4 th China National Cattle Symposium on Applied Techniques and Industry Economics in Beef Production.

第四届全国肉牛生产应用技术与产业经济研讨会

Bio-safety Management Specifications in Beef Cattle Production and Micro Mineral & Vitamin Requirements of Growing & Finishing Beef Cattle.

肉牛生产过程中的生物安全管理规范

青年牛&育肥牛饲养所需微量矿物质及维生素

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Outline 概述

- **Beef Production/Feedlot bio-security**
  肉牛生产/ 饲养场生物安全
  - What is biosecurity? “commonsense”.
    什么是生物安全？ “常识”
  - Measures needed to meet strong biosecurity requirements, that protect your business and enterprise.
    为保障企业及业务，采取的措施需要满足生物安全的需求
  - Disease management & vaccinations.
    疾病控制&疫苗接种
  - Your checklist. 检查清单
- **Promoting The Animal Immune System**
  提升动物免疫系统
  - Four key components.四个关键的补充成分
  - Mineral & vitamin requirements. 矿物质&维生素需要量
  - Increasing your production & profit, with precision scientific software. 利用精密科学的软件，提高生产力和效益
- **‘Takeaway points’ 关键点**

What is bio-security？
什么是生物安全？

- Procedures and measures designed to protect the population, against harmful biological or biochemical substances.

  保护种群免受有害生物或生化物质侵害的程序和措施。

- Preventative measures to reduce the risk of transmission of infectious diseases and living modified organisms.

  采取预防措施，降低传染病和活体转基因生物传播的风险。

(Koblentz, 2010)

Bio-security in beef production

肉牛生产中的生物安全

Welfare, a life worth living. 福利，有价值的生活。

- "Human beings have an intrinsic bond with animals, but our treatment of animals has ranged from respectful to horrendous". Scientific research indicates that the animals have emotions and they feel pain and fear. It is our duty to provide the animals that we raise for food with a decent life, pain free, free of fear and a painless death.
  "人类与动物有着内在的联系，但我们对待动物的方式却从尊重到可怕之间变化"。科学研究表明，动物有情感，会感到痛苦和恐惧。我们有责任为我们饲养的动物提供有尊严的生活，这种生活没有痛苦和恐惧，以及没有痛苦的死亡。
- *I think using animals for food is an ethical thing to do, but we've got to do it right. We've got to give those animals a decent life and we've got to give them a painfulness death. We owe the animal respect.*
  我认为以动物为食是一个关于道德的事情，我们必须以正确的方式去做。我们必须赋予这些动物有尊严的生活以及无痛苦的死亡，我们应该尊重动物。

Dr. Temple Grandin. 汤普乐·格朗丹 博士

**** A decent life includes illness and disease free without hunger, thirst or discomfort.***

有尊严的生活包括没有疾病、没有饥饿、口渴或不适。

A beef Cattle Feedlot 肉牛养殖场

Beef feedlot definition:

"A beef cattle feedlot is a confined yard area with watering and feeding facilities, where cattle are completely hand or mechanically-fed for the purpose of beef production. This definition includes both covered and uncovered yards".

肉牛养殖场定义：
肉牛养殖场（feedlot）是一个有限的区域，有水及饲养设施，为达到牛肉生产的目的而完全手动或以设备饲喂。该定义包括牛舍类或者开放式牧场。

The beef feedlot complex includes 肉牛养殖场包括:

Pens 围栏或圈舍
Handling facilities or yards 保定处理区域或场地
Drains & ponds 排水沟&污水池
Stock lanes and feed alleys 牲畜通道和饲料通道
Manure stockpile and composting pads 粪便堆储发酵
Feed mill and feed storage facilities 饲料加工区域和储藏库房
Stock and vehicle washdown facilities牲畜和设备冲洗设施
Sick or hospital pens to comply with welfare符合动物福利的病畜或医治隔离栏（舍）

Reduce the risk of introducing or spreading an infectious disease, pest or weed.

降低引入或传播传染病、害虫或杂草的风险

i. Introduced stock. 引进的种畜

ii. Vehicle and people movements.车辆和人员活动

iii. Stock feed and feed commodities. 饲料及商品饲料

iv. Property boundaries. 场地边界

v. Feral Animal and wildlife. 野生动植物

vi. Monitoring of animal illness & death. 动物疾病和死亡监测

vii. Maintain good animal health practices. 保持良好的动物健康实践

Disease management and vaccinations.

疾病控制与疫苗接种

- Blood and other body fluids including semen transfer disease.
  血液和包括精液在内的其他体液传播疾病
- Blood sucking insects transfer disease. 吸血昆虫传播疾病
- Manure transfers disease. 粪便传播疾病
- External parasites transfer disease. 体外寄生虫传播疾病
- Internal parasites transfer disease. 体内寄生虫传播疾病
- Feed and feed commodities transfer disease. 饲料或商品饲料传播疾病
- Scalpel's and needles, transfer disease. 手术刀和针传播疾病
- Earth, dirt and mud transfer disease. 泥土传播疾病
- Water transfers disease. 水传播疾病
- Feral animals transfer disease. 野生动物传播疾病
- Feed transfers disease, mycotoxins and aflatoxins. 饲料转换引起的疾病，霉菌毒素和黄曲霉毒素
- **Vaccinations and correct nutrition, eliminate many diseases.**
  疫苗接种结合正确的营养，可以避免很多疾病。

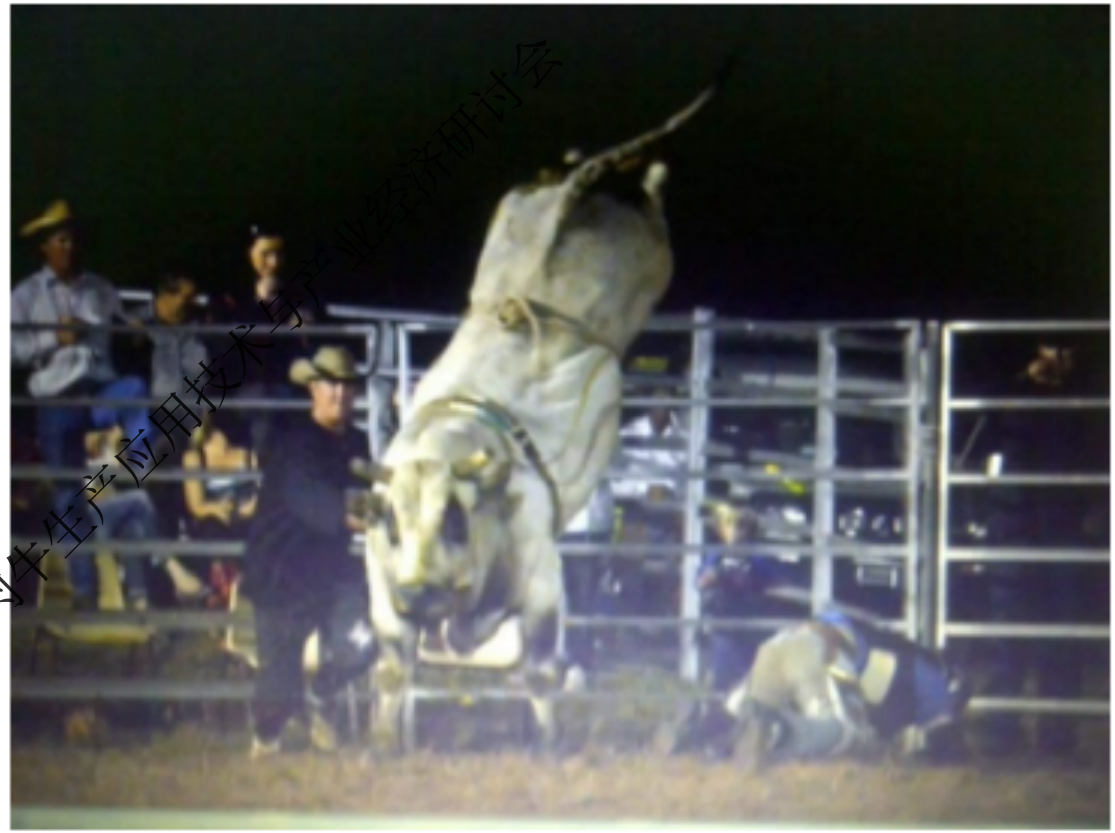
Your checklist 检查清单

- **Vaccinations. Vaccinate against bacterial disease.** 接种疫苗。接种预防细菌性疾病的疫苗

1. **Maintain and implement biosecurity practices for your property and enterprise.** 维护实施财产和企业的生物安全措施
2. **Appoint and employ competent, experienced and qualified managers and consultants, that complement your business, professionalism and wealth.** 任命和雇佣有能力的、经验丰富的、有资质的管理者和顾问，以补充你的业务专业性和帮助财富增长。

✓ **NUTRITION 营养**
✓ **Assist, boost and maintain the animal immune system.**
协助、促进和维护动物的免疫系统
✓ **Manipulate the genetic potential and health**
控制遗传潜力和健康

- ***Protein, energy, vitamins and minerals***
=PRODUCTION AND PROFIT
蛋白，能量，维生素和矿物质=产品和利润



Promoting the animal's immune system. Start at the top !!!

提升动物免疫系统

Why not start first with animal health, lets discuss those benefits:

首先从动物健康开始，让我们讨论一下这些益处：

- Welfare & longevity 福利&寿命
- Genetic manipulation & improvement 基因操纵与改进
- Genetic advance & development 遗传提升与发展
- Production (milk or meat) and fertility
  产量（奶和肉）和生育能力
- Decrease veterinary expenses 兽医费用降低
- Decrease antibiotic use 减少抗生素使用
- Product quality; milk and meat science 产品质量;奶肉科学。
- Feed utilization and feed conversion efficiency (FCE) 'getting your bang for your buck$"
  饲料利用率和饲料转化效率（FCE）"物有所值"
- The reduction in metabolic disease 代谢疾病的减少

Specific, measurable and attainable data collection that improve production, carcass and meat quality

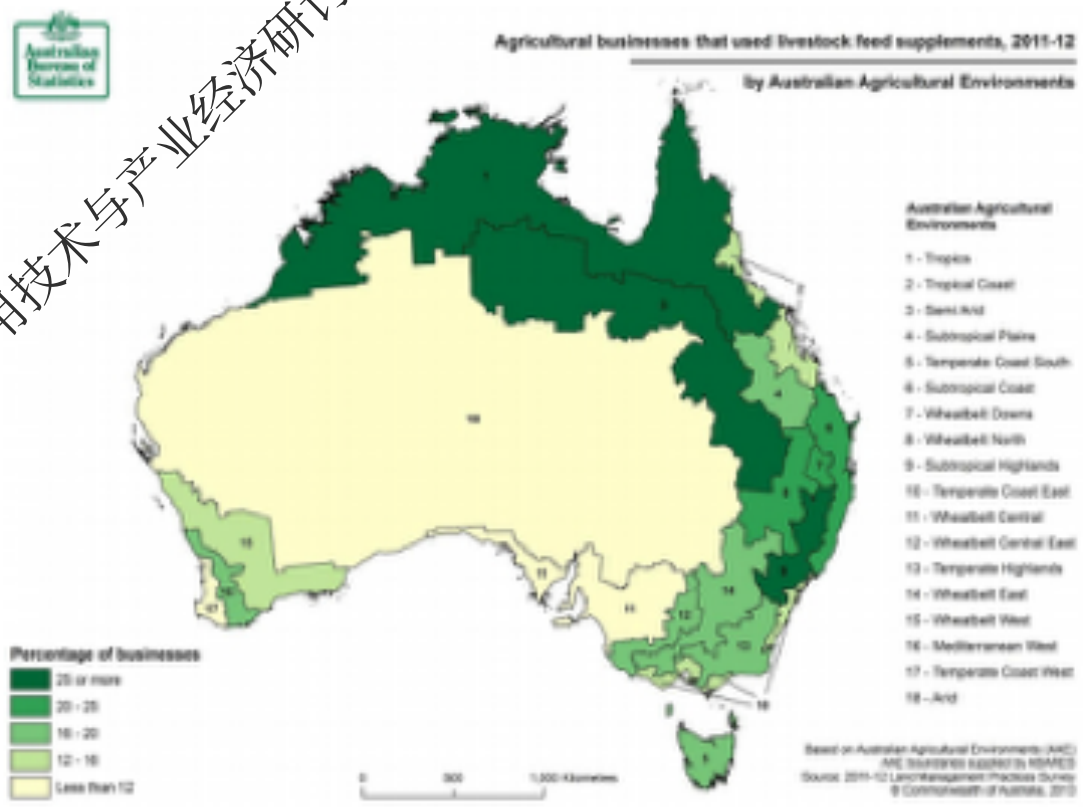
详细的、可测量的和可实现的数据收集，可以促进生产、提高胴体和肉的品质。

The four key supplementation components
四个关键的补充成分

- Micro mineral & vitamin 微量矿物质&维生素
- Macro mineral 常量矿物质
- Protein 蛋白质
- Energy 能量

It is important that you can distinguish the difference between these and understand the benefit to your business. These components are often not an option for the animal but rather you. If you choose not to supplement when the animals are in deficient status, then you are choosing, 'inefficient conversion of feed to production'(beef, milk, fertility)

重要的是，您可以区分这些差异，并了解其对您的业务产生的益处。这些需要补充的成分通常是你的选择而不是动物。如果牲畜处于缺乏状态时你选择不补充那么你选择了“饲料低转化性能的生产”（影响牛肉、牛奶产出和繁殖能力）



Micro minerals & vitamins 为量矿物质&维生素

- Micro minerals measured in mg or ppm. 微量矿物质单位以mg或ppm表示。
- Usually soil specific. 通常为土壤特性
- Cobalt (Co), Copper (Cu), Zinc (Zn), Selenium (Se), Iodine (I), Iron (Fe) and Manganese (Mn). 钴、铜、锌、硒、碘、铁和锰
- Vitamins A, D_3 (both IU), E, B_7 (Biotin) and β-carotene.

  维生素A，D3, E, B7和β-胡萝卜素
- The micro minerals can be supplied by feed, water or injections (not Co). Preference should be in feed, then water and injections as a last resort. Bolus is an effective long term supplement, especially for Co deficiency; short term Co deficiency will see response from Cynacobalamin injection.

  微量矿物质可通过饲料、饮用水或注射（不含钴）方式来提供。首选方式是饲料，其次是水，万不得已时采取注射方式。舔砖是一种有效的长期的补充方式，特别是对于钴缺乏；短期钴缺乏症可通过注射维生素B12（氰钴胺）得到缓解。

Macro Minerals 常量矿物质

- Measured in grams or %.用g或者%度量。
- Calcium (Ca), Phosphorus (P), Magnesium (Mg), Sulphur (S), Sodium (Na), Chlorine (Cl) and Potassium (K). 钙、磷、镁、硫、钠、氯和钾
- They allow optimum rumen fermentation of dry standing feed and in the case of green feed Na, Mg and P may be required in deficient area's.

  允许干燥基础饲料的瘤胃发酵效果达到最佳，在青饲缺乏区域还需要补充钠、镁和磷。
- Don't confuse Nitrogen (N) with protein. N assist the fermentation of fibre in the rumen by bacteria generating microbial crude protein (MCP).

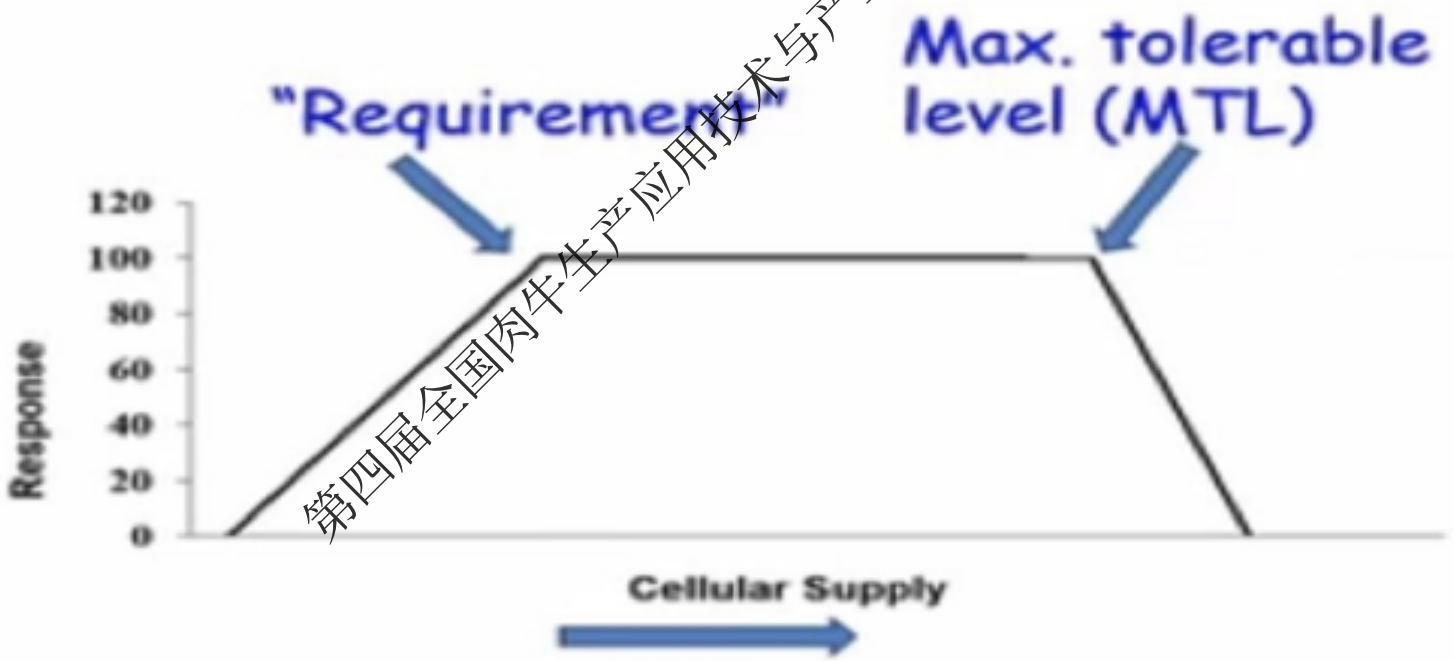
  不要将氮和蛋白质混淆。氮通过细菌产生微生物粗蛋白而协助瘤胃微生物发酵纤维物质。
- P deficiency – decrease in fertility, LWG, skeletal growth & development, increase in metabolic & bacterial disease. P is required for formation of bone & teeth, reproductive health, absorption of CHO via the GIT, metabolism of energy, feed intake, digestion & absorption of protein and milk production.

  磷的缺乏---生育能力降低、日活体增重下降、骨骼生长和发育缓慢，代谢和细菌疾病发生率增加。骨骼与牙齿的形成、生殖健康、碳水化合物的吸收、能量的代谢、饲料的摄入、蛋白质的消化吸收、泌乳等活动都需要磷。
- *P has more known functions than any other mineral element in the animal body.*

  已知的磷在动物体内的功能比任何其他矿物质元素都要多。

建立矿物质需求

Establishing Mineral "Requirements"



可 “吸收”矿物质“需求量” **mg或者g**

“Requirements” mg or g of “absorbed” mineral

- Maintenance 维持
- Gestation妊娠
- Growth生长
- Lactation泌乳

Total Absorbed Requirement (TAR) 总吸收需要量

- Absorption co-efficient 吸收率
  - basal diet/feeds基础日粮
  - supplements 补充料
- Antagonisms 拮抗
- Interactions 交互

Total Absorbed Supply (TAS) 总吸收供给量

Basal feeds provide micro minerals

基础饲料应提供微量矿物质

Formulate with a value

用数值表示

•Values can be are highly variable

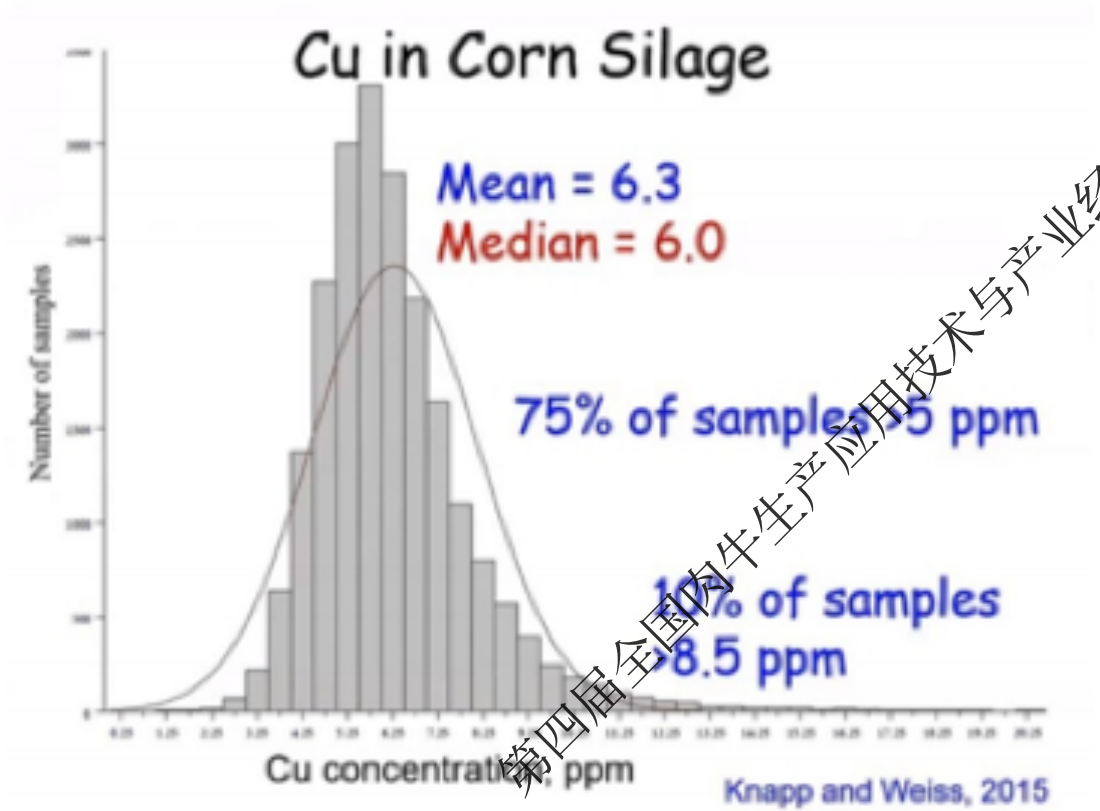
数值是极易变动的

•But those values ARE available

但所有数值均可用

Use a mean or test the feed

使用均值或者饲料的实测值



玉米青贮中铜含量

75%的样本中含量>5ppm

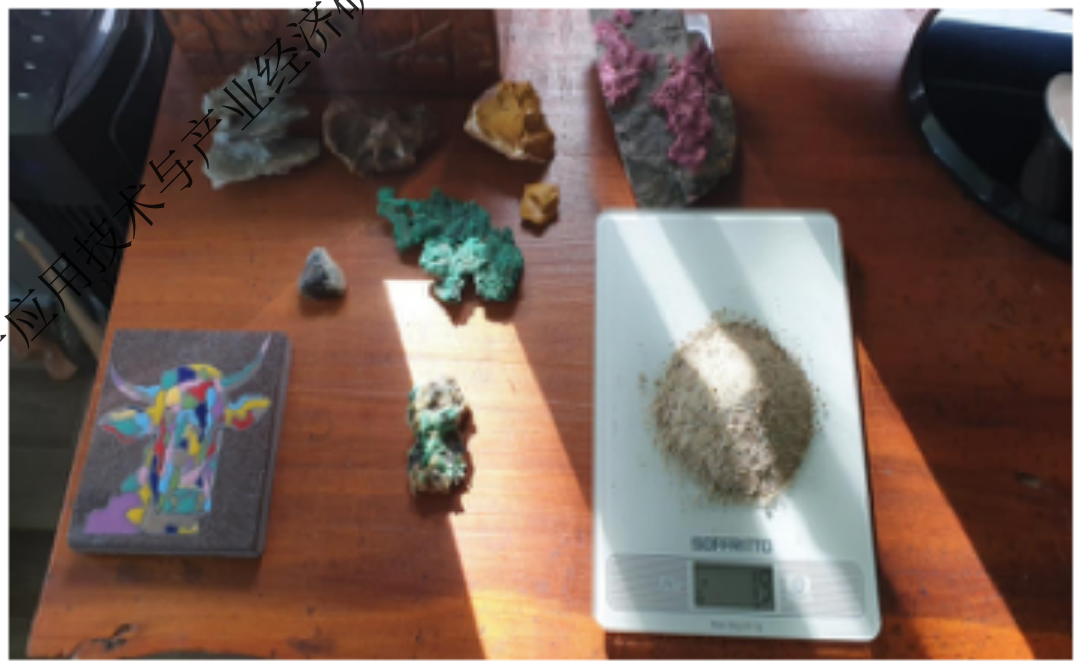
10%的样本中含量>8.5ppm

铜浓度，ppm

Micro minerals in the ingredients

原料中的微量矿物质

- Plant constituents
  植物成分
  - vegetative & organic matter.
    营养物质和有机物
- Free metals within the plant
  植物体内的自由金属
  - depends on soil type.
    取决于土壤类型
- Soil contamination outside the plant
  植物体外的土壤污染
  - harvest technique 收割技术
  - related with soil 土壤相关



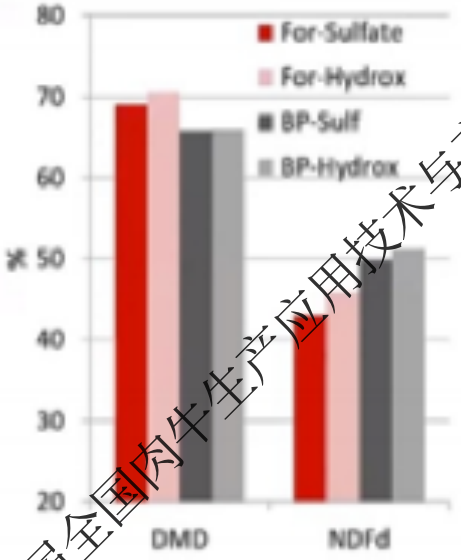
High micro minerals in basal feeds

基础饲料中高微矿物质

- With high ash and Fe
  灰分和铁含量高
  - likely soil contamination
    有土壤污染的可能性
  - availability probably low
    可利用性能或许低
- Without high ash
  灰分含量低
  - could be interior metals
    可能是内部金属元素影响
  - availability may be similar to inorganic supplements
    可利用性类似于无机补充料

Source of TM can affect rumen digestion

- **Forage or byproduct diets**
  1. 64 vs 35% forage (CS + Alf)
  2. CGF, beet pulp, soyhulls in byproduct diet
- **Cu, Mn, Zn were sulfates or Hydroxy forms**
  1. All diets ~20 ppm Cu, 65-85 Zn, 70-80 Mn
  2. Supplemental TM = ~50% of total



Faulkner & Weiss, 2017

TM 来源影响瘤胃消化

- 草料和副产品日粮
  1. 64 VS 35% 草料 （CS+Alf）
  2. 玉米蛋白、甜菜粕、大豆皮等副产品应用

- 铜、锰、锌为硫酸盐或羟基形式
  1. 所有饲料~20ppm 的铜，65-85 的锌， 70-80 的锰。
  2. 补饲微量矿物质元素占总量约50%。

Are differences between organic and inorganic TM only bioavailability?

Organic Zn reduced the pathogen associated with digital dermatitis in feces (inorganic did not)

Faulkner et al., 2017

Intestine is a very important immune organ

↕

Microbiome affects immunity

有机和无机微量矿物质的区别仅仅是生物利用度吗？

有机锌减少粪便中与蹄炎相关的病原体（而无机锌却不能）--- Faulkner et al., 2017

肠是非常重要的免疫器官

↕

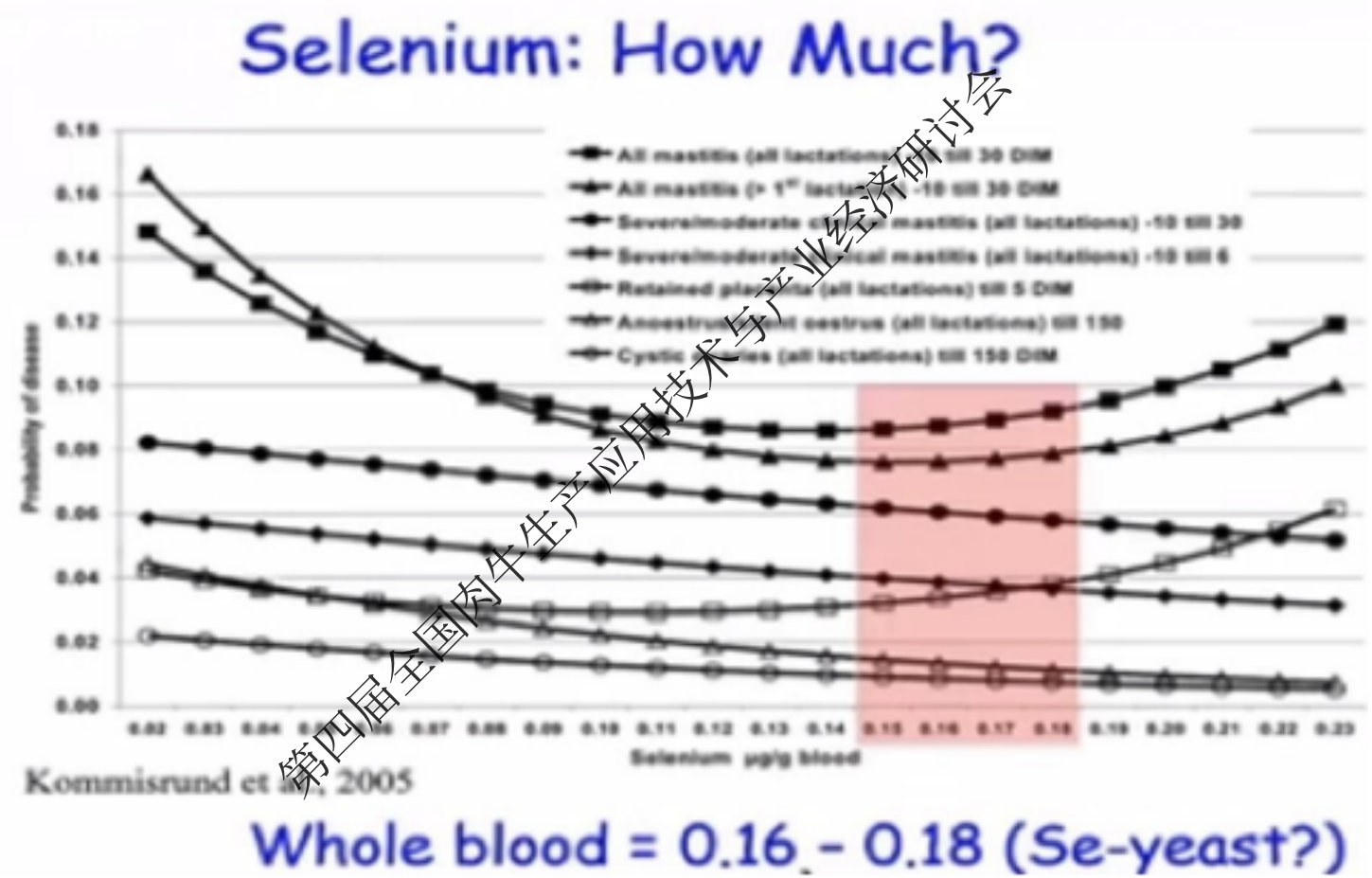
微生物影响免疫力

根据NRC 2001版泌乳母牛总膳食浓度的营养需要

Total dietary Concentrations to Meet Reqt (NRC, 2001) for Lactating cows

Mineral	NRC 2001 mg/kg	Weiss
Co	0.1	0.1 to 0.2
Cu	12 to 14	12 to 17
Fe	20 to 25	20 to 25
Mn	17	35 to 50
Se	0.3	0.3 to 0.6
Zn	40 to 50	50 to 70

硒元素：需要多少？



全血：0.16-0.18 （硒酵母？）

常量矿物质的需求和建议（泌乳母牛）

Macromineral requirements and recommendations (lactating cows)

Mineral	NRC 2001 (%)	Weiss
Ca	0.55 to 0.75	0.65 to 0.90
P	0.32 to 0.40	0.35 to 0.40
Mg	0.15 to 0.18	0.25 to 0.35
K	1.0 to 1.1	1.2 to 1.4
Na	0.20 to 0.25	0.24 to 0.30
Cl	0.25 to 0.30	0.30 to 0.40
S	0.2	0.2

Formulation summary & report 做总结报告

- One page summary 一页总结内容
- Diet summary 饲料总结
- Cost summary 成本总结
- Ration outputs 日粮产出
- Ration report 日粮总结
- CNCPS report (Cornell Net Carbohydrate & Protein System) 蛋白质体系报告（康奈尔净碳水化合物和蛋白质体系）
- Min/Vit report 矿物质/维生素报告
- Amino acids report 氨基酸报告
- Fatty Acids report 脂肪酸报告
- Additives report 添加剂报告
- Mycotoxins report 霉菌毒素报告
- Met. Energy & Protein evaluation 代谢能&蛋白评价
- Mass balance report 物质平衡报告
- Recipe report 配方报告
- Summary of results 结果总结
- Advanced rumen values report
- *Additional – lactation, heat stress, emissions, risk and starch flow; evaluations. 另外--泌乳、热应激、辐射风险和淀粉流量评估。

Financial accounting and projections
财务会计及财务预测

- Cattle groups 牛群
- Feed use 饲料使用
- Profit summary & projections利润汇总及预测
- Period cost 期间成本
- Breakeven purchase price盈亏平衡的采购价
- Cost summary & intake costs成本汇总&进预成本
- Purchase & sale price net profit projections ($/head)购销价格预测净利润（美元/头）
- Day Steps – ADG & intake totals 每天平均日增重&摄 入总量
- Environment – temperature, wind speed, wet or dry etc.环境-温度、风速、干湿度等
- Summary of revenues, expenses & profits 收入、成本和利润数据汇总

Mort & Co and Robyn Island Wagyu, Australia.

https://youtu.be/-20OqRwD_ig

Takeaway points 关键点

- Create a bio-security system and stick to it.
  建立一个生物安全系统并坚持执行。
- Utilize industry professionals and scientist 's with knowledge and experience.
借鉴行业内专家和科学家的知识和经验
- Promote and maintain animal health & welfare提升维护动物健康和福利
- **Nutrition营养:**

Protein + energy + vitamins + minerals = **performance & profit**

蛋白+能量+维生素+矿物质=性能&利润

Thank you for your kind attention. Any questions ?

感谢您的关注，请提问？