



用FRA®C12直接和间接地对抗PRRS

Fight PRRS directly and indirectly with FRA® C12

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Content 内容

1. Welcome: Challenge Question. 前言：挑战问题
2. The origin of FRA® C12 Dry. FRA® C12 Dry (希特力) 的来源
3. What is FRA® C12 Dry. FRA® C12 Dry (希特力) 简介
4. PRRS in Swine Industry. 猪场PRRS蓝耳
5. FRA® C12 versus PRRS. FRA® C12 (希特力) 对抗 PRRS蓝耳病毒
6. Summary: Answer . 结束语：问题的解决办法

Question 问题

PRRS infection on farm,
what to do?

猪场感染蓝耳病毒 (PRRS) , 怎么办?

Answer 解决办法

Do what your mother taught you.
按照妈妈教给你的方法来

We have all used FRA[®] C12 dry

我们一直在食用希特力

- Mother milk
 - +- 750 gr/day breast milk (fat 42 g/kg)
 - Monolaurin content: 0.5 g/kg
 - +- 6 months (180days) lactation
- => Everyone consumed approx....65 g FRA[®] C 12 dry!!!
- 每天哺乳量约750g/每天 (含脂肪42 g/kg)
 - 月桂酸甘油酯含量: 0.5 g/kg
 - 约6个月左右 (180天) 哺乳期
 - => 个人约吃进 65 g FRA[®] C 12dry (希特力)



Where else can it be found?

其他哪里可以发现月桂酸甘油酯?

- Coconut oil contains alpha monolaurin
- 椰子油包含 α -月桂酸甘油酯
- Health supplement for humans
- 对人类健康补给营养
- Lauricidin® → www.lauricidin.com
- [通过此网站了解](http://www.lauricidin.com)
- Other plant derived oils
- 其他植物产生油



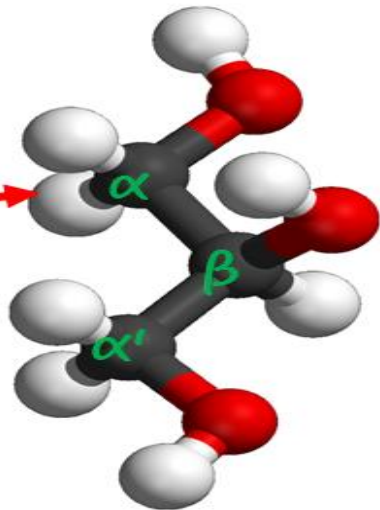
How to produce FRA[®] C 12 dry 希特力的生产工艺



Lauric acid (C₁₂H₂₄O₂)

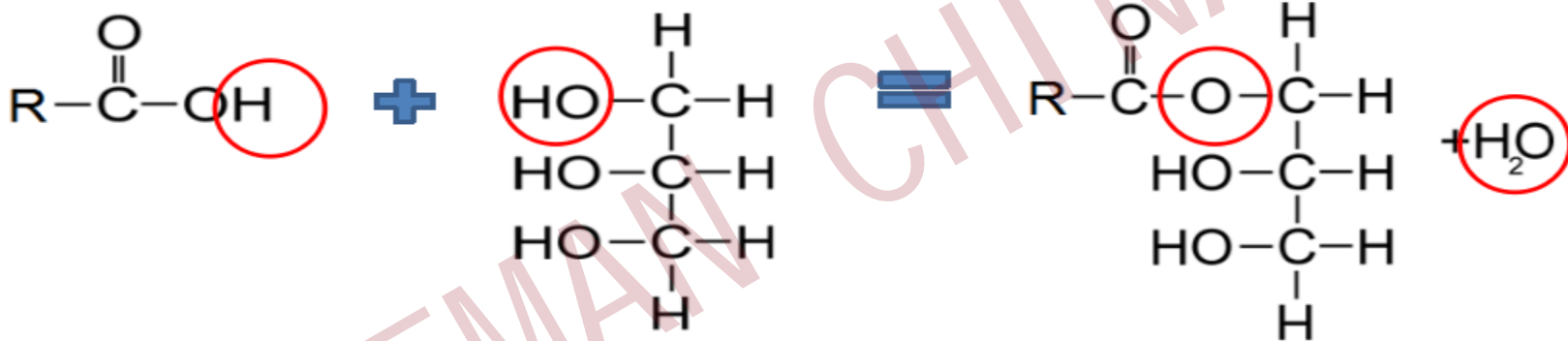
月桂酸

甘油
Glycerol



Esterification Process

酯化反应过程



Lauric acid
月桂酸

Glycerol
甘油

Alpha monolaurin
α-月桂酸甘油酯

PRRS Challenge 蓝耳病的挑战

- Porcine reproductive and respiratory syndrome
- Blue ear pig disease
 - (in [Chinese](#), *zhū láněr bìng* 猪蓝耳病).
- Weakens the overall immune system
- Opens the door for other diseases

猪繁殖性能与呼吸综合征

猪蓝耳病

(中文, *zhū láněr bìng* 猪蓝耳病).

⇒猪群整体免疫降低

⇒其他疾病将有机可趁





What does PRRS do to your pigs?



蓝耳对猪群的危害

Porcine reproductive and respiratory syndrome
猪繁殖性能与呼吸综合症

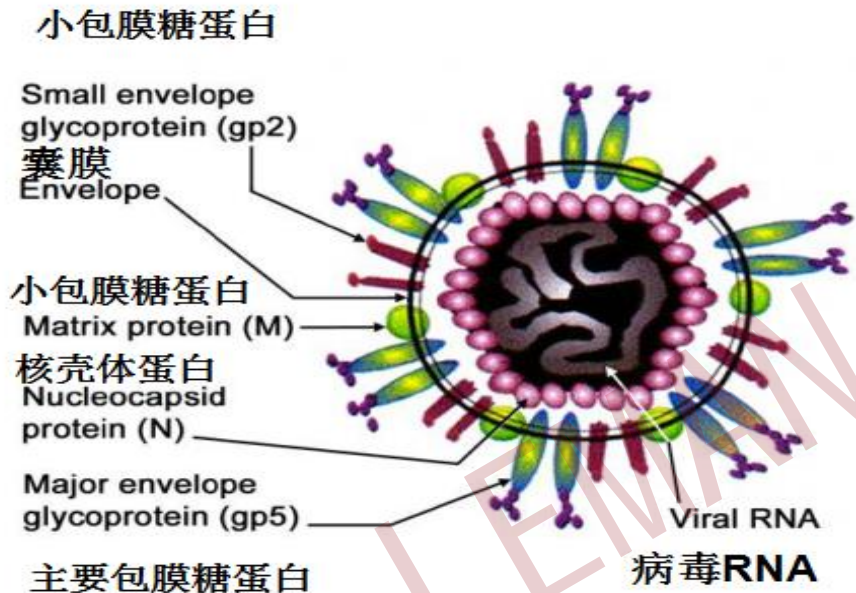


What does PRRS do to money? 蓝耳对资金产生什么影响?

- Worldwide problem
 - **(US \$650 million annually)**
- Started in China in 2006 (HV-PRRSV)
 - **Costs +- USD100/sow & +- USD 5/pig**
- Secondary effect on production cost
- 全球性问题
- 美国，损失预估每年6 亿 5000 万美元
- 从2006年蓝耳在中国爆发
- 粗略估计每头母猪损失约100美元左右
- 二次感染亦对生产成本产生影响



PRRS virus structure PRRS病毒结构



- Two prototype strains of PRRSV:
 - North American Strain
 - European Strain
- In China, in 2000s, a highly virulent North American strain was found
- 蓝耳两种类型
- 北美流株型, 欧洲流株型
- 在中国, 本世纪初发现高毒性的北美流株型

PRRS virus structure PRRS病毒结构

- Viral RNA infect host cells
- Virus envelops:
 - Protection against immune cells (macrophages)
 - Allow fusing virus membranes with host cells and transfer –multiplication of RNA
- RNA 病毒感染宿主细胞
- 囊膜病毒
- 免疫细胞（巨噬细胞）的防护
- 允许融合病毒膜与宿主细胞通过，并且发生转移
- RNA 病毒的繁殖

小包膜糖蛋白

Small envelope glycoprotein (gp2)

囊膜
Envelope

小包膜糖蛋白

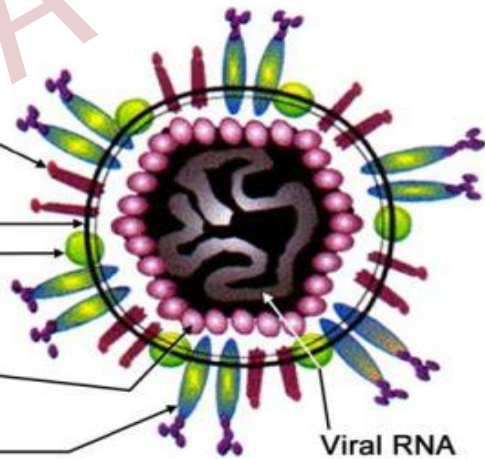
Matrix protein (M)

核壳体蛋白

Nucleocapsid protein (N)

Major envelope glycoprotein (gp5)

主要包膜糖蛋白

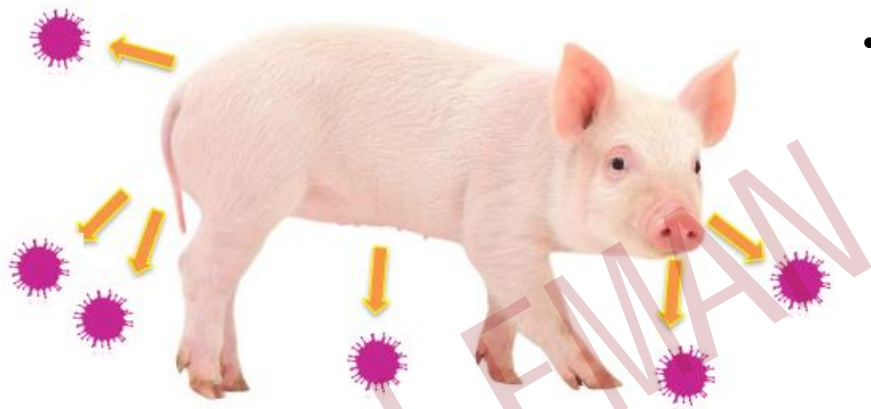


Viral RNA

病毒RNA

Where does the virus hide?

病毒藏身于何处?



- Route of shedding:
- 藏匿的路线
 - Blood 血液
 - Tonsil and lymphoid tissue 扁桃体和淋巴组织
 - Nasal 鼻, 母乳 / 初乳
 - Saliva 唾液
 - Milk/ Colostrum
 - Semen 精液
 - Feces 粪便
 - Urine 尿液

Transmission and propagation

传输和传播

- **Horizontal transmission** means the virus is transmitted through pathways within the herd of pigs and among different herd of pigs.
 - ⇒ Besides the **direct contact** of infected pigs, it is also possible to transmit PRRSV indirectly
 - ⇒ **Indirect infection** can be taken place by different types of media such insects, rodents, farm workers, tools, transporters and even air!

水平传播

水平传播：是指病毒传播通过猪群内部和不同猪群之间的传播

除了直接接触受感染的猪，它也可能间接感染 PRRSV病毒

间接感染可发生在不同类型的媒介，如昆虫、啮齿动物、农场工人、工具、运输者、甚至是空气！



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Transmission and propagation

- **Vertical transmission** means the virus is transmitted through the parental contact:
 - ⇒ especially from sows to piglets at fetal phase.
 - ⇒ transmission among piglets can still be happening to individual healthy piglets **3 months** after farrowing.
 - ⇒ semen plays a crucial role in this case as well, due to the possibility of virus shedding and the widely application of artificial insemination.

- 垂直传输
垂直传输：是指病毒通过父母接触传输
特别是从母猪到仔猪在胎儿阶段
即使健康仔猪生产 3 个月后，经由父母传输的病原体仍可能发病
精液在此时起也十分关键，由于病毒隐藏的可能性，广泛人工授精会增加传染的可能性



PRRSV how does it spread? PRRSV如何传播?

- Transmission → embryo, placenta and semen
- Propagation → contact with feces, air and insects
- Secondary infections → lung infections, meningitis (Streptococcus suis)

传输 → 胚胎、胎盘和精液
传播 → 接触粪便, 空气和昆虫
二次感染 → 肺部感染, 脑膜炎 (猪链球菌)



3 conditions for antiviral 抗病原体的3个条件

1. Oral application:

- Is stable in acidic and neutral environment: covalent bound
- Resist enzymatic breakdown: alfa-monoglyceride

2. Destroy lipid cell membranes (typically gram positive bacteria and fat enveloped viruses):

- Based on more lipophilic MCFA (lauric acid)
- Alfa-monoglycerides are lipophilic and water dispersible

可食性功效

在酸性和中性环境中稳定：共价键

阻止酶的分解： α -单甘油酯

破坏细胞膜脂质

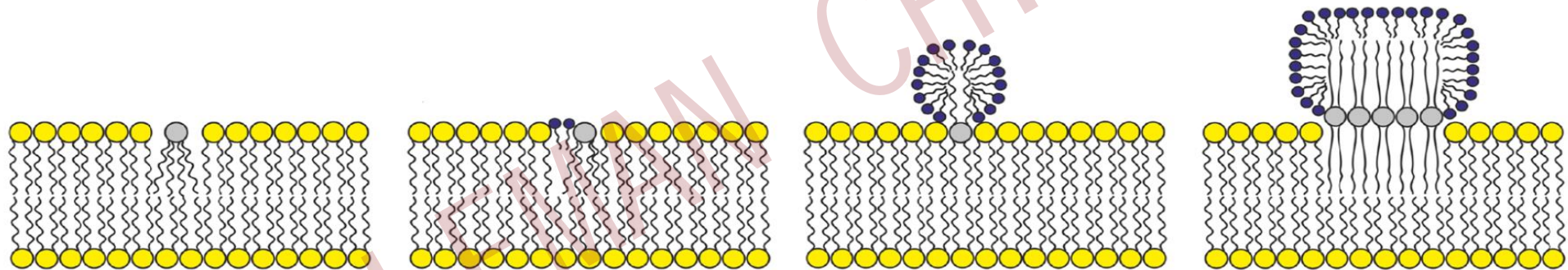
(通常革兰氏阳性细菌和脂肪囊膜病毒)

基于更多的亲脂性 MCFA (月桂酸)

α -单甘油酯具有亲脂性和水溶性

Mode of action FRA® C 12 dry 希特力的工作原理

FRA® C 12 dry destabilizes and disrupts the membrane/fat envelop of viruses
希特力破坏和扰乱病毒的囊膜





3 conditions for antiviral 抗病原体的3个条件

3. Product must work systemic, thus being transported via lymphatic system
 - Alfa-monoglycerides of MCFA, more particularly lauric acid, are taken up by the enterocytes and preferentially transported via the lymph system

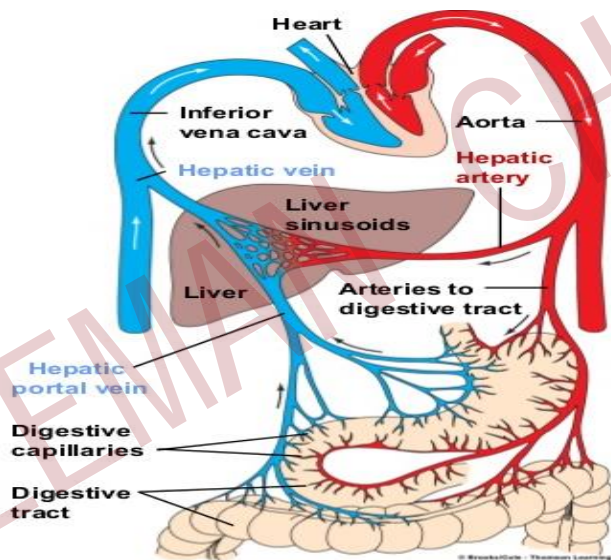
产品必须作用在全身性，从而运往通过淋巴系统

a-单甘油酯的 MCFA，更多特别是月桂酸，是由肠优先运输通过淋巴系统



FRA[®] C 12 dry absorbed inside the body

希特力在体内的吸收





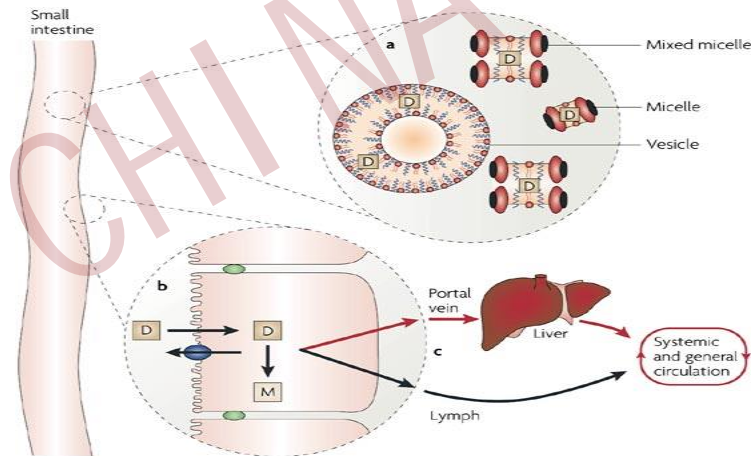
FRA[®] C 12 works inside the body



希特力在体内工作

- Direct virucidal effect
- Absorbed intact in intestinal tract (typical for MCFA-lipids)
- Lymphatic system
- Cleans the lungs and reproductive system

直接灭活病毒反应
在肠道内完整地吸收 (尤其是中链脂肪酸)
经由淋巴系统
清洁肺部和生殖系统



Nature Reviews | Drug Discovery



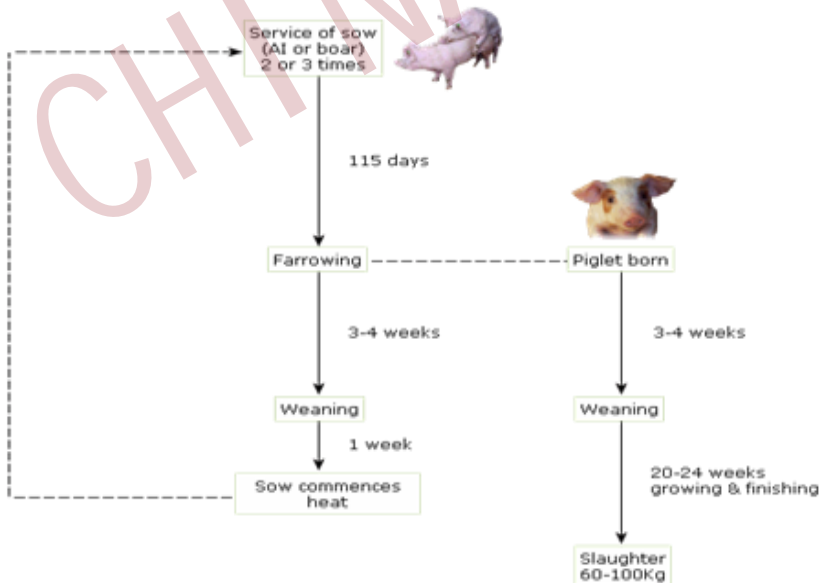
FRA

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Therefore... FRA[®] C 12 in your feed

希特力在饲料中的添加

- Before farrowing → FRA[®] C 12
- Lactating sows → FRA[®] C 12
- Weaning piglets → FRA[®] C 12
- Gilts before mating → FRA[®] C 12
- Boars → FRA[®] C 12
- USA: Using FRA[®] C12 before vaccination
- 在产仔前 → FRA[®] C 12 (希特力)
- 哺乳母猪 → FRA[®] C 12 (希特力)
- 断奶仔猪 → FRA[®] C 12 (希特力)
- 后备母猪 → FRA[®] C 12 (希特力)
- 公猪 → FRA[®] C 12 (希特力)
- 在美国：在疫苗接种前使用 FRA[®] C12 (希特力)



The pig production cycle - typical systems

FRA® C 12 Applications 希特力的添加运用

- Use 3 kg FRA® C12 Dry at 3 weeks before farrowing and the whole lactation period
- Use in creep feed diet 4 kg FRA® C12 Dry at the first 2 weeks and add 3 kg FRA® C12 Dry at the last 2 weeks of starter feed
- Use 3 kg FRA® C12 Dry when gilts are at 80 kg till 120 kg
- Use 4 kg FRA® C12 Dry in Breeder Boar to reduce PRRSV
- Use 3 kg FRA® C12 Dry at the first 3 weeks in the new breeder sow before mixing in the groups
- Use 3 kg FRA® C12 Dry at 2 weeks before vaccination program in sows
- 在产前3周和整个哺乳期，使用3kg FRA® C12 Dry (希特力)
- 饲料中头两周添加4kg FRA® C12 Dry (希特力)
- 开口料的最后2周使用3kg FRA® C12 Dry (希特力)
- 后备母猪在80kg-120kg的时候，添加3kg FRA® C12 Dry (希特力)
- 后备公猪 减少蓝耳病毒，添加4kg FRA® C12 Dry (希特力)
- 新的后备母猪入群前3周，添加3kg FRA® C12 Dry (希特力)
- 母猪疫苗接种前2周，添加3kg FRA® C12 Dry (希特力)



Question 问题

- PRRS infection on farm, what to do?
- 猪场感染蓝耳病毒，怎么办？

Answer 解决办法

Do what your mother taught you.
按照妈妈交你的办法来

Answer 解决办法



Summary 总结

- FRA® C 12 makes sows and sow milk healthier
- Possible due to systemic action
- Similar to mother → baby milk
- Improves protection of piglets from PRRS
- Reduces infection sow to piglet
- More piglets born alive
- Healthier piglets = lower mortalities
- Faster growing fattening pigs (7 days shorter)

FRA® C 12 (希特力) 使母猪和乳汁更健康
产品可作用于全身
和母乳相似， 婴儿乳汁
改善小猪感染蓝耳
减少母猪传染给小猪
出生小猪存活率高
更多健康的小猪， 低死亡率
育肥猪增长迅速 (缩短7天时间)

Thanks

Thank you for your kind attention

感谢仔细聆听

Bioscwin & Framelco