# 生猪养殖屠宰全链条数据管理

# Data management of the entire pig breeding and slaughtering chain

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20251018

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# 个人经历 谢建安Personal Experience Xie Jian'an

谢 建 安

- 毕业于湖南农业大学，动物营养与饲料加工专业&动物遗传育种
- Graduated from Hunan Agricultural University, majoring in Animal Nutrition and Feed Processing & Animal Genetics and Breeding
- 曾任职于农牧上市公司生产经理、营销经理
- I have previously worked as a production manager and marketing manager for a listed agricultural and livestock company
- 2004年加入帝斯曼，历任技术主任、摄生素经理、总营养师、总畜牧师、猪类技术总监
- Joined DSM in 2004, serving successively as Technical Director, Nutritional Manager, Chief Nutritionist, Chief Animal Husbandry Engineer, and Technical Director for Pigs
- 具备丰富的生猪饲养、兽医、营养经验
- Possess extensive experience in pig farming, veterinary medicine, and nutrition
- 擅长领域：Expertise:
  1. 不同饲喂目标下的猪营养方案设计Design of pig nutrition programs under different feeding objectives
  2. 不同饲养环境下的营养方案制定Formulating nutritional plans under different rearing environments
  3. 规模养殖场成本控制 Cost control of large-scale livestock farms

# 目录 Catalogue


01 成本洞察 Cost Insight

02 营养管理 Nutrition Management

03 数据管理 Data management

04 未来展望 Future Prospects


Part.01

# 成本洞察 Cost Insight

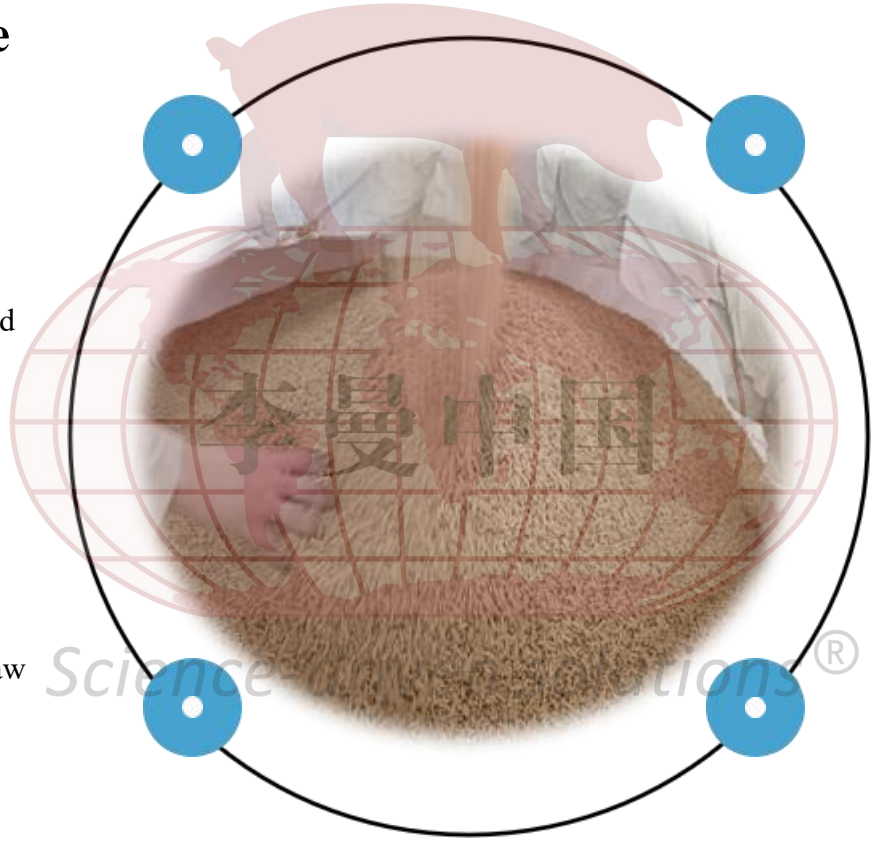
# 生猪养殖 成本管控新常态 New normal of cost control in hog farming

## 饲料成本大幅下降The cost of feed has seen a significant decline

饲料效率持续提升
Feed efficiency continues to improve
断奶至出栏饲料成本低至3.0~3.5元
The feed cost from weaning to slaughter is as low as 3.0~3.5 yuan
断奶仔猪生产成本降低到220元/头
The production cost of weaned piglets has been reduced to 220 yuan per head

## 精确评定原料营养价值 Accurately assess the nutritional value of raw materials

多元的原料营养价值评定方法
Diverse methods for assessing the nutritional value of raw materials
全球化原料采购
Globalized raw material procurement
地产原料选用Selection of raw materials for real estate
添加剂提高原料利用率
Additives enhance the utilization rate of raw materials




## 链接屠宰Link slaughter

市场竞争激烈，屠宰扣款迷雾重重
The market competition is fierce, and the mystery of slaughter deductions is shrouded in confusion
品系与消费市场
Breeds and consumer market
公母、出栏体重
Male and female, slaughter weight
口感、品质与养殖效率平衡
Balance between taste, quality, and breeding efficiency

## 准确制定营养模型Accurately develop a nutritional model

饲喂阶段细分
Subdivision of feeding stages
精准确定各阶段营养需求特性
Accurately determine the nutritional requirements characteristics of each stage
生长曲线，饲喂模型
Growth curve, feeding model
健康营养Healthy nutrition
顺应消费市场变化
Respond to changes in the consumer market

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# 成本构成 Cost structure

| 2024年~2025年中大型集团生产数据对比<br>Comparison of production data for medium and large-sized groups from 2024 to 2025 | | | | | |
|---|---|---|---|---|---|
| 项目 | Project | 单位 | 最佳 | 平均 | 国内行业水平 |
| PSY | PSY | 头 | 35.0 | 30 | 21-24 |
| 分娩率 | Delivery rate | % | 92.0 | 88.0 | 80~85 |
| 断奶数 | Weaning number | 头 | 15.0 | 12.8 | 9~11 |
| 断奶成本 | Weaning cost | 元/头 | 220 | 300 | 320~400 |
| 育肥上市率 | Market rate of fattening pigs | % | 97.0 | 94.0 | 92~95 |
| （断奶-上市）日增重 | (Weaning-to-market) daily weight gain | 克/天 | 870 | 750 | 600~700 |
| （断奶-上市）料肉比 | (Weaning-to-market) feed conversion ratio | | 2.32 | 2.60 | 2.6~3.0 |
| （断奶-上市）饲料造肉成本 | (Weaning-to-market) feed-to-meat cost | 元/斤 | 3.40 | 4.00 | 3.8~4.8 |
| 商品猪育肥全成本 | Total cost of fattening commercial pigs | 元/斤 | 6.10 | 6.8/7.0 | 7.0~8.0 |
| 动保成本 | Animal health costs | 元/头 | 44 | 68 | 50~100 |
| 人工水电等费用 | Costs of labor, water, electricity, etc | 元/头 | 223 | 388 | |

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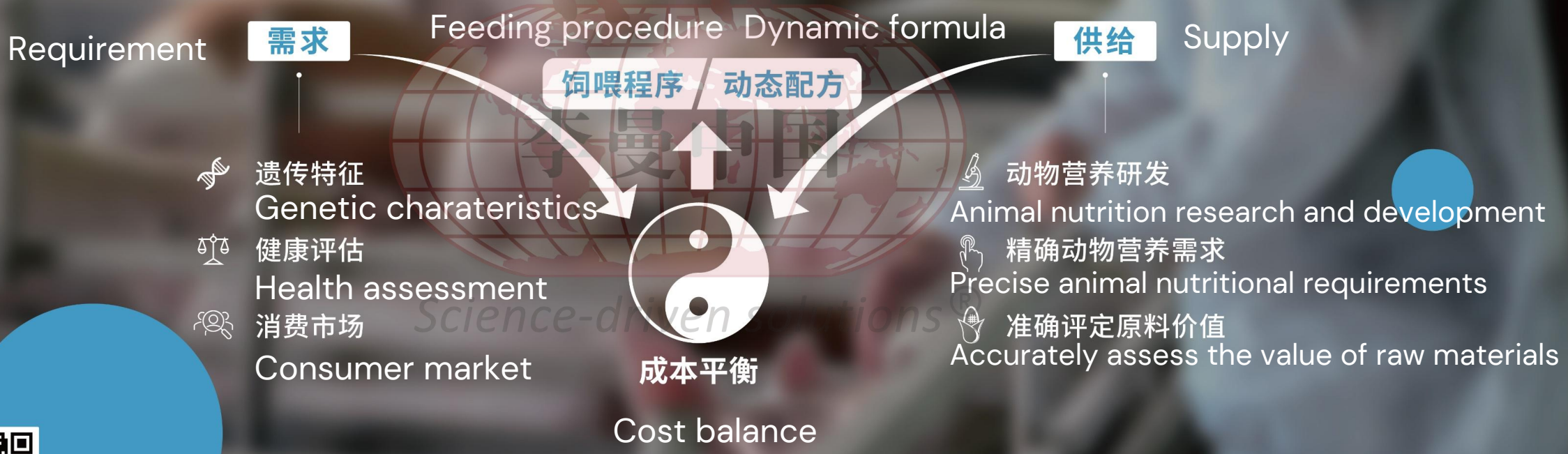
# 帝斯曼-芬美意

# 第一时间 现场动态精准营养解决方案

On-site dynamic and precise nutritional solutions in the first time

(专业团队+便携设备) (Professional team + Portable equipment)




更多信息

Part.02

# 营养管理

# Nutrition Management

*Science-driven solutions®*

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# 营养管理 核心原理

# Nutrition management Core principles

01

## 物质构建基础Material construction foundation

1.蛋白质的核心作用1. Core role of protein
作为肌肉、皮肤、内脏、血液等组织的核心原料，遗传物质合成，直接决定肌肉生长速度与瘦肉率
As the core raw material for tissues such as muscles, skin, internal organs, and blood, the synthesis of genetic material directly determines the rate of muscle growth and lean meat percentage
2.矿物质与骨骼发育2. Minerals and bone development
钙、磷等矿物质构成骨骼框架
Minerals such as calcium and phosphorus constitute the skeletal framework

02

## 能量驱动 Energy-driven

1.能量饲料供给动力1. Energy feed provides power
玉米、小麦等碳水化合物提供基础代谢能量
Carbohydrates such as corn and wheat provide basic metabolic energy
油脂支持脂肪积累与体重增长
Oils and fats support fat accumulation and weight gain
2.能量转化增效技术
2. Energy conversion and efficiency enhancement technology
酶制剂、肠道健康
Enzyme preparation, intestinal health

03

## 生理功能调节 Physiological function regulation

1.消化系统优化1. Digestive system optimization
肠道菌群调控； 氯化钠调节渗透压，促进胃酸分泌。
Regulation of intestinal flora; Sodium chloride regulates osmotic pressure and promotes gastric acid secretion.
2.免疫与抗病力提升2. Immunity and disease resistance enhancement
维生素等微量营养素在生长、繁殖、健康作用
Micronutrients such as vitamins play a role in growth, reproduction, and health
抗氧化 antioxidant

04

## 生产受市场欢迎的猪肉Produce pork that is popular in the market

1.食用质量 --色泽 、 风味 、 嫩度 、 多 汁性
1. Edible quality -- color, flavor, tenderness, juiciness
2.营养质量 --蛋 白 质 和 脂肪酸 的含量 、 蛋 白 质 、 脂肪酸组成
2. Nutritional quality -- content of protein and fatty acids, composition of protein and fatty acids
3.加工质量--系水力 、 pH值 、 脂肪饱和程度 、 抗氧化能力 、蛋白质变性程度 、结缔组织含量3. Processing quality - water binding capacity, pH value, degree of fat saturation, antioxidant capacity, degree of protein denaturation, connective tissue content
4.卫生质量 --药物残 留 、 微生物含量
4. Hygiene quality -- drug residues, microbial content
5.人文质量 5. Humanistic quality

05

## 环境可持续Environmental sustainability

环境可持续性：通过营养调控减少氮碳排放，提升养殖生态效益
Environmental sustainability: Reducing nitrogen carbon emissions through nutrient regulation and enhancing the ecological benefits of aquaculture



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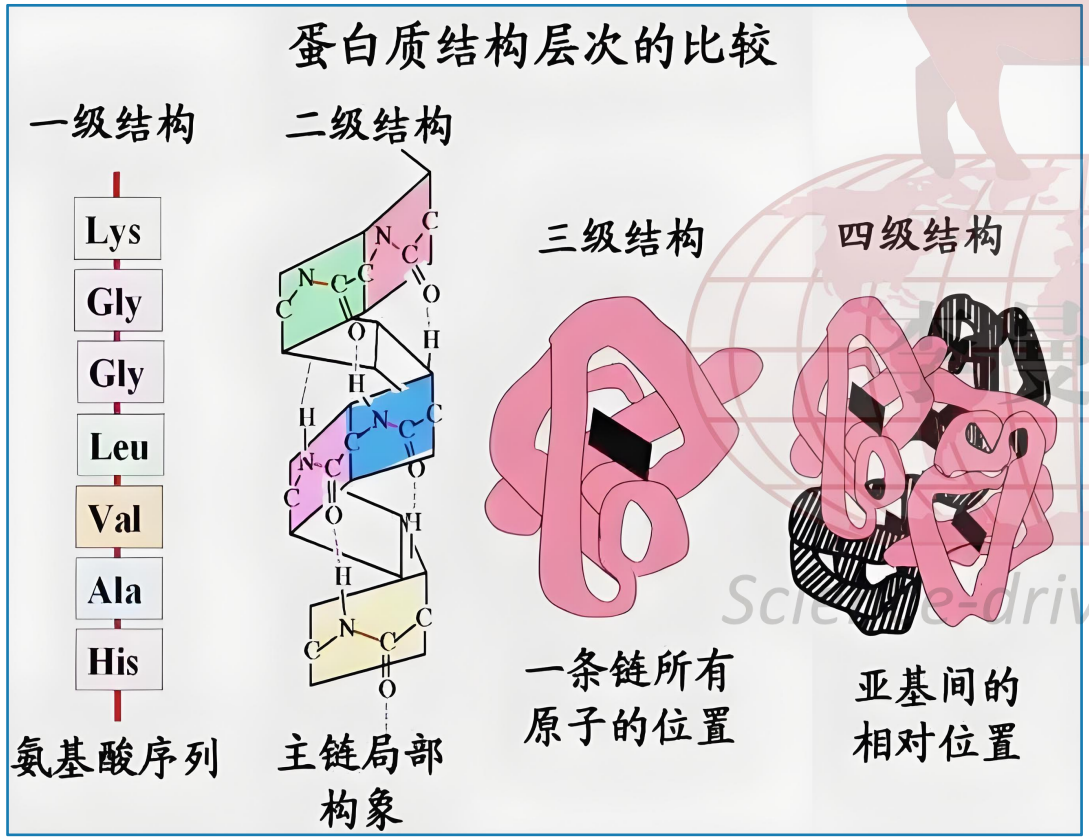
# 01物质构建基础

# 01 Material construction foundation

## 蛋白质的核心作用The core role of proteins

## 蛋白质理想氨基酸组成，氨基酸-可利用氨基酸

## Ideal amino acid composition of protein, amino acid - available amino acid




1. 蛋白质是细胞、组织和器官的主要结构成分。例如：胶原蛋白是皮肤、骨骼、肌腱的主要成分，提供结构支撑；角蛋白存在于毛发和指甲中，增强其硬度和韧性；肌肉中的肌动蛋白和肌球蛋白负责肌肉收缩。
2. Proteins are the main structural components of cells, tissues, and organs. For example, collagen is the main component of skin, bones, and tendons, providing structural support; keratin is found in hair and nails, enhancing their hardness and toughness; actin and myosin in muscles are responsible for muscle contraction.
3. 催化生化反应： 酶是蛋白质的一种，能加速体内生化反应速度。DNA聚合酶协助遗传信息复制。
4. Catalytic biochemical reactions: Enzymes are a type of protein that can accelerate the speed of biochemical reactions in the body. DNA polymerase assists in the replication of genetic information.
5. 运输或储存功能： 血红蛋白将氧气从肺部输送至全身组织；脂蛋白转运胆固醇和脂肪；铁蛋白储存铁元素。
6. Transportation or storage function: Hemoglobin transports oxygen from the lungs to tissues throughout the body; lipoprotein transports cholesterol and fat; ferritin stores iron.
7. 蛋白质是免疫系统的重要组成部分：抗体（免疫球蛋白）识别并中和病原体；补体蛋白协助清除外来微生物；细胞因子调节免疫细胞的活性，协调炎症反应。
8. Proteins are crucial components of the immune system: antibodies (immunoglobulins) recognize and neutralize pathogens; complement proteins aid in the clearance of foreign microorganisms; cytokines regulate the activity of immune cells and coordinate inflammatory responses.
9. 调节生理功能 激素调节：部分激素（如胰岛素、生长激素）属于蛋白质或多肽，调控血糖、生长发育等。
10. Regulating physiological functions: Hormonal regulation: Certain hormones (such as insulin and growth hormone) are proteins or polypeptides that regulate blood sugar levels, growth, and development.
11. 供能作用 当碳水化合物和脂肪供能不足时，蛋白质可提供能量。
12. Energy supply function: When carbohydrates and fats are insufficient in providing energy, proteins can supply energy.
13. 其他特殊功能 凝血，视觉，基因表达调控。
14. Other special functions include blood coagulation, vision, and gene expression regulation.

# 01物质构建基础

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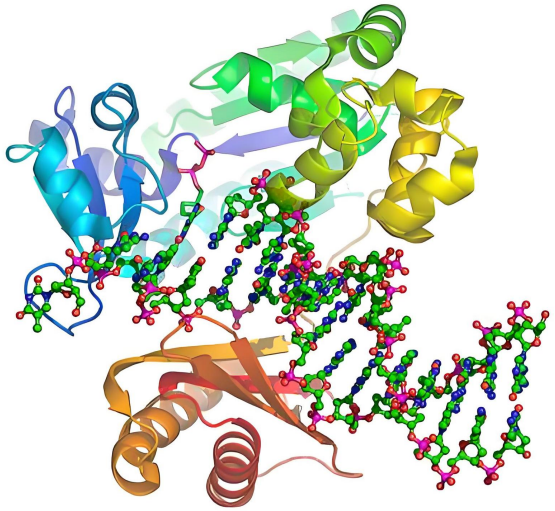
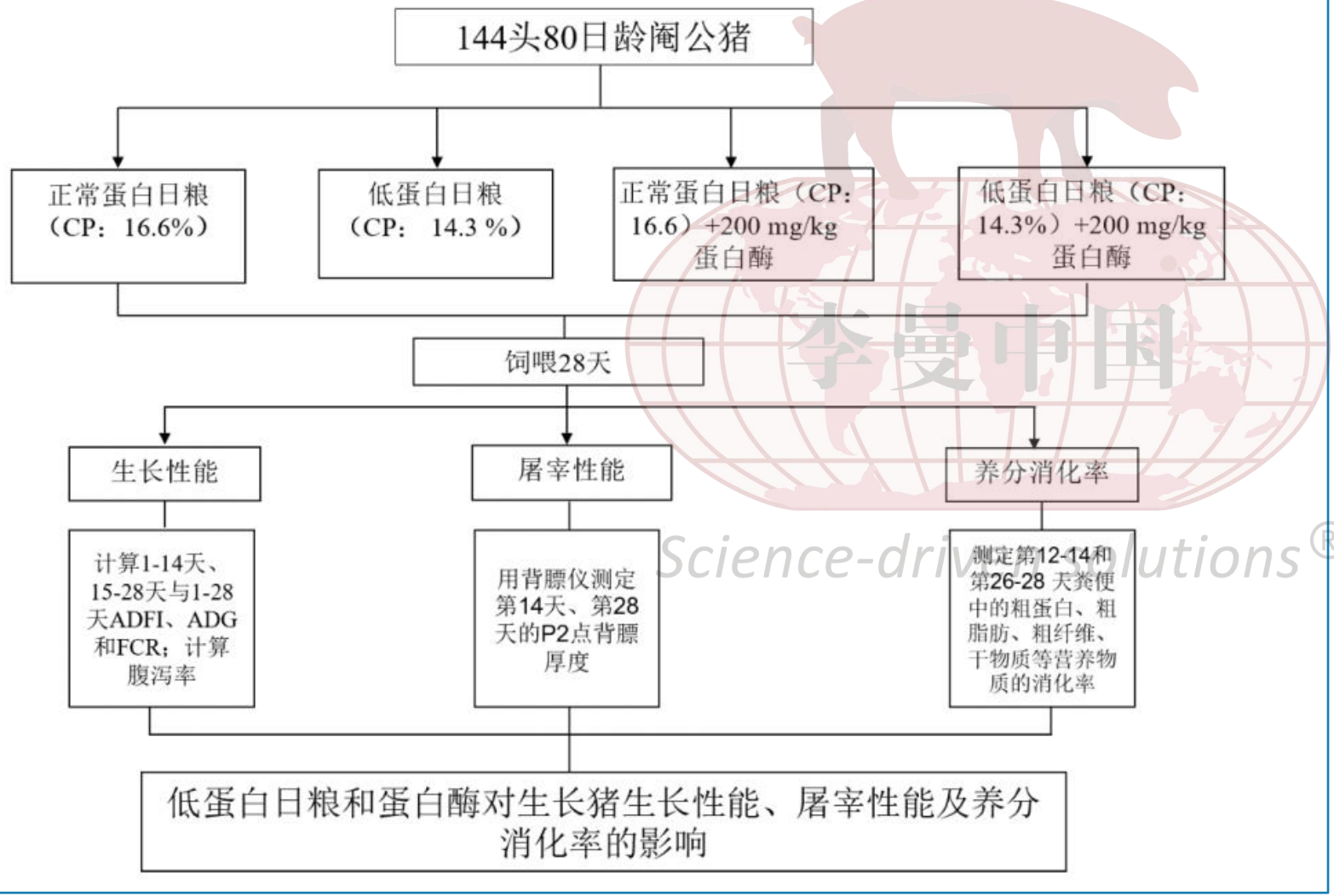
蛋白质的核心作用The core role of proteins

蛋白质理想氨基酸组成，氨基酸-可利用氨基酸

Ideal amino acid composition of protein, amino acid - available amino acid






| 原料组成，g/kg | 基础日粮 | 低蛋白日粮 |
|---|---|---|
| 玉米 | 695.4 | 761.7 |
| 麸皮 | 20 | 30 |
| 豆粕， 43% CP | 240 | 160 |
| 氯化钠 | 4.2 | 4.2 |
| 石粉 | 10 | 10 |
| 磷酸氢钙 | 6.5 | 7.5 |
| 大豆油 | 13 | 10 |
| 赖氨酸盐酸盐 | 2.3 | 4.6 |
| 蛋氨酸 | 0.4 | 1.1 |
| 苏氨酸 | 0.2 | 1.2 |
| 色氨酸 | | 0.4 |
| 缬氨酸 | | 1.3 |
| 猪预混料 4205[1] | 5 | 5 |
| 产品处理预混料[2] | 3 | 3 |
| 营养水平，% | | |
| 粗蛋白（实测值） | 16.66 | 14.71 |

# 01物质构建基础

# 01 Material construction foundation

蛋白质的核心作用The core role of proteins

蛋白质理想氨基酸组成，氨基酸-可利用氨基酸

Ideal amino acid composition of protein, amino acid - available amino acid

**表 3　低蛋白日粮和蛋白酶对生长猪生长性能的影响**

| 项目 | 正常蛋白水平 | | 低蛋白水平 | | SEM | P 值 | | |
|---|---|---|---|---|---|---|---|---|
| | 0 mg/kg 蛋白酶 | 200 mg/kg 蛋白酶 | 0 mg/kg 蛋白酶 | 200 mg/kg 蛋白酶 | | 蛋白水平 | 蛋白酶 | 蛋白水平×蛋白酶 |
| **体重/kg** | | | | | | | | |
| 第 1 d | 30.36 | 29.08 | 30.34 | 30.48 | 0.27 | 0.21 | 0.30 | 0.20 |
| 第 14 d | 43.13 | 41.54 | 43.54 | 43.36 | 0.36 | 0.14 | 0.24 | 0.34 |
| 第 28 d | 58.27 | 59.56 | 60.84 | 63.38 | 1.22 | 0.21 | 0.45 | 0.80 |
| **1-14 d** | | | | | | | | |
| ADFI (kg/d) | 1.95 | 1.85 | 2.00 | 2.03 | 0.02 | ＜0.05 | 0.55 | 0.26 |
| ADG (kg/d) | 0.97 | 0.94 | 1.01 | 0.99 | 0.01 | 0.16 | 0.43 | 0.90 |
| F/G | 2.01 | 1.98 | 1.98 | 2.06 | 0.02 | 0.63 | 0.62 | 0.28 |
| **15-28 d** | | | | | | | | |
| ADFI (kg/d) | 2.66 | 2.67 | 2.82 | 2.54 | 0.06 | 0.90 | 0.35 | 0.29 |
| ADG (kg/d) | 1.16 | 1.38 | 1.32 | 1.38 | 0.06 | 0.51 | 0.27 | 0.51 |
| F/G | 2.36 | 1.93 | 2.19 | 1.72 | 0.06 | 0.18 | ＜0.05 | 0.88 |
| **1-28 d** | | | | | | | | |
| ADFI (kg/d) | 2.23 | 2.26 | 2.37 | 2.27 | 0.03 | 0.36 | 0.67 | 0.43 |
| ADG (kg/d) | 1.06 | 1.16 | 1.17 | 1.26 | 0.03 | 0.20 | 0.26 | 0.95 |
| F/G | 2.11 | 1.94 | 2.05 | 1.83 | 0.08 | 0.32 | ＜0.05 | 0.78 |

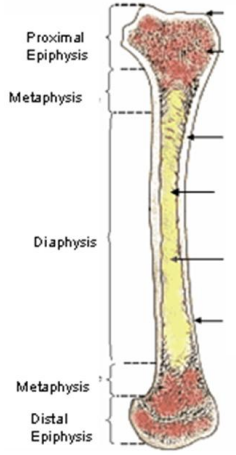
# 01物质构建基础 01 Fundamentals of material construction

矿物质与骨骼发育

Minerals and bone development

钙、磷等矿物质构成骨骼框架

Minerals such as calcium and phosphorus constitute the skeletal framework




| | Ca supply | | | Phytase | | | P value | | |
|---|---|---|---|---|---|---|---|---|---|
| Items | STTD Ca (growth) | Total Ca (NRC2012) | STTD Ca (bone) | No | Yes | SD[2] | Ca requirement | Phytase | Interaction |
| Bone dry weight, g | 79.1B | 81.7B | 89.0A | 84.5 | 82.1 | 7.1 | < 0.01 | 0.25 | 0.31 |
| Bone ash, g | 37.8C | 41.2B | 46.2A | 42.4 | 41.0 | 3.0 | < 0.01 | 0.11 | 0.24 |
| Bone Ca, g | 13.3C | 14.6B | 16.3A | 15.0 | 14.4 | 1.0 | < 0.01 | 0.04 | 0.26 |
| Bone P, g | 6.8C | 7.4B | 8.3A | 7.7 | 7.4 | 0.6 | < 0.01 | 0.07 | 0.37 |
| Bone ash, % | 47.8B | 50.5A | 52.1A | 50.3 | 50.0 | 2.6 | < 0.01 | 0.70 | 0.93 |
| Bone Ca, % | 16.8B | 17.9A | 18.4A | 17.8 | 17.6 | 1.0 | < 0.01 | 0.42 | 0.94 |
| Bone P, % | 8.7B | 9.1A | 9.4A | 9.1 | 9.0 | 0.5 | < 0.01 | 0.47 | 0.96 |
| Initial body length, m | 0.62 | 0.63 | 0.63 | 0.62 | 0.63 | 0.16 | 0.82 | 0.06 | 0.47 |
| Final body length, m | 1.01 | 1.00 | 1.02 | 1.01 | 1.01 | 0.45 | 0.26 | 0.88 | 0.99 |



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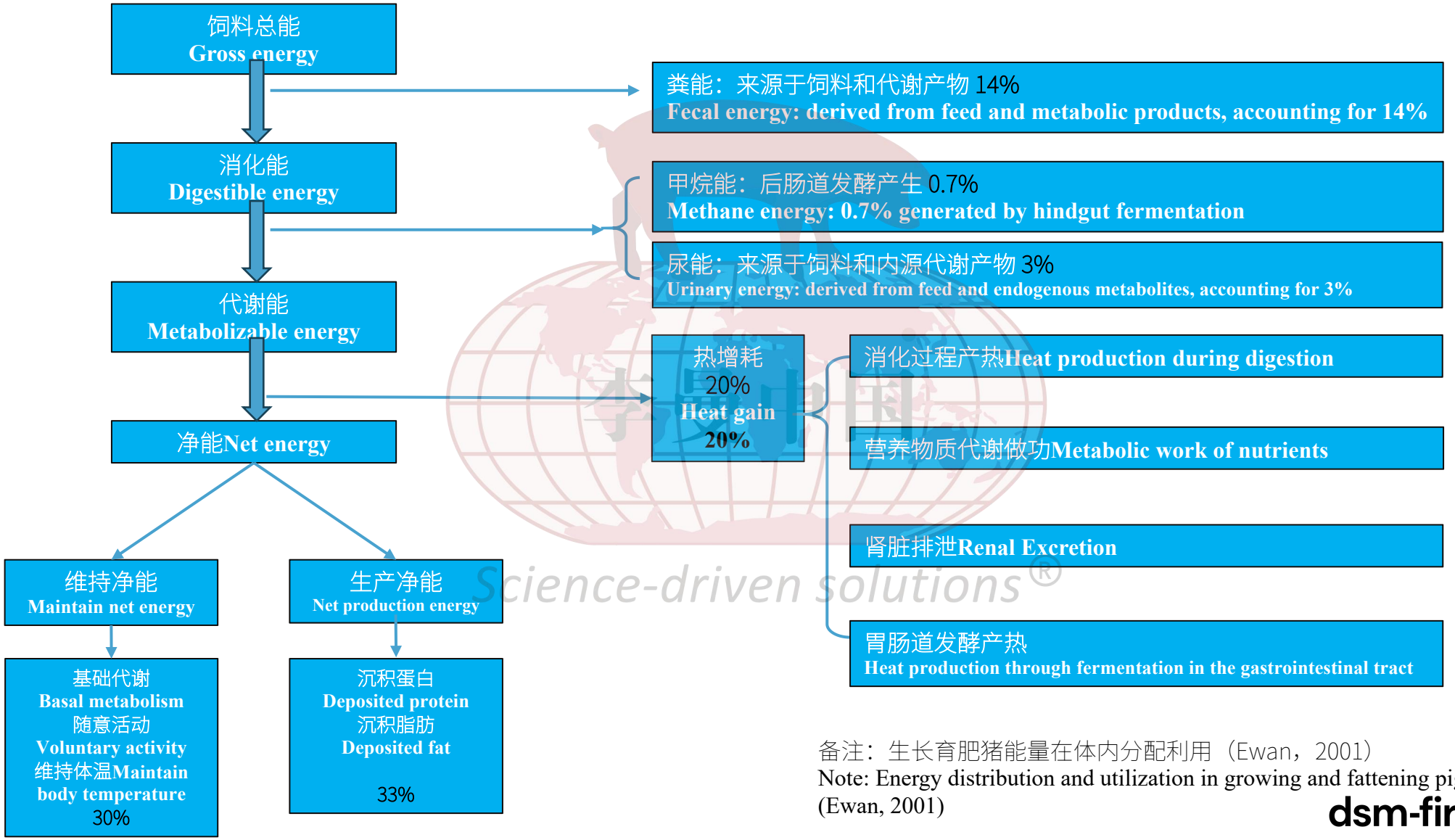
# 02能量驱动02 Energy Drive




备注：生长育肥猪能量在体内分配利用（Ewan，2001）
Note: Energy distribution and utilization in growing and fattening pigs (Ewan, 2001)



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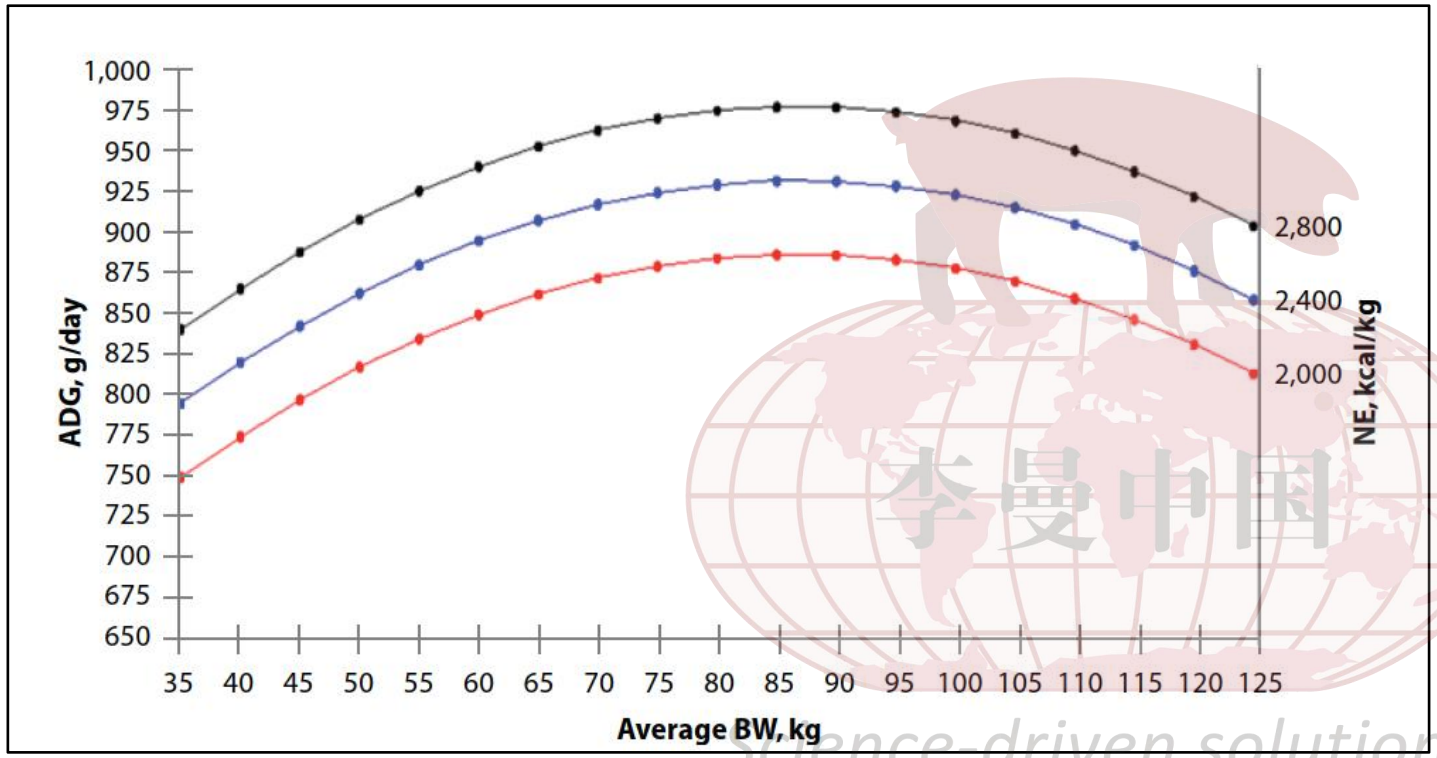
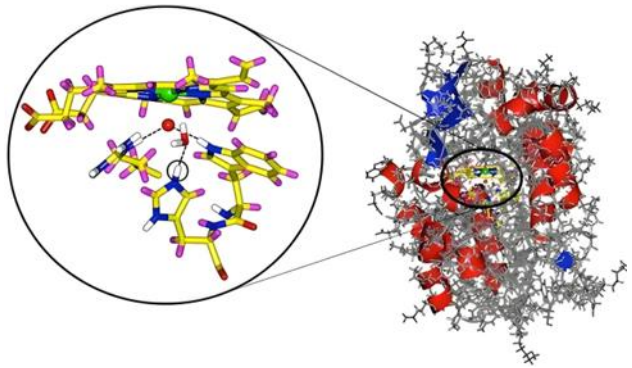
# 02能量驱动02 Energy drive





- 采用回归模型，基于体重预测猪在不同饲粮NE水平下的日增重。
  [日增(g/d) = 0.1135*NE (kcal/kg) + 8.8142*平均体重(kg) - 0.05068*平均体重(kg)*平均体重(kg) + 275.99]
- Using a regression model, daily weight gain of pigs under different dietary NE levels was predicted based on body weight.
  [Daily gain (g/d) = 0.1135*NE (kcal/kg) + 8.8142*Average body weight (kg) - 0.05068*Average body weight (kg)*Average body weight (kg) + 275.99]
- 该品系生长速率随平均体重增加而增加，但当平均体重超过87 kg时生长速率降低。
- The growth rate of this strain increases with the increase in average body weight, but it decreases when the average body weight exceeds 87 kg.

备注：2013，S. Nitikanchana等



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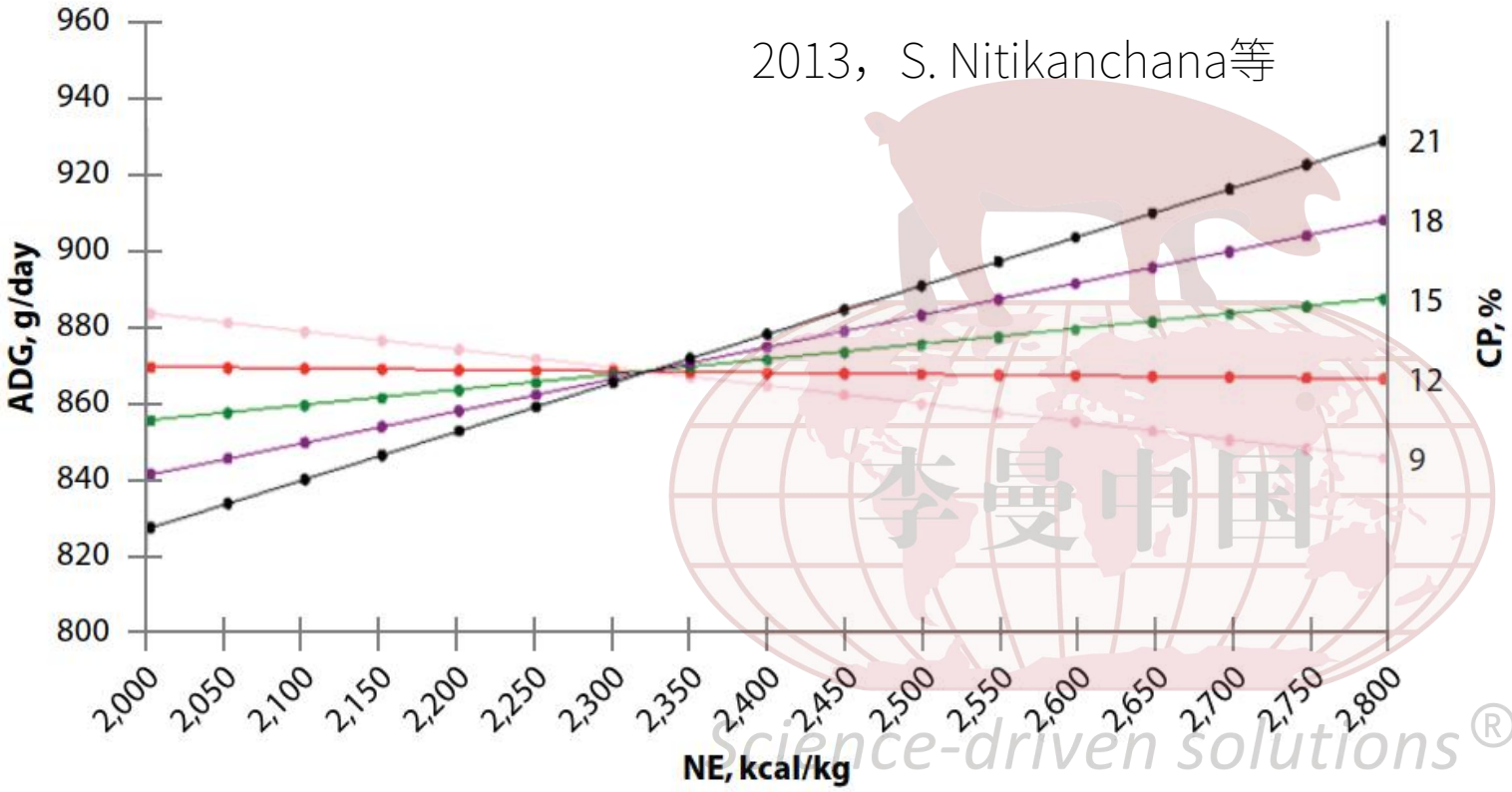
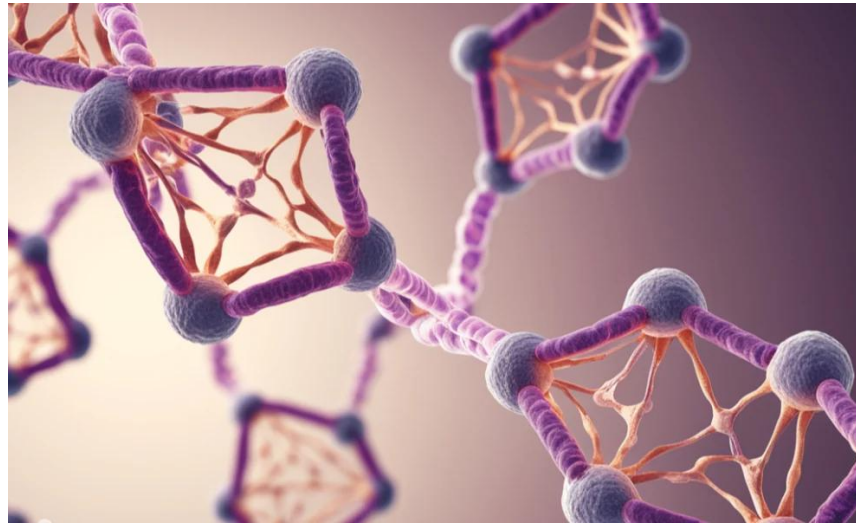
# 02能量驱动 02 Energy Drive



采用回归分析模型[ADG (g/d) =-0.1809*NE]预测在不同CP(%)水平下增加饲粮NE (kcal/kg)的100公斤猪的日增重(ADG)（千卡/千克） + 1.6119*平均体重（千克） - 34.2735*CP（%） + 0.01476*NE（千卡/千克）*CP（%） +129.63*SID赖氨酸(%)+ 1047.92](SID =标准回肠可消化)。增加饲粮NE可使日增重呈线性提高;不同粗蛋白质水平对日增重的改善幅度(斜率)不同，当粗蛋白质水平提高时，饲粮NE对日增重的改善幅度最大。

Using a regression analysis model [ADG (g/d) = -0.1809*NE], we predict the average daily gain (ADG) (kcal/kg) of 100 kg pigs under different crude protein (CP) (%) levels when the dietary net energy (NE) (kcal/kg) is increased. The prediction formula is: ADG = 1.6119 * average body weight (kg) - 34.2735 * CP (%) + 0.01476 * NE (kcal/kg) * CP (%) + 129.63 * SID lysine (%) + 1047.92 (SID = standard ileal digestible). Increasing dietary NE can linearly improve ADG; different CP levels have different improvement rates (slopes) on ADG, and when CP levels increase, the improvement rate of dietary NE on ADG is the greatest.



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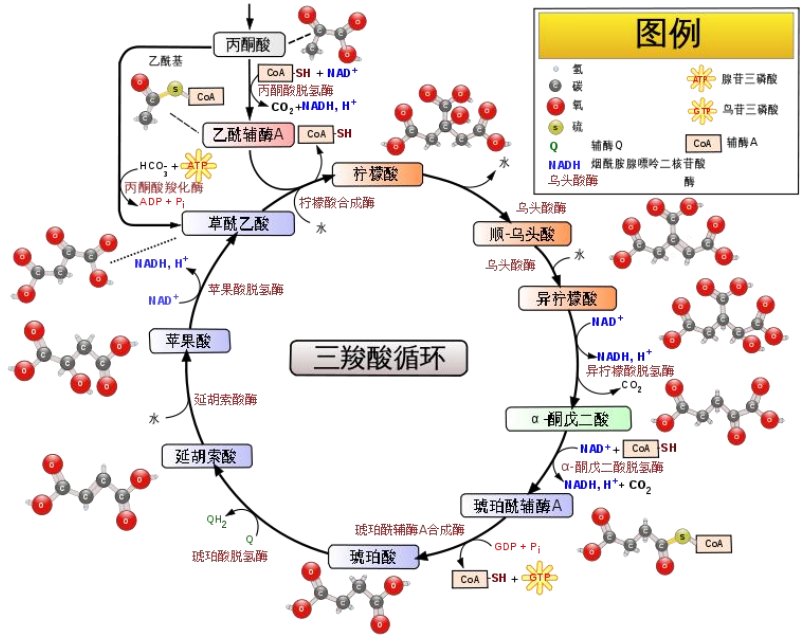
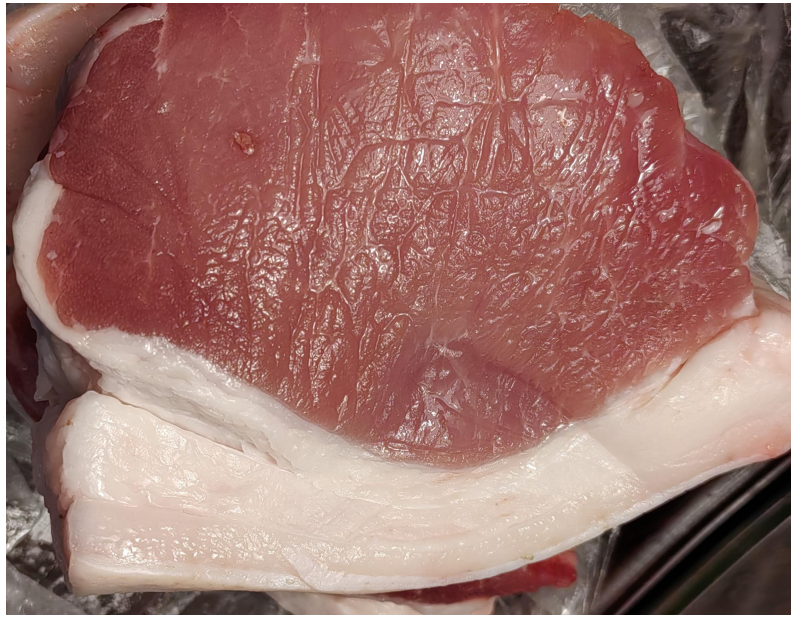
# 03生理功能调节 03 Physiological function regulation

# 04生产市场欢迎的猪肉

# 04 Produce pork that is welcomed by the market



- 感官优质：High-quality sensory experience:
  - 肉色鲜红、有光泽 The meat is bright red and lustrous
  - 脂肪分布均匀且呈白色透明状 The fat is evenly distributed and appears white and transparent
  - 肌肉纹理细腻柔软 The muscle texture is delicate and soft
  - 系水力强 "The hydraulic system is strong."
- 口感更优质：Better taste:
  - 自然的猪肉味道 Natural pork flavor
  - 肉质细嫩、鲜美 The meat is tender and delicious
  - 口感多汁 Juicy taste

- PH值，是反映肌糖原酵解速度，体现肌肉的酸度。当PH值小于5时白肌肉（PSE肉），过高容易产生黑干肉（DFD）。
- PH value reflects the speed of muscle glycolysis and indicates the acidity of muscles. When the pH value is less than 5, it indicates PSE meat, while a high pH value is prone to producing dark, dry meat (DFD).
- 颜色和香味是评价猪肉品质直观感觉，肌肉中的色素、血红蛋白和肌红蛋白的含量及其氧化还原等状态决定肉色。猪屠宰以后，短时间内颜色为浅红色，被氧化生成高铁肌红蛋白，使肉的颜色逐渐变褐。
- Color and aroma are intuitive senses for evaluating pork quality. The content and redox state of pigments, hemoglobin, and myoglobin in the muscle determine the meat color. After slaughtering, the color of the pork is light red for a short period of time, and it is oxidized to form metmyoglobin, gradually turning the meat brown.
- 系水力，表示肌肉组织保持其内部水分的能力。大理石花纹、肌内脂肪含量是猪肉质地最关键因素
- Hydraulic retention refers to the ability of muscle tissue to retain its internal water content. Marbling and intramuscular fat content are the most critical factors affecting pork texture
- 嫩度，主要由肌肉中各种蛋白质的结构决定。
- Tenderness is primarily determined by the structure of various proteins in the muscle.

# 04生产市场欢迎的猪肉 04 Produce pork that the market welcomes
# 实现生长性能与猪肉品质性状平衡
# Achieve a balance between growth performance and pork quality traits

- 瘦肉率、生长速度，获得稳定适当的肌内脂肪，数据积累
- Lean meat percentage, growth rate, obtaining stable and appropriate intramuscular fat, data accumulation
- 蛋白质（氨基酸）主要影响瘦肉率和肌内脂肪含量，还对肉的风味、嫩度、多汁性等特性产生影响
- Protein (amino acid) primarily influences lean meat percentage and intramuscular fat content, and also affects meat characteristics such as flavor, tenderness, and juiciness
- 日粮氨基酸水平也会对猪肉品质产生一定影响 The amino acid level in the diet can also exert a certain influence on pork quality
  - 赖氨酸可使背最长肌面积增加，肌肉多汁性和嫩度下降
  - Lysine can increase the area of the longissimus dorsi muscle, while reducing the juiciness and tenderness of the meat
  - β-丙氨酸和组氨酸可使肉色的稳定性及脂肪抗氧化性得到改善 β-丙氨酸
  - β - alanine and histidine can improve the stability of meat color and fat antioxidant activity. β - alanine
  - 色氨酸可增强抗应激能力，降低PSE肉的产生有一定作用
  - Tryptophan can enhance anti-stress ability and play a certain role in reducing the production of PSE meat
  - 天门冬氨酸可提高猪的瘦肉率，降低脂肪比率
  - Aspartic acid can increase the lean meat percentage of pigs and reduce their fat ratio
  - SID 异亮氨酸与赖氨酸比例为 51% 时，可显著提高育肥猪背最长肌的肌内脂肪含量和 单不饱和脂肪酸浓度，显著降低滴水损失和剪切力
  - When the SID (isoleucine to lysine) ratio is 51%, it can significantly increase the intramuscular fat content and monounsaturated fatty acid concentration of the longissimus dorsi muscle in fattening pigs, and significantly reduce the drip loss and shear force

- 脂肪水平和质量会直接影响猪肉的品质；共轭亚油酸和月桂酸
- Fat level and quality directly affect the quality of pork; conjugated linoleic acid and lauric acid
- 抗氧化剂 维生素E、有机硒、原花青素可抗氧化，延长猪肉保质期，保持色泽和风味。
- Antioxidants such as vitamin E, organic selenium, and procyanidins can resist oxidation, extend the shelf life of pork, and maintain its color and flavor.
- 功能性添加剂 (胍基乙酸GAA，肌醇)
- Functional additives (guanidinoacetic acid GAA, inositol)

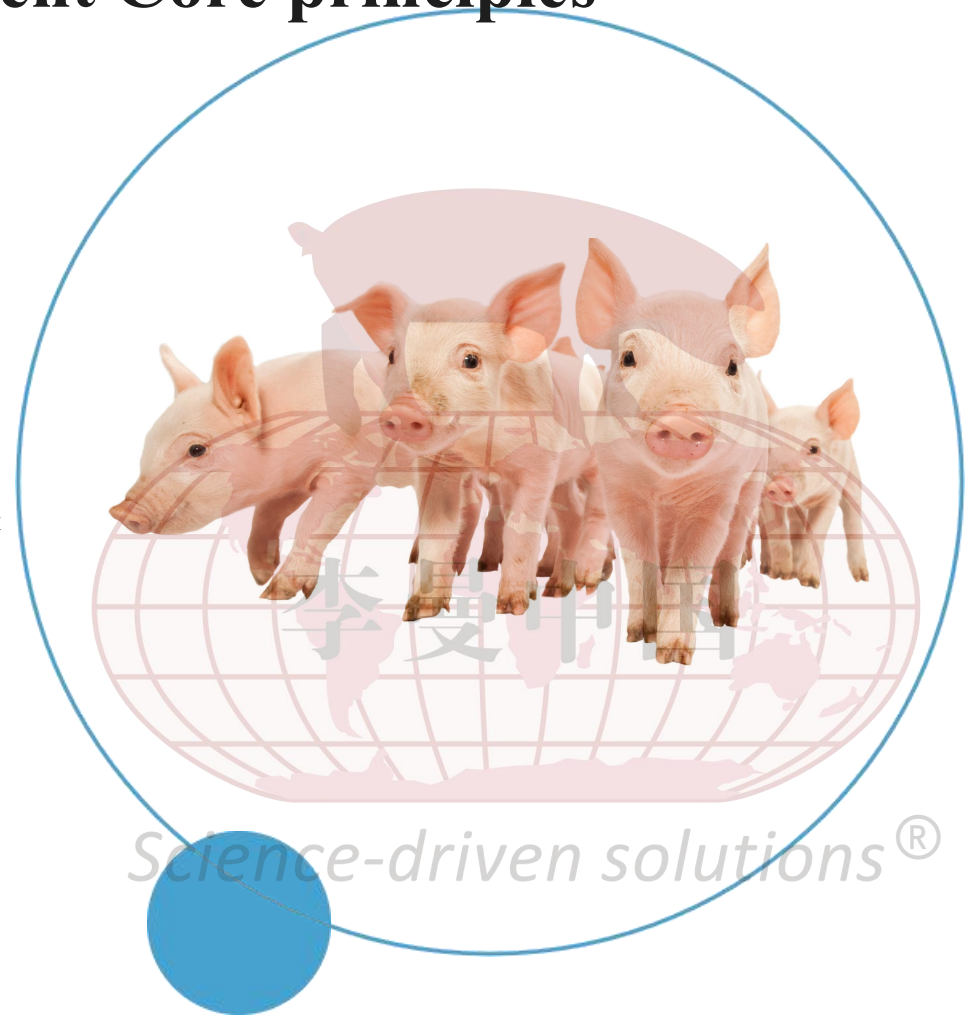
# 05环境可持续05 Environmental sustainability

- 畜牧业占人类温室气体总排放量的14.5%，未来还将继续增长
- The livestock industry accounts for 14.5% of the total greenhouse gas emissions from human activities, and this proportion is expected to continue increasing in the future
- 环境可持续性：通过营养调控减少氮碳排放，提升养殖生态效益
- Environmental sustainability: Reducing nitrogen carbon emissions through nutrient regulation and enhancing ecological benefits of aquaculture
- 达标排放，循环利用"Up to standard emissions, recycling"
- 节约资源 Conserve resources
- 畜牧业减排，解决方案包括：
- To reduce emissions in animal husbandry, the solutions include:
  - 苯甲酸：减少猪高达18%的氨排放
  - Benzoic acid: reduces ammonia emissions from pigs by up to 18%
  - 蛋白酶：提高蛋白质消化率，减少高达17%的氮排放
  - Protease: Improves protein digestibility and reduces nitrogen emissions by up to 17%
  - NSP酶：提高非淀粉多糖利用率，降低碳排放3%
  - NSP enzyme: Enhance the utilization rate of non-starch polysaccharides and reduce carbon emissions by 3%
  - 智能可持续服务：帮助养殖户了解其环境足迹和改善机会
  - Smart Sustainable Services: Assisting farmers in understanding their environmental footprint and identifying opportunities for improvement



# 营养管理 核心原理

# Nutrition management Core principles




01

## 物质构建基础Material construction foundation

1.蛋白质的核心作用1. Core role of protein
作为肌肉、皮肤、内脏、血液等组织的核心原料，遗传物质合成，直接决定肌肉生长速度与瘦肉率
As the core raw material for tissues such as muscles, skin, internal organs, and blood, the synthesis of genetic material directly determines the rate of muscle growth and lean meat percentage
2.矿物质与骨骼发育2. Minerals and bone development
钙、磷等矿物质构成骨骼框架
Minerals such as calcium and phosphorus constitute the skeletal framework

02

## 能量驱动 Energy-driven

1.能量饲料供给动力1. Energy feed provides power
玉米、小麦等碳水化合物提供基础代谢能量
Carbohydrates such as corn and wheat provide basic metabolic energy油脂支持脂肪积累与体重增长
Oils and fats support fat accumulation and weight gain
2.能量转化增效技术
2. Energy conversion and efficiency enhancement technology
酶制剂、肠道健康
Enzyme preparation, intestinal health

03

## 生理功能调节 Physiological function regulation

1.消化系统优化1. Digestive system optimization
肠道菌群调控； 氯化钠调节渗透压，促进胃酸分泌。Regulation of intestinal flora; Sodium chloride regulates osmotic pressure and promotes gastric acid secretion.
2.免疫与抗病力提升2. Immunity and disease resistance enhancement
维生素等微量营养素在生长、繁殖、健康作用
Micronutrients such as vitamins play a role in growth, reproduction, and health
抗氧化 antioxidant

04

## 生产受市场欢迎的猪肉Produce pork that is popular in the market

1.食用质量 --色泽 、 风味 、 嫩度 、 多 汁性
1. Edible quality -- color, flavor, tenderness, juiciness
2.营养质量 --蛋 白 质 和 脂肪酸 的含量 、 蛋 白 质 、 脂肪酸组成
2. Nutritional quality -- content of protein and fatty acids, composition of protein and fatty acids
3.加工质量--系水力 、 pH值 、 脂肪饱和程度 、 抗氧化能力 、蛋白质变性程度 、结缔组织含量3. Processing quality - water binding capacity, pH value, degree of fat saturation, antioxidant capacity, degree of protein denaturation, connective tissue content
4.卫生质量 --药物残 留 、 微生物含量
4. Hygiene quality -- drug residues, microbial content
5.人文质量 5. Humanistic quality

05

## 环境可持续Environmental sustainability

环境可持续性：通过营养调控减少氮碳排放，提升养殖生态效益
Environmental sustainability: Reducing nitrogen carbon emissions through nutrient regulation and enhancing the ecological benefits of aquaculture

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# 数据价值 Data value

## 成本控制
## Cost control

通过分析饲料采购、养殖成本等数据，企业可发现成本高的环节并优化。如对比不同能量、蛋白质饲料价格和质量，选择性价比高的渠道

By analyzing data such as feed procurement and breeding costs, enterprises can identify and optimize high-cost links. For example, by comparing the prices and qualities of different energy and protein feeds, they can choose channels with high cost-effectiveness

## 品质提升
## Quality improvement

分析饲料营养与猪肉品质的关系，调整饲料配方

屠宰率，胴体等级，扣款明细，疫病检出记录，运输温控

Analyze the relationship between feed nutrition and pork quality, and adjust the feed formula

Slaughter rate, carcass grade, deduction details, disease detection records, temperature control during transportation

## 效率提高
## Efficiency improvement

分析养殖流程数据，找出效率低的环节并改进。优化饲喂程序，实现营养数据与生产效率数据的关联分析。提高饲料转化率，减少饲料成本。适时出栏，增加销售收入

Analyze the data of the breeding process, identify the inefficient links and make improvements. Optimize the feeding procedure, and achieve a correlation analysis between nutritional data and production efficiency data. Improve the feed conversion rate and reduce feed costs. Timely slaughter to increase sales revenue

## 决策支持
## Decision support

通过市场需求数据，企业可调整养殖规模、品种、饲喂模型、营养方案。如市场对高猪肉品质需求增加，企业扩大或缩小养殖规模

Based on market demand data, enterprises can adjust their breeding scale, breed, feeding model, and nutrition plan. For instance, if the market demands for high-quality pork increase, enterprises can expand or reduce their breeding scale

# 数据采集类别Data collection category

## 养殖数据

## Breeding data

采集生猪养殖过程中的数据，如生长速度、饲料摄入量、健康状况等。可通过传感器、智能设备等实时监测。例如，安装体重传感器，定期记录生猪体重变化。

Collect data during the pig breeding process, such as growth rate, feed intake, health status, etc. Real-time monitoring can be achieved through sensors, smart devices, etc. For example, install a weight sensor to regularly record changes in pig weight.

## 屠宰数据

## Slaughtering data

在屠宰环节采集数据，如猪肉品质指标、出肉率等。通过专业检测设备获取准确数据。例如，检测猪肉的大理石花纹评分、脂肪含量等。

Collect data during the slaughtering process, such as pork quality indicators and meat yield. Obtain accurate data through professional testing equipment. For example, test the marble pattern score and fat content of pork.

## 饲料数据

## Feed data

收集饲料的相关数据，包括营养成分、采购价格、使用量等。建立饲料数据库，方便查询和分析。如记录每次采购饲料的品牌、价格和营养指标。

Collect relevant data on feed, including nutritional components, purchase prices, usage amounts, etc. Establish a feed database for convenient query and analysis. For example, record the brand, price, and nutritional indicators of each batch of feed purchased.

## 市场数据

## Market data

关注市场数据，如猪肉价格、需求趋势等。可通过市场调研、行业报告等渠道获取。了解市场动态，为企业决策提供依据。

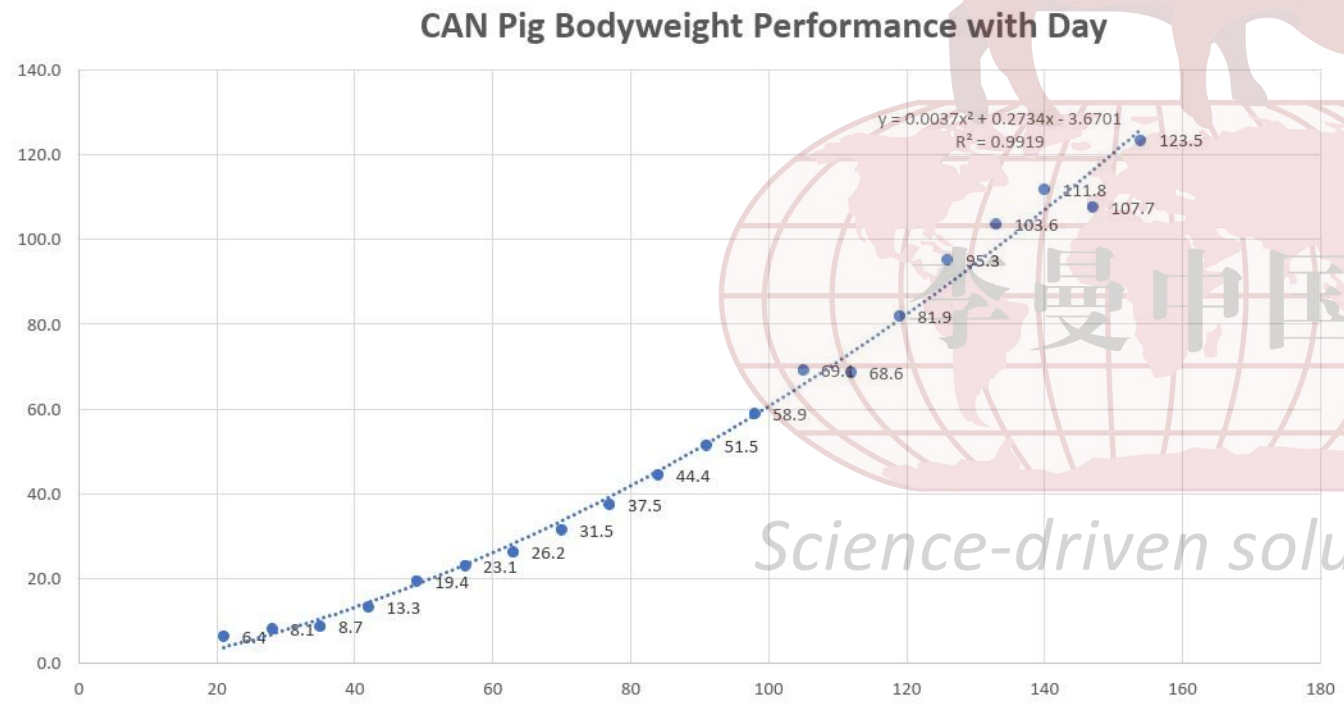
Pay attention to market data, such as pork prices and demand trends. This data can be obtained through channels such as market research and industry reports. Understanding market dynamics provides a basis for corporate decision-making.

# 养殖数据采集 探寻生长潜力

# Breeding data collection to explore growth potential

## Summary on Pig Live Bodyweight Changes by Day

### 10-15% higher than PIC commercial stock




| Day | CAN | PIC |
|---|---|---|
| 21 | 6.4 | 5.9 |
| 28 | 8.1 | 7.3 |
| 35 | 8.7 | 9.5 |
| 42 | 13.3 | 12.2 |
| 49 | 19.4 | 15.4 |
| 56 | 23.1 | 19.8 |
| 63 | 26.2 | 24.7 |
| 70 | 31.5 | 29.9 |
| 77 | 37.5 | 35.4 |
| 84 | 44.4 | 41.3 |
| 91 | 51.5 | 47.5 |
| 98 | 58.9 | 54.0 |
| 105 | 69.1 | 60.5 |
| 112 | 68.6 | 67.3 |
| 119 | 81.9 | 74.1 |
| 126 | 95.3 | 81.0 |
| 133 | 103.6 | 87.8 |
| 140 | 111.8 | 94.6 |
| 147 | 107.7 | 101.4 |
| 154 | 123.5 | 108.0 |

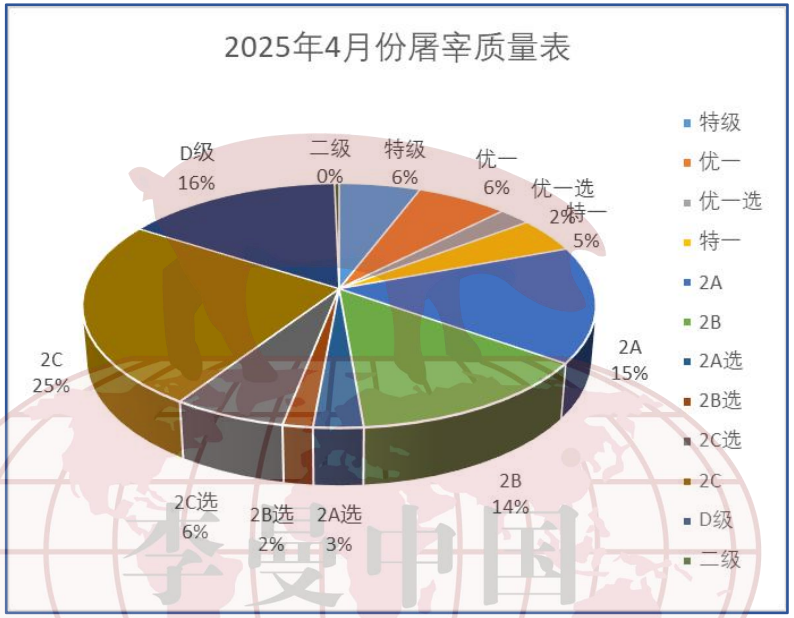
| 体重kg | 日龄 |
|---|---|
| 30 | 70 |
| 60 | 110 |
| 90 | 132 |
| 120 | 157 |
| 147 | 180 |

◆依据日龄、体重实测值生长曲线
◆Based on the growth curve of actual measured values of age and weight
◆30 kg 体重以前的日增重不作为主要追求指标。重点在好肠道健康和骨骼发育
◆Daily weight gain before reaching 30 kg is not the main pursuit indicator. The focus is on good intestinal health and bone development
◆超过100kg日增重降低
◆Daily weight gain decreases when exceeding 100kg
◆对应不同日增重，可以做出更精准、造肉成本更低的营养方案
◆Based on different daily weight gains, a more precise nutritional plan with lower meat production costs can be formulated

CAN霸州研发中心

# 屠宰数据采集 透视屠宰扣款迷雾

# Slaughter data collection: Penetrating the mystery of slaughter deductions




用屠宰数据优化养殖决策

Optimize breeding decisions using slaughter data

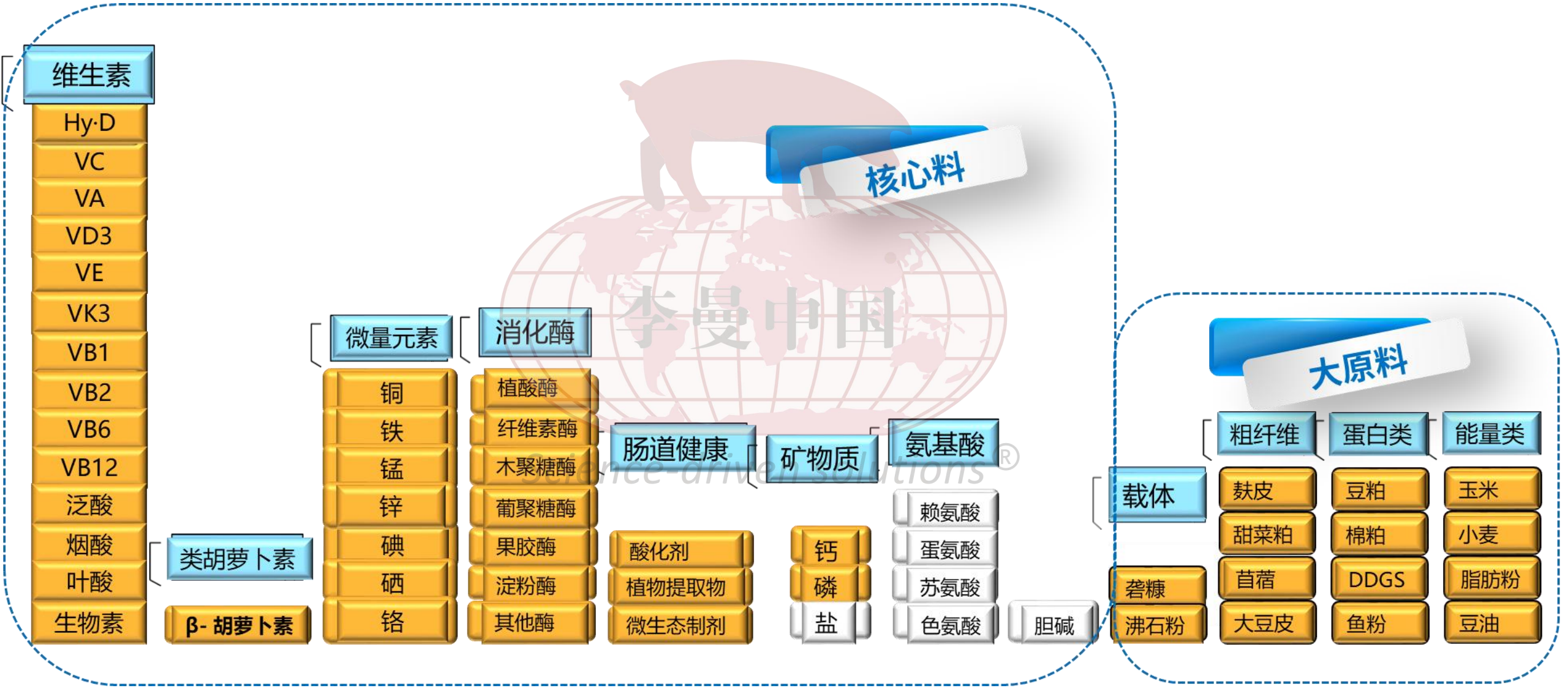
- Backfat thickness + eye muscle area
- 背膘厚+眼肌面积
  → Adjust energy supply during the fattening period
  → 调整育肥期能量供给
- Analysis of carcass damage sites
- 胴体损伤部位分析
  → Improve the housing and driving methods
  → 改进栏舍、驱赶方式
- Meat color grading 肉色评分
  → Optimize stress management before slaughter, Additive nutrition
  → 优化出栏前应激管理，添加剂营养



***生猪屠宰质量分析表

| 2025年4月 | 出肉率（去蹄） | 头数 | 毛重 | 头均 | 特级 | 优一 | 优一选 | 特一 | 2A | 2B | 2A选 | 2B选 | 2C选 | 2C | D级 | 二级 | 急宰 | 销毁 | 结算单价 | 金额 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4月3日 | 72.43% | 120 | 14,871 | 124 | 4 | 7 | 2 | 9 | 17 | 17 | 1 | 4 | 3 | 37 | 19 | - | - | - | 14.66 | 217,829 |
| 4月4日 | 72.85% | 120 | 15,205 | 127 | 5 | 3 | 2 | 2 | 14 | 13 | - | 2 | 19 | 41 | 19 | - | - | - | 14.80 | 224,929 |
| 4月22日 | 73.94% | 120 | 13,941 | 116 | 11 | 13 | 4 | 6 | 24 | 19 | 9 | - | - | 11 | 22 | 1 | - | - | 15.14 | 210,899 |
| 4月合计 | 73.56% | 1200 | 150,264 | 125 | 70 | 79 | 28 | 55 | 185 | 167 | 33 | 20 | 75 | 296 | 188 | 4 | - | - | 14.76 | 2,217,897 |

# 饲料数据 采集Feed data collection



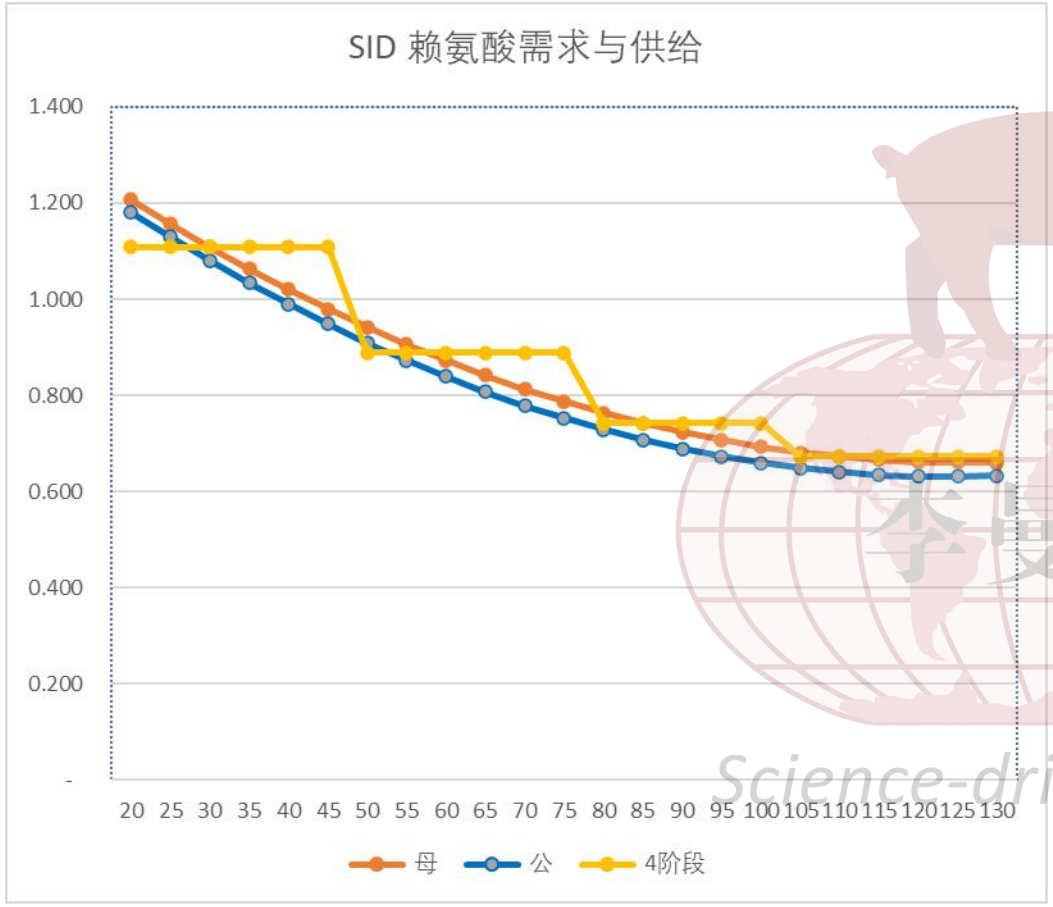
# 饲料数据 采集

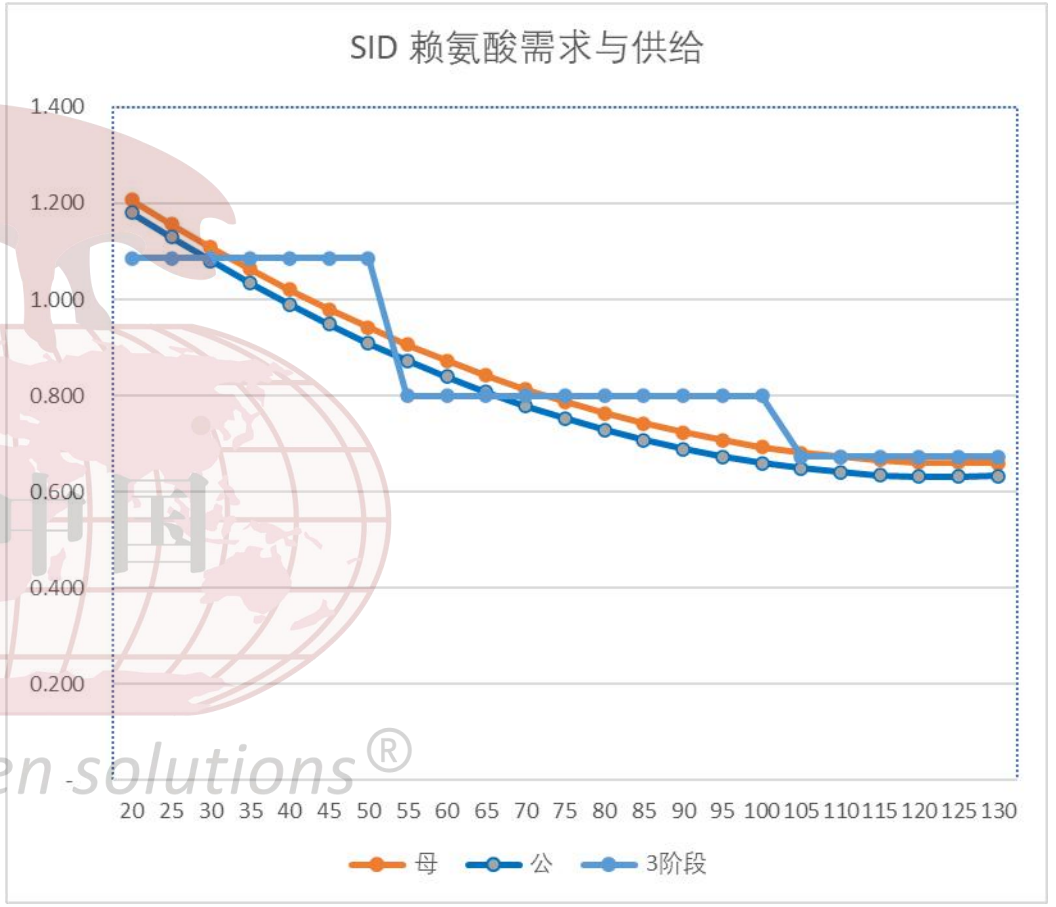
# Feed data collection

| | | |
|---|---|---|
| 维生素 A | 212350 IU | 锰 |
| 维生素 D3 | 66672 IU | 锌 |
| 维生素 E | 1800 IU | 蛋氨酸 |
| 维生素 K3 | 66.7 mg | L-赖氨酸 |
| 维生素 B1 | 66.7 mg | 苏氨酸 |
| 维生素 B2 | 226.7 mg | 水分不高于 |
| 维生素 B6 | 133.3 mg | |
| 维生素 B12 | 0.8 mg | |
| D-生物素 | 5.3 mg | |
| D-泛酸 | 666.7 mg | |
| 烟酰胺 | 800.1 mg | |
| 氯化胆碱 | 6680 mg | |
| 铁 | 3333 mg | |
| 铜 | 733.0 mg | |

| 营养指标 | 数值 | 单位 |
|---|---|---|
| 干物质 | 86.9 | % |
| CP | 16.0 | % |
| EE | 2.5 | % |
| CF | 3.2 | % |
| SUG | 2.9 | % |
| NDF | 9.8 | % |
| Lys | 1.05 | % |
| Ca | 0.490 | % |
| P-total | 0.448 | % |
| 有效磷A-P[%] | 0.240 | % |
| Ca/P | 1.093 | - |
| 盐NaCl[%] | 0.409 | % |
| DE q | 3,260 | Kcal |
| ME q | 3,130 | Kcal |
| NE q | 2,380 | Kcal |
| SID Lys-s | 0.940 | % |
| SID Lys/NE[g/Mcal] | 3.950 | - |
| SID [M+C]/Lys | 58.000 | % |
| SID Thr/Lys | 64.000 | % |
| SID Trp/Lys | 17.000 | % |
| SID Ile/Lys | 58.455 | % |
| SID His/Lys | 39.933 | % |
| SID Val/Lys | 68.000 | % |

# 市场数据 采集Market data collection






生长育肥3阶段与4阶段饲喂差异

Feeding differences between 3 and 4 stages of growth and fattening

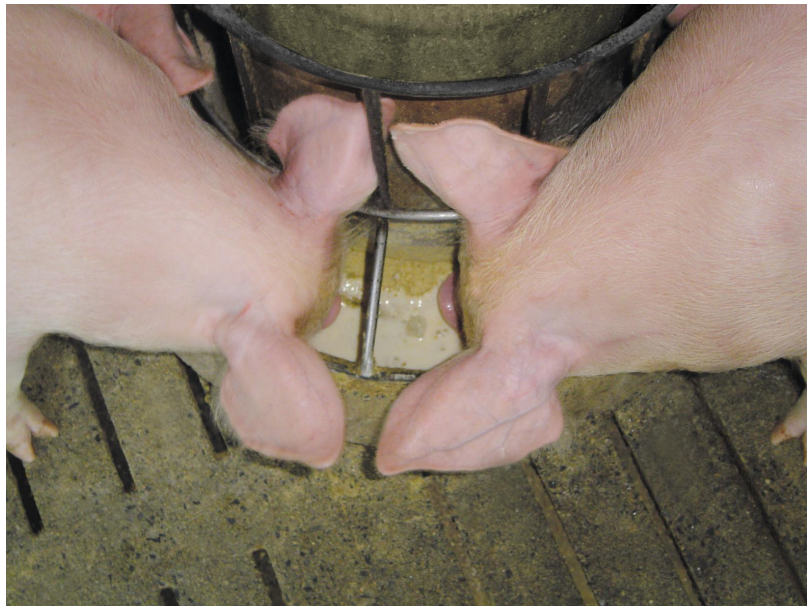
# 市场数据 采集Market data collection

## 恰当的乳猪营养具有超强的后期影响力

## Proper nutrition for suckling pigs has a profound impact on their later development

| | 日粮 | | | | | |
|---|---|---|---|---|---|---|
| 项目 | A18.4% | B17.4% | C19.1% | D18.8% | SEM | *P*-value |
| 14到21天试验后跟踪 | | | | | | |
| 日增重 | 576[ab]<br>-100 | 584[b]<br>-101 | 516[a]<br>-90 | 537[ab]<br>-93 | 17 | 0.03 |
| 日采食 | 780<br>-100 | 763<br>-98 | 750<br>-96 | 786<br>-101 | 23 | 0.69 |
| 料肉比 | 1.36[ab]<br>-100 | 1.31[a]<br>-96 | 1.45[bc]<br>-107 | 1.47[c]<br>-108 | 0.03 | < 0.01 |





Hengxiao Zhai, Wen Ren, and Anna-Maria Kluenter
DSM China Animal Nutrition Research Center Co., Ltd, Bazhou, Hebei Province, China
065799 CN-S-2015-05:

# 利用数据管理 生长育肥策略

# Utilize data management for growth and fattening strategies

## 定制营养

## Customized nutrition

生长育肥猪采用定制功能性营养，可提高猪群健康状况，发挥最大生长潜能。根据育肥猪的特点和需求，设计专属的饲料配方，满足其营养需求。

Adopting customized functional nutrition for growing and fattening pigs can enhance the health status of the herd and unleash their maximum growth potential. Based on the characteristics and needs of fattening pigs, we design exclusive feed formulas to meet their nutritional requirements.

## 配方设计

## Formulation design

在配方设计上，要第一时间关注市场动态，运用精准营养模型。结合饲料原料价格和生猪生长需求，调整配方。例如，当某种原料价格上涨时，寻找替代原料。

In formula design, it is essential to pay close attention to market dynamics and utilize precise nutrition models. By considering the prices of feed ingredients and the growth needs of pigs, adjustments can be made to the formula. For instance, when the price of a certain ingredient rises, alternative ingredients should be sought.

## 成本优势

## Cost advantage

饲料成本进入3.5元时代，为育肥猪养殖带来成本优势。企业可利用这一优势，扩大养殖规模或提高养殖质量。合理控制成本，提高养殖效益。

With feed costs entering the 3.5 yuan era, it brings cost advantages to the breeding of fattening pigs. Enterprises can leverage this advantage to expand the scale of breeding or improve the quality of breeding. By reasonably controlling costs, they can enhance the efficiency of breeding.

## 持续优化

## Continuous optimization

持续优化养殖策略和饲料配方，是提高育肥猪养殖效益的关键。不断总结经验，根据市场变化和生猪生长情况，调整养殖方案。

Continuously optimizing breeding strategies and feed formulas is the key to improving the breeding efficiency of fattening pigs. We should constantly summarize experience and adjust breeding plans based on market changes and the growth status of pigs.



种猪、仔猪阶段数据管理

**Data management for breeding pigs and piglets**

Part.04

# 未来展望

# Future Prospects

# 数据管理的 技术趋势Technological trends in data management

## 地方原料饲料研发
**Local raw material and feed research and development**

开发本地特色原料是关键的降本增效举措。利用新型原料和添加剂，改善肠道健康，提高饲料利用率。开发发酵原料、副产品替代部分传统蛋白原料。

Developing locally sourced specialty ingredients is a crucial measure to reduce costs and enhance efficiency. By utilizing novel ingredients and additives, we can improve intestinal health and enhance feed utilization. Additionally, we can develop fermented ingredients and by-products as substitutes for some traditional protein sources.

1

## 区块链溯源
**Blockchain traceability**

区块链技术将用于生猪养殖屠宰全链条溯源。消费者可通过扫码查询猪肉的来源、养殖过程和屠宰信息，保障食品安全，提高消费者对猪肉品质的信任度。

Blockchain technology will be utilized for traceability across the entire pig breeding and slaughtering chain. Consumers can scan a QR code to inquire about the origin, breeding process, and slaughtering information of pork, ensuring food safety and enhancing consumers' trust in pork quality.

2

## 基因编辑技术
**Gene editing technology**

基因编辑技术有望应用于生猪养殖。通过编辑猪的基因，提高猪肉品质和抗病能力。如培育出肉质更好的猪品种。Gene editing technology is expected to be applied to pig farming. By editing the genes of pigs, the quality of pork and disease resistance can be improved. For example, pig breeds with better meat quality can be cultivated.

3

## 智能化养殖
**Intelligent breeding**

未来智能化养殖将快速发展。通过物联网、大数据等技术，实现生猪养殖的自动化管理。例如，智能猪舍环境管控，健康预警提高养殖效率和生猪健康水平。

In the future, intelligent farming will develop rapidly. Through technologies such as the Internet of Things and big data, automated management of pig farming will be achieved. For example, intelligent pigsty environment control and health early warning will improve farming efficiency and pig health levels.

4

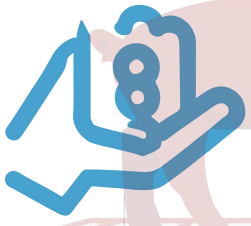
# 生猪养殖数据管理 挑战与应对

# Pig farming data management: Challenges and responses

## 技术挑战
## Eechnical challenge

新技术应用面临挑战，如基因编辑技术的伦理和法律问题。企业需加强技术研发和管理，确保技术应用的安全性和合法性。

The application of new technologies faces challenges, such as the ethical and legal issues of gene editing technology. Enterprises need to strengthen technology research and development and management to ensure the safety and legality of technology application.



## 市场挑战
## Market challenges

市场竞争激烈，消费者需求变化快。企业需及时了解市场动态，调整产品结构和营销策略，满足市场需求。

The market competition is fierce, and consumer demands change rapidly. Enterprises need to timely understand market dynamics, adjust product structure and marketing strategies to meet market demands.

## 环保挑战
## Environmental protection challenges

环保要求日益严格，养殖企业面临环保压力。企业需加强环保管理，采用绿色养殖技术，减少环境污染。

With increasingly stringent environmental protection requirements, aquaculture enterprises are facing environmental pressure. Enterprises need to strengthen environmental management, adopt green aquaculture technologies, and reduce environmental pollution.

## 人才挑战
## Talent challenge

专业人才短缺制约企业发展。企业需加强人才培养和引进，提高员工素质，为企业发展提供人才支持。

The shortage of professional talents restricts enterprise development. Enterprises need to strengthen talent cultivation and introduction, improve employee quality, and provide talent support for enterprise development.



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# 生猪养殖数据管理 发展策略

# Pig farming data management and development strategy

## 技术创新

## Technological innovation

加大技术创新投入。与科研机构合作，开展智能化养殖、饲料营养调控等技术研究，提高企业技术水平。Increase investment in technological innovation. Collaborate with research institutions to conduct technical research on intelligent breeding, feed nutrition regulation, and other technologies, in order to enhance the technological level of the enterprise.

## 品牌建设

## Brand building

注重品牌建设，提高品牌价值。通过优质产品和良好服务，树立品牌形象。如参加行业展会、开展品牌宣传活动，提高品牌知名度。
Focus on brand building and enhance brand value. Establish a brand image through high-quality products and excellent services. For instance, participate in industry exhibitions and conduct brand promotion activities to increase brand awareness.

## 产业链整合

## Industrial chain integration

加强产业链整合，实现养殖、屠宰、销售一体化。降低成本，提高效率。例如，企业可自建屠宰场和销售渠道，减少中间环节，提高利润空间。
Strengthen the integration of the industrial chain to achieve integration of breeding, slaughtering, and sales. Reduce costs and improve efficiency. For example, enterprises can build their own slaughterhouses and sales channels to reduce intermediate links and increase profit margins.

## 人才培养

## Talent cultivation

培养专业人才，满足企业发展需求。开展内部培训和外部引进，提高员工素质。提升企业竞争力。
Cultivate professional talents to meet the development needs of the enterprise. Conduct internal training and external recruitment to improve employee quality. Enhance the competitiveness of the enterprise.



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