/26:1) were identified. The changes in lipid profile might be related to the inflammation caused by early weaning. These findings might provide new therapeutical targets for intestinal dysfunctions caused by weaning stress.

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### 3 . Wickerhamomyces anomalus relieves weaning diarrhea via improving gut microbiota and redox homeostasis using a piglet model (利用仔猪模型, 异常Wickerhamomyces通过改善肠道微生物群和氧化还原稳态缓解断奶腹泻)

简介: Weaning stress commonly damages the intestinal barrier of mammals, resulting in gut microbiota dysbiosis, intestinal illness, and even severe diarrhea. Probiotics are used as a nutritional strategy to promote the health of humans and animals and the gut microbiota balance. Here *Wickerhamomyces anomalus* was applied as a probiotic supplement to a weaned piglet model to investigate its impacts on growth performance, antioxidant capacity, inflammation response, and intestinal health. Supplemental 1 g kg<sup>-1</sup> 108 cfu g<sup>-1</sup>W. anomalus 13611 significantly decreased the feed conversion ratio (FCR), alleviated diarrhea, improved the apparent total tract digestibility of neutral detergent fiber (NDF) and gross energy (GE), increased the concentration of total antioxidant capacity (T-AOC) and catalase (CAT) in serum, and decreased the concentration of malondialdehyde (MDA) and pro-inflammatory cytokines such as interleukin-1 $\beta$  (IL-1 $\beta$ ) in serum. Importantly, supplementation of W. anomalus 13611 also improved the gut microbiota, decreasing the relative abundance of Oxalobacteraceae, enriching the relative abundances of Lactobacillaceae and Lactobacillus, and increasing the

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relative abundances of two species of *Lactobacillus* (*helveticus* and *delbrueckii*). In conclusion, *W. anomalus* 13611 could effectively promote growth performance and alleviate diarrhea in a model of weaned piglets, which may be related to improved antioxidant activity, anti-inflammatory response, and alteration in the structure of the gut microbiota.

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#### 4. $\gamma$ -氨基丁酸对断奶仔猪抗氧化性能、养分代谢和免疫功能的影响

**简介:** 研究旨在探讨 $\gamma$ -氨基丁酸 ( $\gamma$ -aminobutyric acid, GABA) 对断奶仔猪抗氧化性能、养分代谢和免疫功能的影响。选取健康、体重相近的25日龄断奶杜×长×大仔猪60头,随机分成5组(对照组及20、40、60 mg/kg GABA组和80 mg/kg GABA组),每组3个重复,每个重复4头仔猪,预试期5 d,正试期28 d。于正试期第1、14天和第28天分别称量每头仔猪重量,试验结束当天清晨前腔静脉采集血液,离心分离血清备用。结果显示:与对照组相比,20、60 mg/kg GABA组血清尿素氮(BUN)显著降低( $P<0.05$ );40 mg/kg GABA组和80 mg/kg GABA组总胆固醇(TC)、三酰甘油(TG)及低密度脂蛋白(LDL)显著降低( $P<0.05$ );20 mg/kg GABA组肌酐(Cr)显著降低( $P<0.05$ );40 mg/kg GABA组和80 mg/kg GABA组血清免疫球蛋白A(IgA)和免疫球蛋白G(IgG)均显著升高( $P<0.05$ );60 mg/kg GABA组血清总蛋白(TP)、白蛋白(ALB)及溶菌酶(LYS)显著升高( $P<0.05$ );80 mg/kg GABA组血乳酸(LAC)显著降低( $P<0.05$ );60 mg/kg GABA组超氧化物歧化酶(SOD)、总抗氧化力(T-AOC)及过氧化氢酶(CAT)活性显著升高( $P<0.05$ ),但丙二醛(MDA)浓度显著降低( $P<0.05$ )。综上,添加60 mg/kg GABA能够改善断奶仔猪养分代谢,提高其免疫和抗氧化性能。

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