澳大利亚养猪业竞争力分析

Competiveness of the Australian pork industry

产业现状The industry

产业统计Industry Statistics	2015
猪场数量 Producers (n)	1,400
母猪数量 Sows (n)	277,000
屠宰数量 Pigs slaughtered (000)	4,930
产肉量（胴体重量, kg） Production (kg carcass weight)	372,658
胴体重（kg）Carcass weight (kg)	74
出口量（t）Exports (tonne)	34,093
进口量（t）Imports (tonne)	171,911
人均消费量 Per capita consumption (kg)	26.0
鲜肉消费量 Fresh (kg)	9.8
肉制品消费量 Processed (kg)	16.2

不同国家养猪业生长性能指标(2014)

Performance Indicators for selected countries (2014)

国家/指标 Country/ Indicator	澳大利亚 AUSTRALIA	加拿大 Canada	美国 USA	丹麦 Denmark	荷兰 Netherlands	英国 GB
胴体增重成本（澳元/公斤） COP ($ AUS/kg carcass weight)	2.71	2.02	2.02	2.56	2.73	2.90
饲料成本 Feed ($AUS/tonne)	438	348	327	421	465	475
饲料:胴体重 HFC (Kg/kg CWT)	3.68	3.90	3.94	3.65	3.44	3.72
消化能:胴体重 HFC (MJ DE/kg CW)	51.2	52.3	56.3	51.1	48.2	52.8
母猪年产断奶仔猪数 Pigs weaned/sow/y	23.4	22.7	24.6	30.5	29.2	24.1
母猪出栏商品猪 Pigs sold/sow/y	22.4	21.5	22.4	28.5	27.8	22.7
胴体重 （公斤） Carcass weight (kg)	78	98	97	84	92	80.5
母猪年产胴体重（kg/妊娠母猪） Carcass/sow/y (kg progeny)	1747	2105	2167	2378	2565	1823
断奶后死亡率（%） Wean-finish mortality (%)	4.0	5.5	8.9	6.6	4.8	5.9

行业背景-2014年和2015年价格
Putting industries in context –prices in 14 and 15

国家 Country	澳大利亚 AUS	欧洲 EU	美国 USA	加拿大 Canada	巴西 Brazil
2014	3.15 (2.71)	2.50 (2.80)	2.65 (2.02)	2.64 (2.02)	2.25 (2.12)
2015	3.35	2.10	1.93	1.80	1.80
2016	3.80	??	??	??	??

胴体价格（澳元/公斤胴体）
Price ($AUS/kg CW)

优势和机遇Advantages and opportunities

- 动物健康及抗生素的使用
  Animal Health and antibiotic use

- 澳大利亚没有猪繁殖与呼吸综合症，猪流感或者猪流行性腹泻病毒，并且还能继续减少患病群的数量，相应的可以减少抗生素的使用 - 需要投入
  Australia does not have PRRS, Swine influenza or PEDv and has the potential to have a low disease status herd and reduced antibiotic use accordingly –investment needed

- 大型零售商对澳大利亚猪肉产品的大力支持 - 目前表现为高价格，随着产业的增长将维持较高的价格。可以减少猪肉进口。
  High and increasing support for Australian product and High Integrity product by major retailers – currently expressed in high prices and will be in growth of the industry. Potential to replace imports.

- 贯穿整个行业的有活力的研发和培训。优秀的研发和培训模板 - 持续的提高和创新。
  Active and inclusive R&D and Training across the industry. Excellent models for R&D and training –continual improvement and innovation.

- 排名前80-100的猪场成本很有竞争力并且他们生产了75%-80%的猪肉。
  Top 80-100 producers are cost competitive and produce 75%-80% of pork.

- 与亚洲水平接近 **Close proximity to Asia**

挑战和机遇 Challenges and opportunities

- 谷物和原料的高成本 - 需要高饲料效率的动物和生产体系，以及可替代的饲料资源。**High grain and ingredient costs - need systems and animals which don't require much feed and alternative feed sources.**
- 传统的饲养条件和饲喂系统 - 需要投资改善，并建立新的商业模式（就像美国）**Old housing and housing systems – need investment and new business models (like the US)**
- 较低的胴体重，导致每头猪产肉成本和加工成本过高 - 需要说服零售商，高胴体重可以满足消费者的需求（体型），并可以生产出更多的澳大利亚本地猪肉供加工使用。**Low carcass weight and associated high over head and processing costs – need to convince retailers that consumer demand (portion size) can be met with heavier carcasses and to have more Australian pork used in processing.**
- 更好的繁殖性能 – 可能进口种猪或应用已有的科技改善繁殖性能 **Better reproduction – potential to import genetics and implement wealth of knowledge available on improving reproduction.**

底线Bottom Line

- 澳大利亚养猪业是目前世界上利润最高、最有活力的产业之一Australian industry is currently one of the most profitable and "vibrant" in the world.
- 基于长期合约的增长预期 – 反应了对澳大利亚养猪业产业链整合的需求 Expect growth based on longer term contracts –reflection of demand for high integrity Australian pork
- 仍然还有很多的资金 Still a lot of money remaining on the table
  - 繁殖力Reproduction
  - 胴体重Carcass weight
  - 饲料成本Feed Cost
  - 饲料效率Feed efficiency
  - 进一步的差异化Further differentiation
- 全球标杆是很好的目标 – 但是首先需要销售并保护我们所现有的Global benchmarking interesting but-Need to sell and protect what we have
- 发展过程中会出现什么问题呢 – 以及我们如何处理？What can go wrong –and what are we doing about it?

成功（盈利）最重要的原因-改革
Major reason for success (profit) -Transformation

限位栏 STALLS

群养 GROUP HOUSING

将目前所拥有的做到最好
Making the best of what we have

- 可以追赶的目标 **Some lessons from the 'best" in benchmarking**
  - **胴体增重成本（14/15年）-从2.42-3.2澳元/公斤**

    COP (14/15) – ranged from $2.42 -$3.20/kg carcass weight
  - **你们是如何提高PSY的呢？**

    Interesting how participants are improving pigs weaned/sow/y

14-15年的标杆数据
Bench Marking 14-15 annual (All)

关键指标 KPI	母猪年断奶仔猪数 Pigs weaned Per sow/y	窝产活仔数 BA	分娩率 FR (%)	断奶后死亡率 PWM (%)
平均 Average	23.4	11.4	85.4	11.7
前三 Best 3	27.2	12.7	90.5	8.8
第一 Best	29.6	13.3	92.7	7.7
最差的 Worst	20.9	10.4	76.7	16.5
美国 USA	25	13.5	85	11.5
加拿大 Canada	23	14.5	86	15-20
丹麦 Denmark	30	16+	86	16.0

排名前三的生长性能
Performance of the best three herds

Herd/KPI	H1	H2	H3
母猪年产断奶仔猪数 Pigs/sow/y	29.6	26.5	25.6
总产仔数 TB (sows)	15.1	14.8	12.2
产活仔数 BA (sows)	13.8	13.5	11.5
断奶期死亡率 PWM (%)	11.7	12.9	11.1
分娩率 FR (%)	91.7	89.3	89.3
断奶日龄 Weaning age (d)	21	28.6	18.5
饲料:胴体重 HFC	NA	3.62	3.63
胴体重（公斤）Carcass weight (kg)	NA	79	75

断奶日龄对母猪下一胎仔猪生长性能的影响
Effects of weaning age on progeny performance

猪群Herd	H1	H2	H3
断奶仔猪量 Pigs weaned	29.6	26.5	25.6
断奶日龄 Weaning age (d)	21	29	19
断奶后的死亡率 Mortality – Wean-sale (%)	NA	5.4	5.2
出生后日增重 ROG from birth (g/d)	NA	624	672
断奶后日增重 ROG wean-sale (g/d)	NA	715	725
断奶后饲料转化率 FCR wean -sale	NA	2.47	2.32
母猪饲料用量 Sow feed used (tonne/sow)	NA	1.17	1.28

关键信息
Take Home Message

- 理想的断奶期是什么时候？
  What is the ideal weaning age?
  - 可能不能低于19日龄
    Probably not <19 days
  - 可能不是28日龄
    Probably not 28 days
  - 取决于断奶重和适应断奶的能力
    Depends on weaning weight and quality of weaner accommodation

研发成果将会继续提高竞争性

R&D Outcomes likely to contribute to improved competiveness

- 配种期饲喂Ω-3脂肪酸对母猪繁殖性能、夏天妊娠率和仔猪性别比例的影响
  Effects of higher omega 3 fatty acids around mating on reproduction and summer infertility and the sex ratio of the litter
- **AusScan在线系统 – 豆粕和菜粕中消化能、表观代谢能、活性赖氨酸、可消化赖氨酸和其它氨基酸的即时检测　AusScan online –immediate determination of DE and AME and reactive and SID lysine and other amino acids for Soy bean meal and canola meal**
- 真正能提高饲料效率的技术　Technologies which genuinely improve feed efficiency
- 减少断奶仔猪和育肥猪炎症的策略（阿司匹林，维他命E，更高的蛋氨酸水平）
  Strategies to reduce inflammation in weaner and grower pigs (Aspirin , Vitamin E , Higher Methionine levels)
- 断奶期同步排卵　Synchronisation of ovulation at weaning
- 人工授精 Post Cervical AI

对于豆粕和加拿大油菜籽粕中氨基酸近红外检测校准的快速更新

Quick update on NIRS calibrations for amino acids in soy bean meal and canola meal

- 现在可以实现在线对 豆粕和加拿大油菜籽粕的校准-AusScan在线

  Calibrations now available on line for both soy bean meal and canola meal –AusScan On Line

- 谷物和蛋白原料的校准被批准后可以直接放置在近红外检测机器中

  Calibrations for grains and protein meals can be licenced and placed on NIRS machines

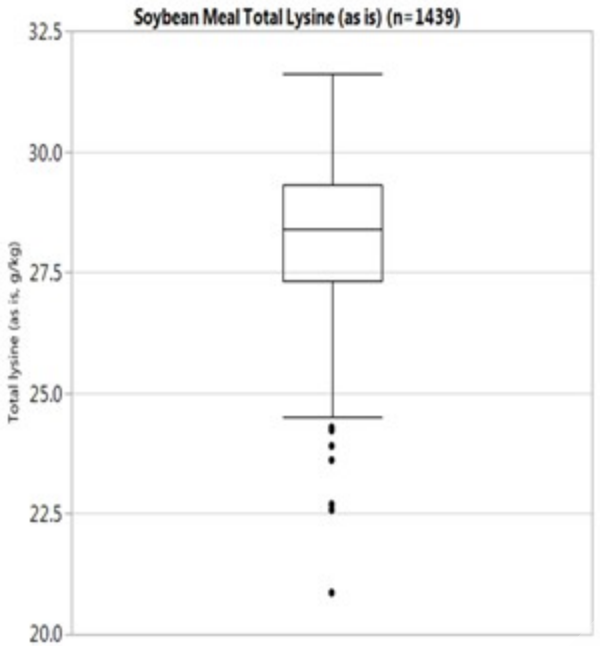
- 豆粕-总氨基酸，活性赖氨酸以及SID氨基酸

  SBM – total amino acids ,reactive lysine and SID amino acids

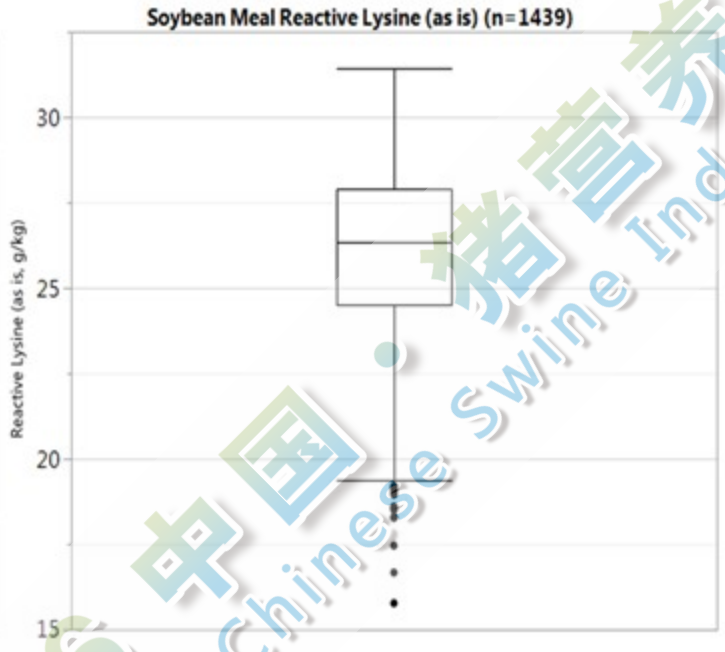
- 加拿大油菜籽粕-总氨基酸以及活性赖氨酸

  Canola – total amino acids and reactive lysine

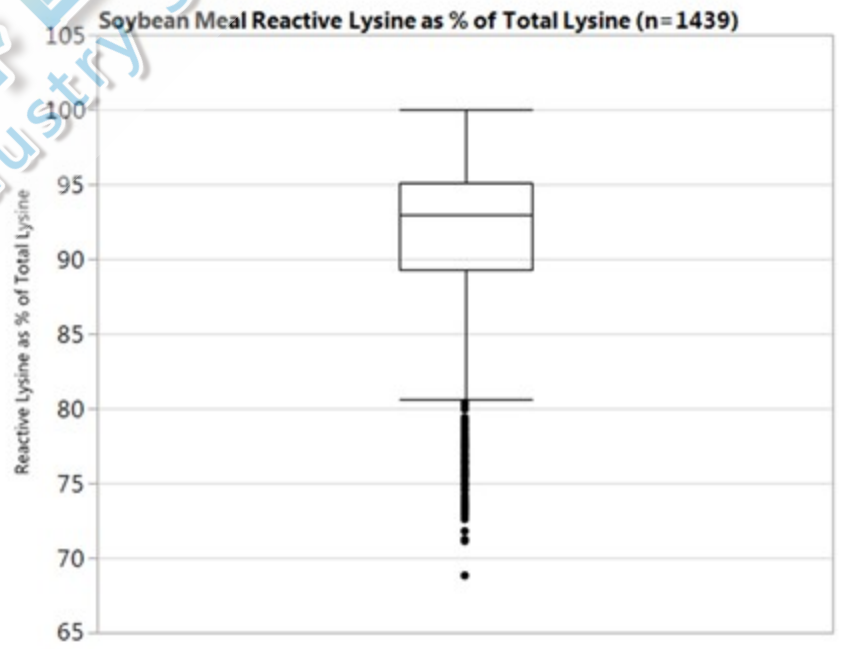
豆粕中赖氨酸和活性赖氨酸的变化（1439个样品） Variation in lysine and reactive lysine content of SBM (1439 samples)



赖氨酸

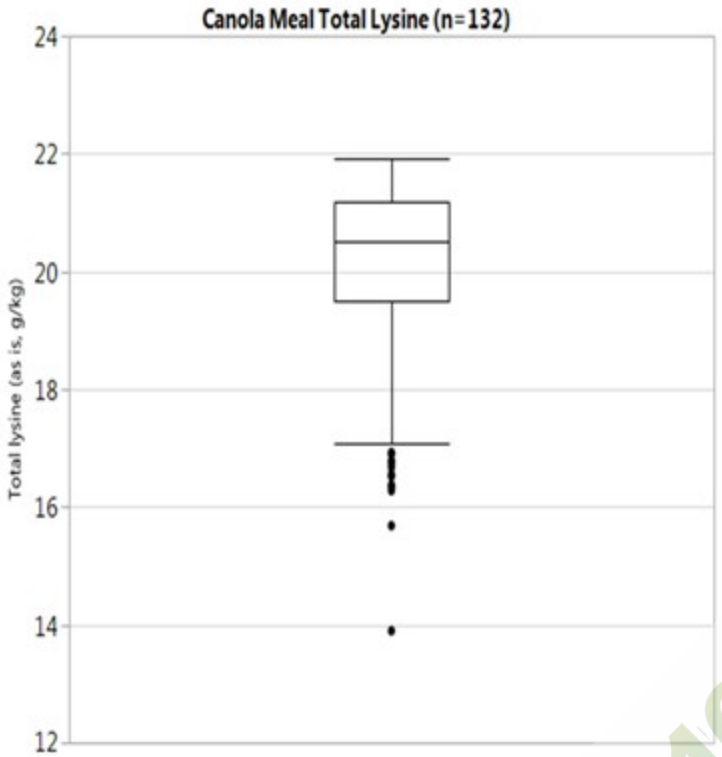


活性赖氨酸

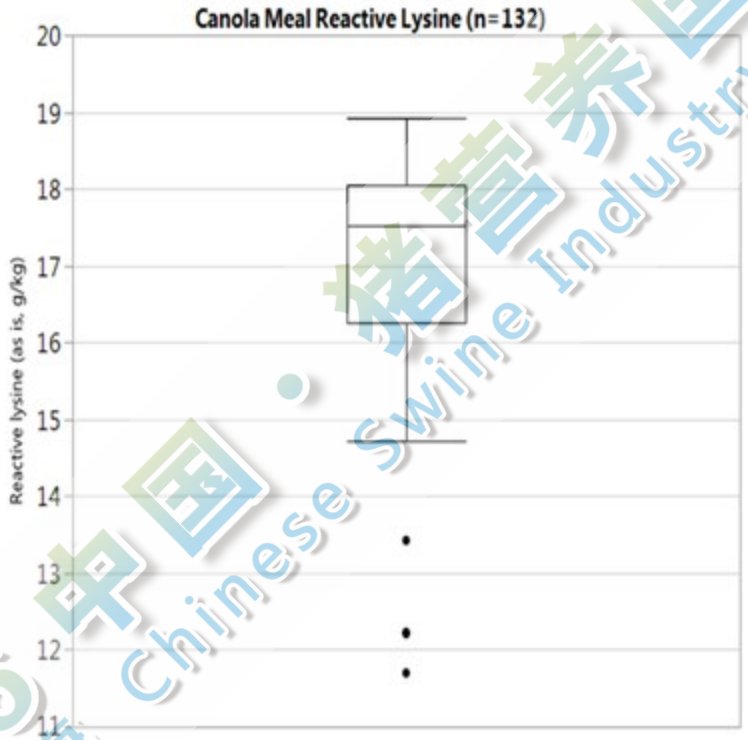


活性赖氨酸：赖氨酸

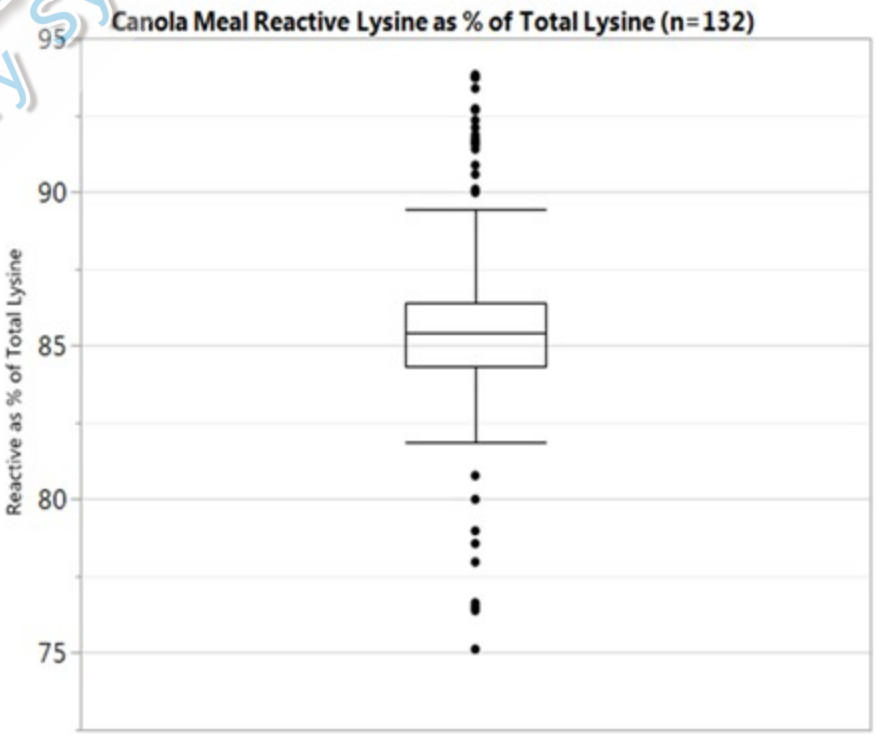
油菜籽粕中总赖氨酸和活性赖氨酸的变化*Variation in canola meal total and reactive lysine*



赖氨酸



活性赖氨酸



活性赖氨酸：赖氨酸

以表格的形式 In tabulated form

项目Item	中位值 Median value	上限值 Upper value	下限值 Lower value
大豆粕（1430个样品）Soy bean meal (1430 samples)			
总赖氨酸（克/千克）Total lysine (g/kg)	28.2	32.0	24.4
活性赖氨酸（克/千克）Reactive lysine (g/kg)	26.8	32.0	19.6
活性赖氨酸在总赖氨酸中所占比例（百分比）Reactive lysine/total lysine (%)	94.2	100	80.4
菜籽粕（132个样品）Canola meal (132 samples)			
总赖氨酸（克/千克）Total Lysine (g/kg)	20.6	21.9	17.0
活性赖氨酸（克/千克）Reactive Lysine (g/kg)	17.6	19.0	14.7
活性赖氨酸/总赖氨酸（百分比）Reactive lysine/total lysine (%)	85.4	88.8	82.3

炎症-影响性能的隐患

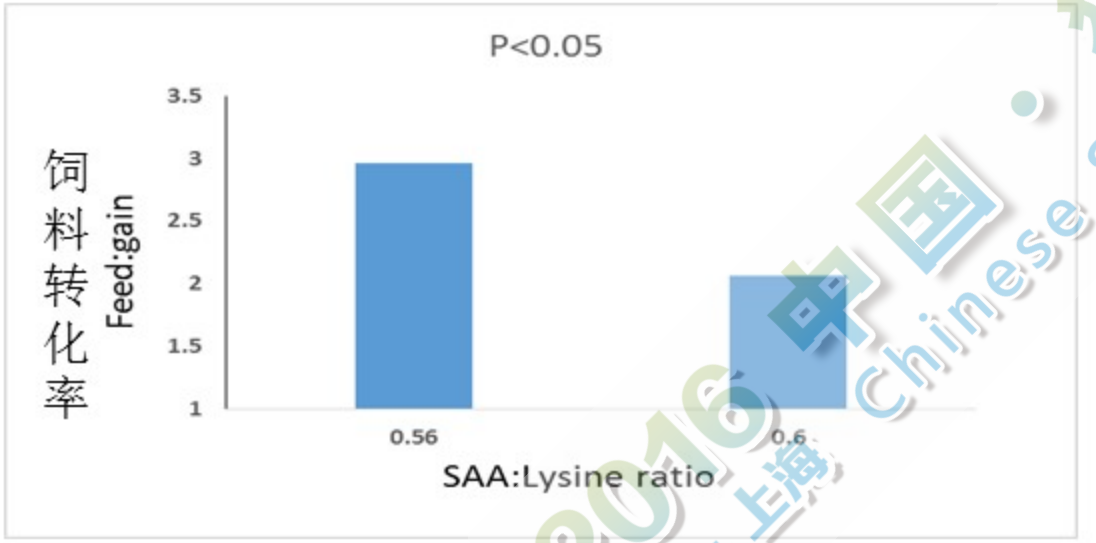
Inflammation –the hidden robber of efficiency

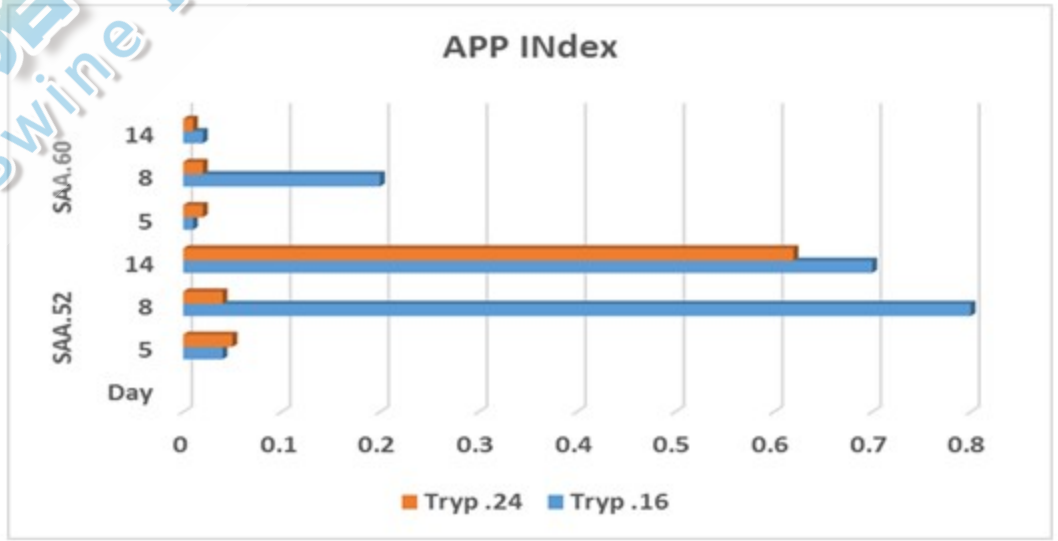
- 炎症是由一些常见的商业行为（如断奶）或环境因素（如灰尘和细菌）刺激免疫系统引起的。**Inflammation can be and is induced by common commercial practices such as weaning and by stimulation of the immune system by the pigs environment (dust and bacterial particles).**
- 减少炎症对动物的性能（和健康？）影响的措施包括
  Strategies to reduce the impact on animal performance (and health?) include
  - **对于断奶的幼猪使用高含量的维生素E Higher vitamin E levels for weaner pigs**
  - 于所有类型的猪使用阿司匹林 **Aspirin for all classes of pigs**
  - 对所有类型的猪使用含硫氨基酸（蛋氨酸）
    Higher sulphur amino acid (Methionine) levels for all classes of pigs

含硫氨基酸对ETEC攻毒断奶仔猪生长性能和急性期蛋白质的指数的影响

Effects of higher SAA level on the performance and acute phase protein (APP) index of weaner pigs challenged with ETEC

- 21日龄断奶仔猪提供可消化含硫氨基酸:赖氨酸分别为0.52和0.6，而可消化色氨酸:赖氨酸为0.16和0.24 。Pigs weaned at 21 days and offered diets with SID SAA :SID lysine ratios of .52 and 0.60 (added Methionine) each at Trp:Lys ratios of 0.16 and 0.24
- 在第5,6,7天使用大肠杆菌攻毒 Challenged with E coli on days 5,6 and 7
- 14天之后检测生长性能Performance measured over 14 days





含硫氨基酸对生长育肥猪生长性能的影响

Effects of Sulphur Amino Acids (SAA) on grower-finisher performance

- **动物经常处于应激状态 Animals under constant immune stress/challenge**
- **含硫氨基酸与免疫应答和免疫蛋白密切相关 SAA involved in immune responses and immune proteins**
- **可能会导致用于蛋白质沉积的氨基酸减少May result in reduced amino acids for protein deposition**

含硫氨基酸对于免疫激活猪只生长性能的影响
Effects of Sulphur Amino Acid (SAA) levels on the performance of immune activated pigs

- 猪每周注射两次生理盐水或细菌细胞壁的脂多糖Pigs injected twice weekly with saline or a bacterial cell wall Lipo -poly saccharide

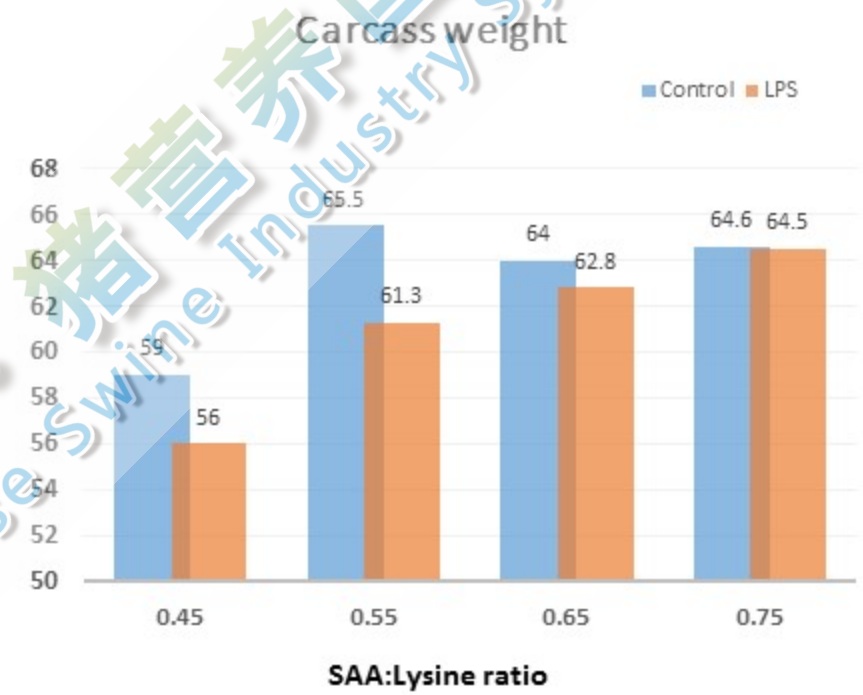
- 每天测量直肠温度Rectal temperature measured daily.
- 不同日粮含硫氨基酸：赖氨酸分别为0.45、0.55、0.65、0.75 。
Responses to dietary SAA:Lysine ratios of 0.45 , 0.55 , 0.65 and 0.75
- 通过添加蛋氨酸改变日粮含硫氨基酸比例SAA ratio altered by increasing Methionine content of the diet
- 试验期42天 Duration - 42 days

对生长速度和胴体重量的影响
Effects on growth rate and carcass weight

日增重

含硫氨基酸:赖氨酸

胴体重



含硫氨基酸:赖氨酸

关键信息 Take home messages

- **免疫系统的激活和炎症是真实的而且也经常出现在商业猪肉生产中**
  Immune system activation and inflammation is real and probably common in commercial pork production.
- **澳大利亚科学家正在建立农场的诊断工具来**评估猪群的免疫状况
  Australian scientists working on an on-farm diagnostic kit to assess herd immune status.
- **同时 In the meantime**
  - **所有猪只日粮含硫氨基酸浓度提高到推荐值的偏高水平** Formulate Methionine :Lysine ratio at the higher end of current recommendations for all classes of pigs
  - **考虑在断奶仔猪日粮中提高维生素E水平（200-250IU） Consider increasing Vitamin E level** of first stage weaner diets (200-250 IU)
  - **策略性的使用**阿司匹林Strategic use of aspirin

提高饲料的效率
Improving Feed Efficiency

- 除了基因改良，过去10年，在提高猪饲料效率的研究方面很少有进展。Apart from genetics there have few advances in improving feed efficiency in growing –finishing pigs in last 10 years.
- 代谢调节剂如PST和瘦肉精都可以增加蛋白质沉积和饲料效率，都可以降低肉品风味，并且用量减少。
  Metabolic modifiers such as PST and Ractopamine both increase protein deposition and feed efficiency – both have fallen out of favour and use is decreasing.
- 最近由爱荷华州立大学管理的一个美国项目告诉我们将健康作为影响因素，并且还需要更多的研究，这也是我们早就知道的。Recent large US project managed by ISU told us what we already knew and considered health as the factors requiring more research.
- 容易降低饲料的效率，在没达到动物的遗传潜力之前 - 挑战在于如何能够在商业环境下完全的利用并提高动物的潜能。Easy to reduce feed efficiency below the genetic potential of the animal – the challenge is to fully exploit the animals potential in commercial situations and ideally to enhance it.

调节育肥猪采食量 *Manipulating intake in finisher pigs*

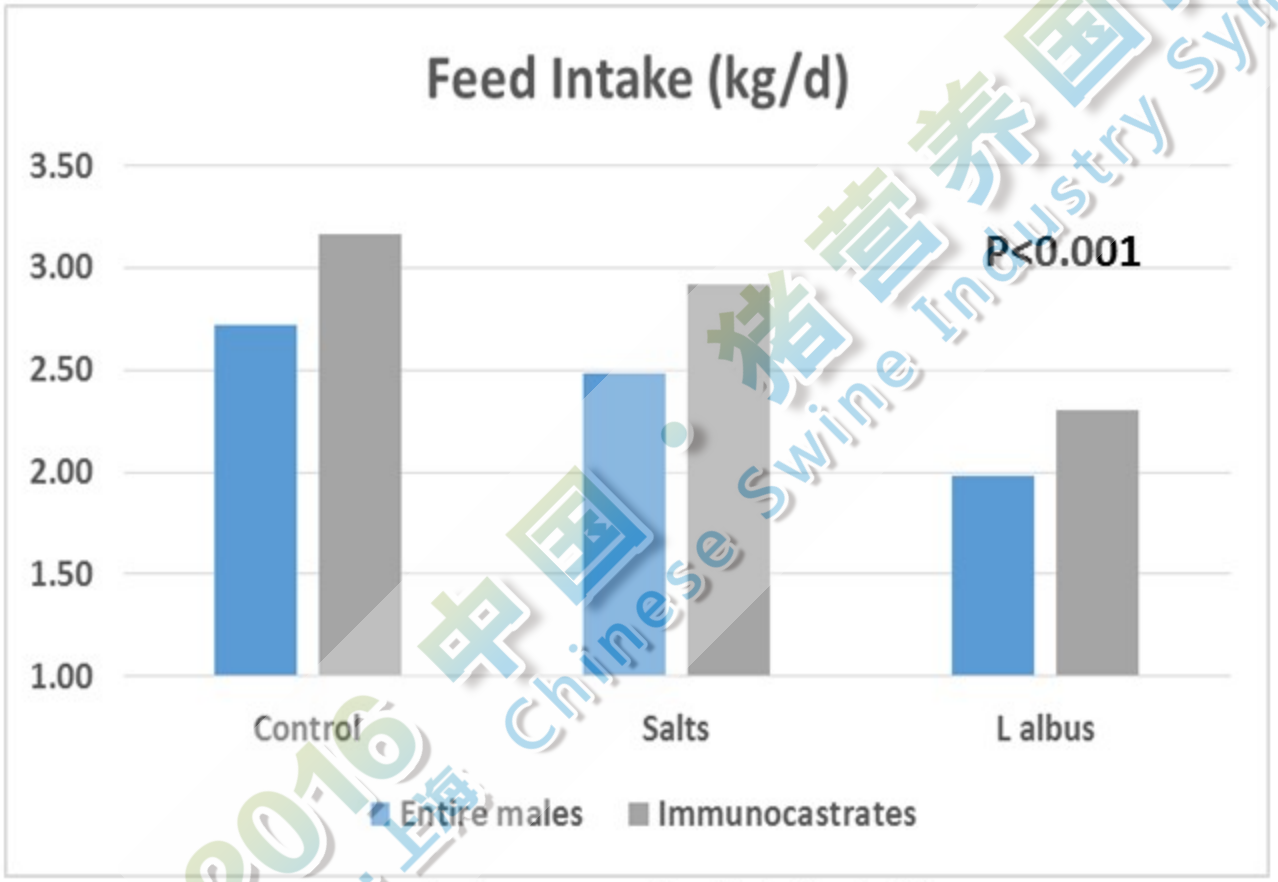
- **用公猪和免疫去势猪来研究**STUDY WITH ENTIRE MALES AND IMMUNOCASTRATES
  - **初始重**-75KG STARTING WEIGHT -75 KG
  - **试验期**-28天 DURATION -28 DAYS
  - **在实验开始的的时候进行第二次免疫去势接种**SECOND IMPROVAC VACCINATION GIVEN AT START OF EXPERIMENT
- **方法**TREATMENTS
  - **对照 – 基础日粮** CONTROL –CONVENTIONAL DIET
  - 3%氯化钙二水合物**3%** ， 1.6%三聚磷酸钠 – 盐

    CALCIUM CHLORIDE DI-HYDRATE, 1.6% SODIUM TRIPOLYPHOSPHATE –SALTS
  - 白色羽扇豆-30%，0-7天；15%，7-14天；20%，15-28天

    LUPIN ALBUS -30% FOR DAY 0-7, 15% D 7-14 AND 20% FOR D 15-28

0-28天，对饲料采食量的影响

Effects on feed intake 0-28 days

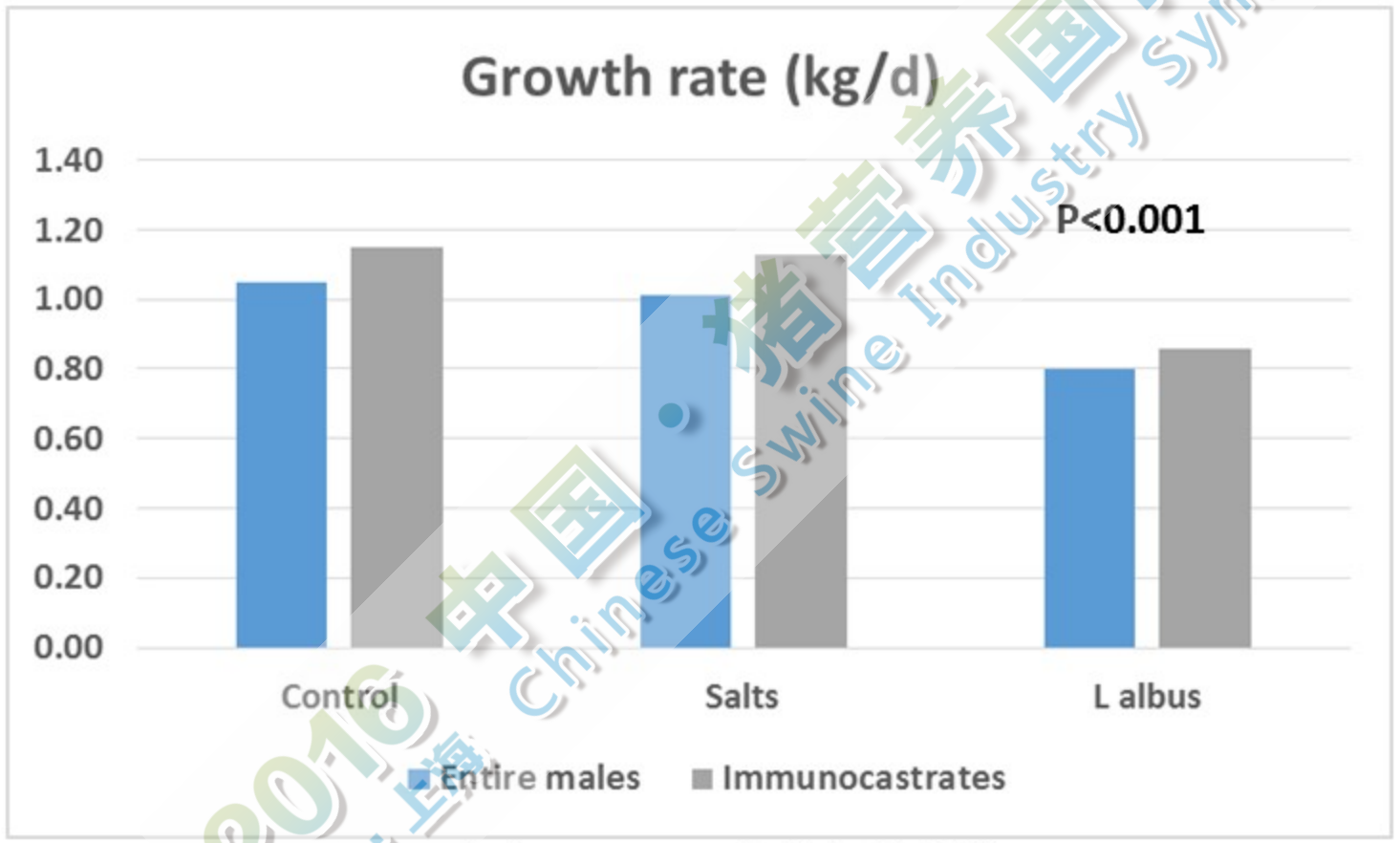


公猪　　免疫去势公猪

Moore 2016

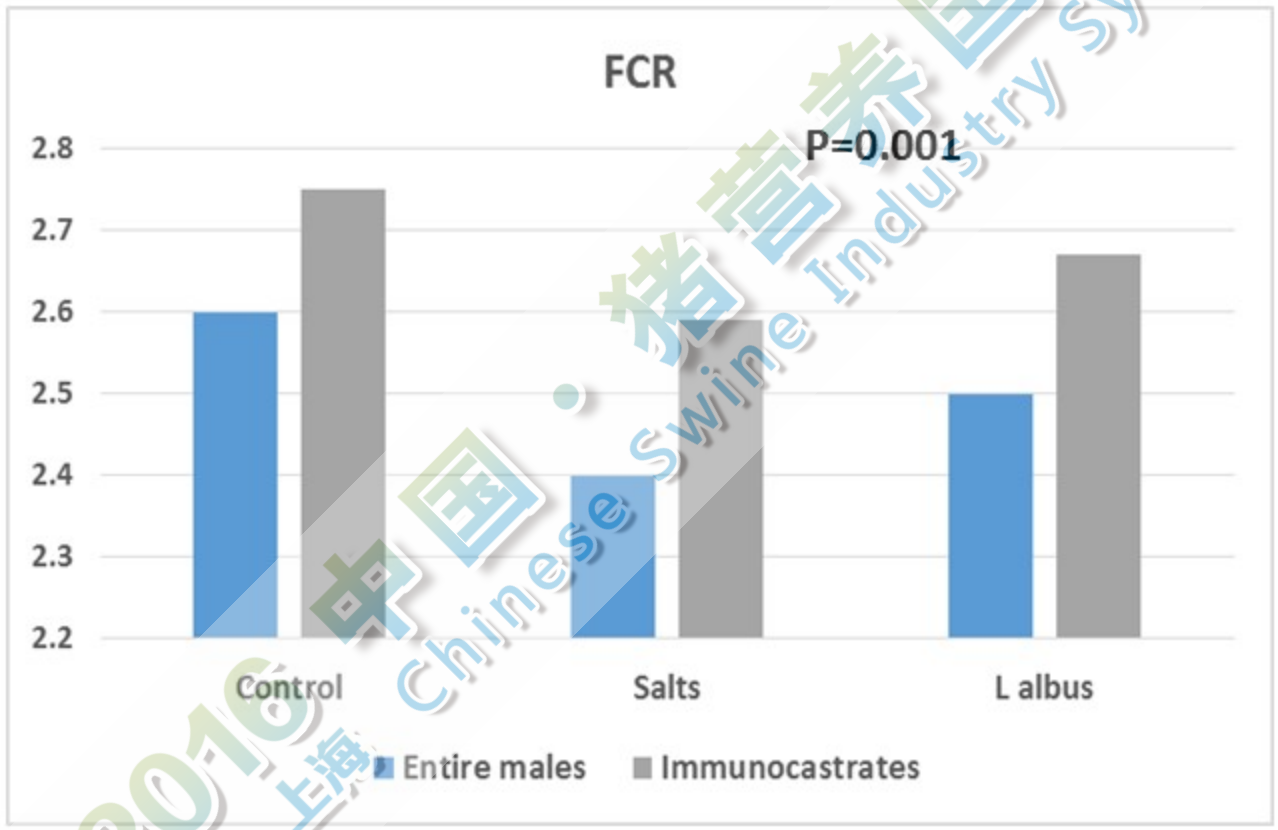
0-28天，对日增重的影响

Effects on growth rate 0-28 days



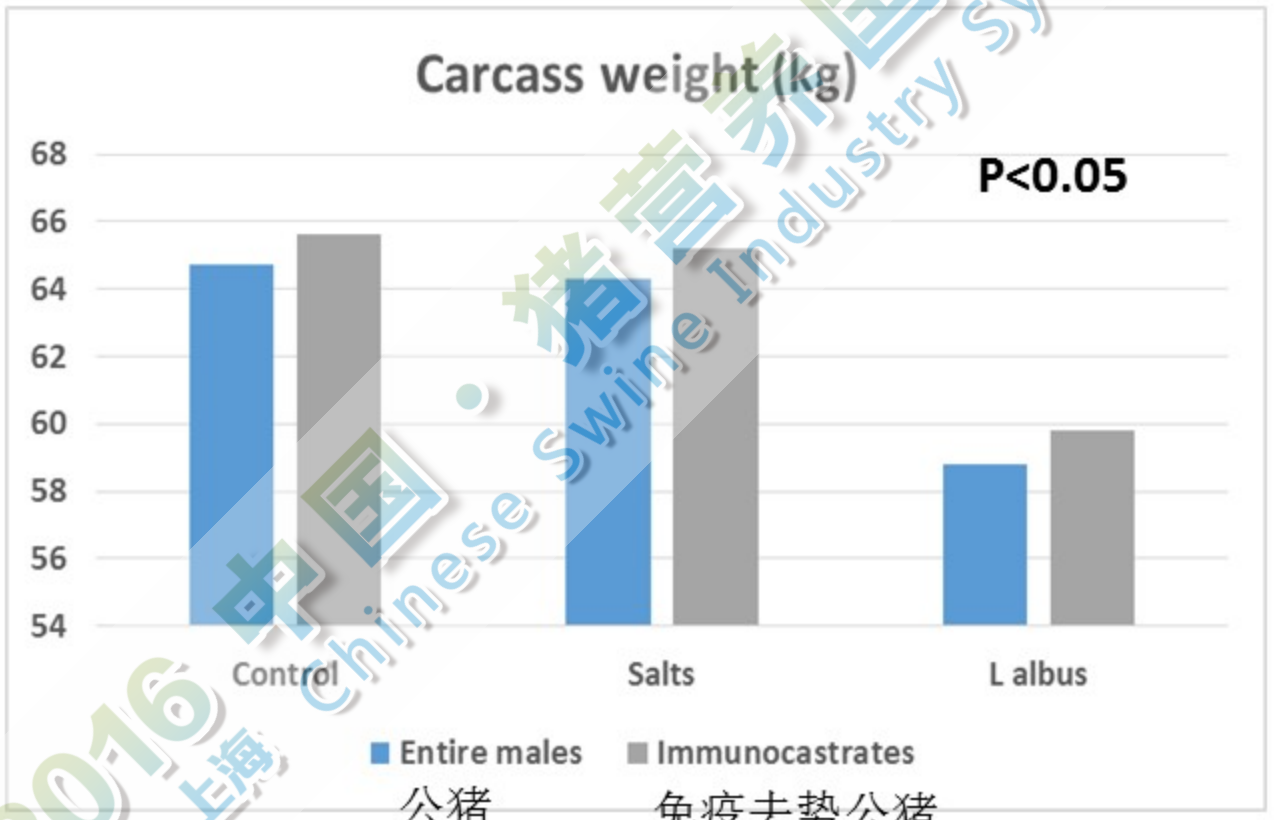
公猪　　免疫去势公猪

0-28天对饲料转化率的影响 Effects on feed conversion ratio 0-28 days



公猪　　免疫去势公猪

对胴体重的影响
Effects on carcass weight



抑制猪的采食量
Suppressing Feed Intake in finisher Pigs

- 单独饲养的雌性猪INDIVIDUALLY HOUSED FEMALE PIGS
- **初始重-76公斤** STARTING WEIGHT -76 KG
- **试验期-21天** DURATION -21 DAYS
- **4种处理方式** FOUR TREATMENTS
  - **对照组 – 基础日粮**CONTROL –CONVENTIONAL DIET
  - **加4%氯化钙+2.2%**三聚磷酸钠（盐）CONTROL PLUS 4% CA CL2+2.2% NA5P3O10 (SALTS)

  - 120毫克/公斤鹅去氧胆酸（CDCA）120 MG/KG CHENODEXYCHOLIC ACID (CDCA - TOP DRESSED)
  - **5%**月桂酸 5% LAURIC ACID

结果 Results

处理方式 Treatment	控制 Control	盐 Salts	鹅去氧胆酸 CDCA	月桂酸 LA	P值 Significance
末重（公斤） Final weight (kg)	93.8	89.8	94.9	93.4	0.039
采食量（千克/天） Feed intake (kg/d)	3.56	3.01	3.37	3.20	0.007
日增重（千克） Daily gain (kg)	1.28	1.09	1.33	1.26	0.039
饲料转化率 FCR (kg/kg)	2.81	2.81	2.52	2.55	0.023

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