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动物营养专题

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前沿资讯

1．农业资源利用与区划团队系统剖析我国生猪生产粪污处理利用模式

简介：近日，中国农业科学院农业资源与农业区划研究所农业资源利用与区划团队根据实地调研，总结出五种生猪生产粪污处理典型模式，从模式特点和养殖户行为特征两方面深入分析其内在联系，揭示了生猪养殖粪污处理发展现状及未来趋势。相关研究成果以“Recognition on characteristics and applicability of typical modes for manure & sewage management in pig farming: A case study in Hebei, China”为题发表于国际顶级环境科学期刊《废物管理（Waste management）》。据尹昌斌研究员介绍，目前集约化规模养殖已经成为我国生猪养殖行业发展的主要趋势，在满足人民食品需求、促进经济发展的同时，也产生了大量粪便和污水，导致环境污染问题加剧。粪便和污水管理 （MSM） 对于减轻环境压力，实现粪污综合利用至关重要。然而，由于MSM方法的多样性和养殖户行为的异质性，政府推广与实际应用存在一定差距。探究现阶段主流MSM模式，剖析其模式特点，识别养殖户对相应模式选择的驱动因素具有现实意义。该研究基于河北省406份猪场实地调研样本数据，运用聚类分析，总结出五种典型模式，即传统简易处理模式（TSM）、混合处理模式（MPM）、半沼气处理模式（SBM）、专业处理单一利用模式（PPSUM）和专业处理综合利用模式（PPFUM）。运用多样本检验和多元逻辑回归，进一步区分了养殖户采用相应模式的异质性特征，结果表明，养殖结构、土地使用、农户特征及其主观意识影响其MSM行为。农户教育水平及其环保意识的提升，促进其采用技术密集型MSM模式。养殖规模的扩大对其采用机械化、多元化MSM措施具有积极影响。土地作为不易更改的客观因素限制了粪污处理后还田。结论明确了典型的MSM模式及其特征，为养猪场选择适宜的模式提供参考，进一步提高微观、宏观层面上粪污处理利用效率，为中国养猪业的绿色可持续性发展做出贡献。该研究得到国家社会科学基金重大项目资助，中比博士生师博扬为论文第一作者，尹昌斌研究员为通讯作者。据悉，《Waste management》为环境科学一区TOP期刊，最新影响因子为8.816，旨在为科学家提供各种与废弃物处理相关的独到评论性文章。

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http://agri.ckcest.cn/file1/M00/10/0F/CsgkOGMapnqAexO8AAxdSSlHGio834.pdf

学术文献

1．饲料原料玉米的猪营养价值评定研究进展

简介：玉米是猪饲料的主要原料之一，在饲料配比中可达70%。玉米的营养成分含量因品种、地域等不同差异很大，深入研究和评价玉米化学成分及营养价值，可更合理地利用饲用玉米、降低饲料生产成本。本文综述了玉米的营养成分、猪有效能以及氨基酸标准回肠末端消化率等研究进展，以期为玉米在猪饲料中高效应用提供参考。

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2．Comparative ileal digestibility of gross energy and amino acids in low and high tannin sorghum fed to growing pigs(低、高单宁高粱对生长猪总能和氨基酸回肠消化率的比较)

简介：Low tannin sorghum cultivars (LTS) have been previously proved to contain greater available energy and apparent total tract digestibility (ATTD) of gross energy (GE) and crude protein (CP) than high tannin sorghum cultivars (HTS); however, their comparative ileal digestibility of energy and nitrogen excluding microbial interference in pigs remains mostly unknown. This study was designed to compare apparent (AID) and standardized ileal digestibility (SID) of amino acids (AA) associated with the AID and hindgut disappearance (HGD) of GE and CP in 4 LTS and 4 HTS fed to growing pigs. Eighteen barrows (27.6 ± 3.5 kg) fitted with a distal ileum T-cannula were allotted to a replicated 9 × 3 Youden square design with 9 diets and 3 periods to give a total of 6 replicate pigs per diet. Each period lasted 10 days, with 5 days adaption to the diets followed by 3 days collection of faeces and then 2 days collection of ileal digesta. Eight sorghum diets contained 966 g/kg sorghum grain as the only source of dietary energy and nitrogen, and one nitrogen-free diet was used to determine basal ileal endogenous nitrogen loss. Mean AID, ATTD, and HGD of GE and CP were higher in LTS than in HTS ($P < 0.05$). Mean SID of 8 out of 15 AA were decreased in HTS ($P < 0.05$). The AID, ATTD, and HGD of GE or CP had a negative correlation with condensed tannins and total phenolics in sorghum grain ($P < 0.05$). The SID of essential AA, including lysine, threonine, valine, histidine, and arginine, were highly or moderately negatively correlated with condensed tannins and total phenolics content in sorghum grains ($P < 0.05$). Overall, HTS provided less ileal digestibility and hindgut disappearance of energy and nitrogen, implying that condensed tannins in sorghum grain may impede nutrient digestibility, not only in the foregut but also in the hindgut segements of pigs.

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http://agri.ckcest.cn/file1/M00/03/3D/CsgkOYdxXGKAK_evAAYOn3HoDds252.pdf

3．Effects of Dietary Protein Content and Crystalline Amino Acid Supplementation Patterns on Growth Performance, Intestinal Histomorphology, and Immune Response in Weaned Pigs Raised Under Different Sanitary Conditions.(饲粮蛋白质含量和晶体氨基酸添加模式对不同卫生条件下断奶仔猪生长性能、肠道组织形态和免疫应答的影响)

简介：The aim of this experiment was to investigate the effects of dietary crude protein (CP) contents and crystalline amino acids (CAA) supplementation patterns on growth performance, intestinal histomorphology, and immune response in weaned pigs under clean (CSC) or unclean sanitary conditions (USC). A total of 144 weaned pigs (6.35 ± 0.63 kg body

weight) were assigned to 6 treatments in a 3 × 2 factorial arrangement based on CP content and sanitary conditions using a randomized complete block design, giving 8 replicates per treatment with 3 pigs per pen. Pigs were fed 1 of 3 diets for 21 d: one high CP (HCP; 22%) and two low CP (LCP; 19%) diets supplemented with 9 indispensable AA or only 6 AA (Lys, Met, Thr, Trp, Val, and Ile) as CAA. The CSC room was washed weekly, whereas the USC room had sow manure spread in the pens and was not washed throughout the experiment. Body weight and feed disappearance were recorded weekly. Blood was sampled from one pig per pen weekly, and the same pig was euthanized for jejunal tissues sampling on d 21. Pigs raised under USC had reduced ($P < 0.05$) average daily gain (ADG) and gain to feed ratio (G:F) in wk 2, but contrary results that greater ($P < 0.05$) ADG and G:F were found in pigs under USC in wk 3. Overall, there was an interaction where G:F did not differ between HCP and LCP under CSC, however, LCP decreased ($P < 0.05$) G:F compared to HCP under USC. Pigs fed the HCP diet had higher ($P < 0.05$) fecal scores than those fed the LCP diets throughout the experiment. Pigs fed the LCP had higher ($P < 0.05$) villus height to crypt depth ratio than those fed the HCP. An interaction was observed where goblet cell density in the jejunum was higher ($P < 0.05$) in pigs fed LCP than HCP under CSC, but no difference was found between HCP and LCP under USC. Different CAA supplementation patterns did not influence both growth performance and histomorphology. Pigs raised under USC had greater ($P < 0.05$) plasma interleukin (IL)-10 and IL-6 concentrations and reduced ($P < 0.05$) plasma tumor necrosis factor-alpha concentration. Also, the LCP diets resulted in a greater ($P < 0.05$) plasma IL-10 concentration. In conclusion, overall growth performance did not differ between HCP and LCP under CSC, but LCP diets reduced G:F under USC. Feeding LCP diets to weaned pigs improved gut morphology under USC and ameliorated systemic inflammation induced by USC, whereas CAA supplementation patterns did not affect growth performance and gut morphology.

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http://agri.ckcest.cn/file1/M00/10/0F/CsgkOGMa0daACaqnABe-DMnB2I8817.pdf

4. 仔猪早期断奶存在的主要问题及应对策略

简介：早期断奶技术可通过提高母猪年生产力、饲料利用率等方式降低饲养成本，进而提高生猪养殖经济效益，对生猪养殖具有重大意义。但早期断奶技术也造成了仔猪断奶应激、腹泻率增加等问题，从而提高仔猪发病率和死亡率。文章综述早期断奶仔猪存在的主要问题，从仔猪饲养管理、生理调控和营养调控方面讨论仔猪早期断奶应激的应对策略，为缓解仔猪早期断奶应激综合征提供参考，为仔猪早期断奶技术在畜牧生产中的进一步应用提供参考。

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http://agri.ckcest.cn/file1/M00/03/3D/CsgkOYdxWumAMCjmABV6i5ZPGis646.pdf