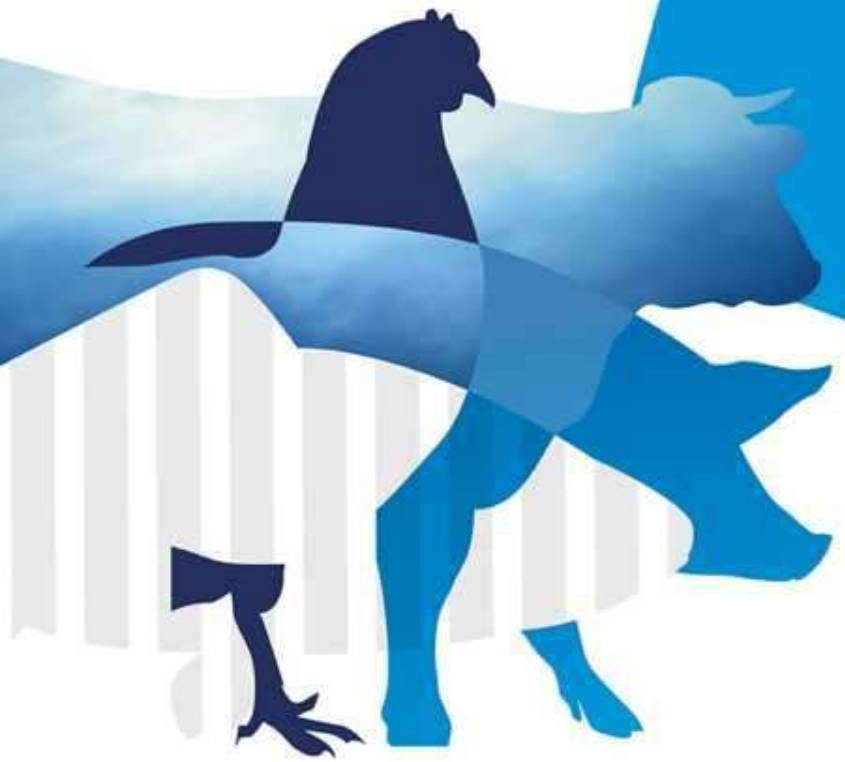


VIV ASIA 2017
MARCH 15 - 17, BANGKOK, THAILAND
INTERNATIONAL PLATFORM
FROM FEED TO FOOD

Optimising gut performance in pigs: Asian and Australian experiences

VIV Master Class Vietnam

Dr Neil Gannon
Regional Product Manager

WWW.VIV.NET

Optimising gut performance in pigs: Asian and Australian experiences

Dr Neil Gannon
Regional Product Manager

neil.gannon@biomin.net

Size comparison Australia vs Vietnam

Presentation Overview

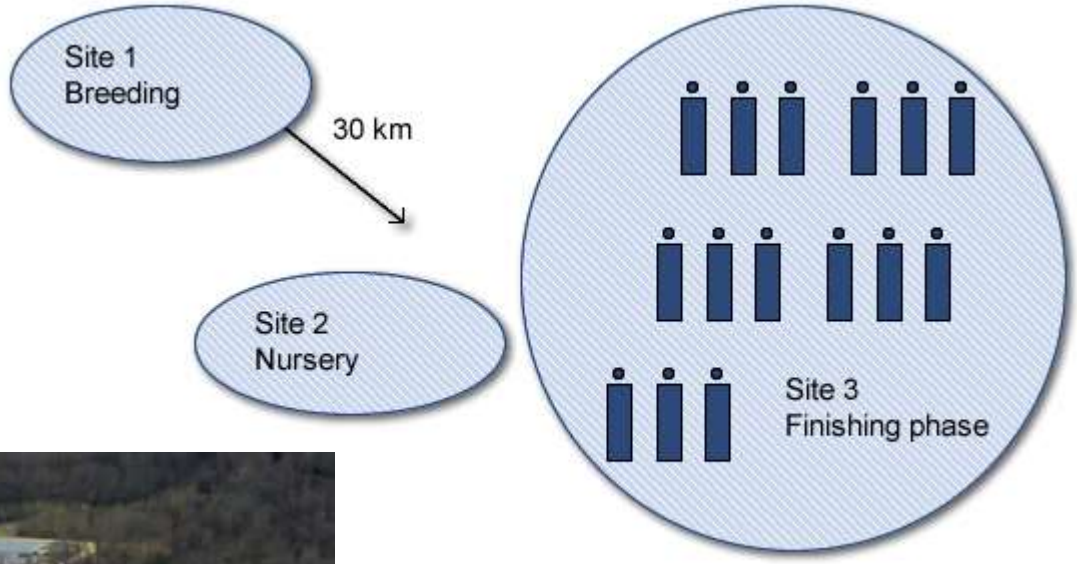
- Overview of production systems in region
- Key challenges faced in the region
- Key influencers of gut health
- Strategies for optimising gut health
- Summary
- Questions?

Asian region pig production systems

- Many types of pig production systems are found!
- Commercial to backyard

Asian region pig production systems

- Farrow-to-finish to contract growing
- Single to multi-site operations



Asian region pig production systems

- Outdoor to fully tunnel ventilated sheds

Asian region pig production systems

- Many types of pig production systems are found!
- Commercial to backyard
- Farrow-to-finish to contract growing
- Single to multi-site operations
- Outdoor to fully tunnel ventilated sheds
- Each operation has a unique set of conditions
  - therefore unique strategy for each operation to ensure optimal production is required

Asian region pig production challenges

- Again, extremely wide ranging!
- High input costs and low output price (universal)
- Access to capital (money)
- Climatic conditions (very hot to very cold)
- Price and availability of raw materials
- Quality and consistency of raw materials
- Availability of skilled workforce
- Disease status
- Access to vaccines and antibiotics to assist in disease control (including AGP bans)
    - Combination of above challenges means there is no single solution for all pig operations

What are the big players in AU+NZ doing?

forum for the future | futures centre

ABOUT PARTNERS TOPIC HUBS TRENDS THE LONG VIEW

New Zealand meat to be antibiotic-free by 2030

06 Aug 2015

By Juliette Aplin

What are the big players in AU doing?

Decision was driven by supermarket, there is no government intervention or regulation

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ani
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caged eg

These major animal welfare initiatives are a response to demand from customers for more responsibly sourced products and will see 34,000 mother pigs no longer kept in stalls for long periods of their lives and 350,000 hens freed from cages.

Key factors influencing feed efficiency in pigs

Genetics
- Breed differences
- Production system
  - Shed or free range

Environment
- Geographic location
- Seasonal effects

Housing
- Air control
- Litter or slats?
- Stocking density

Feeding
- Intake
- Digestibility
- Availability
- Ingredients+nutrients

Feed Efficiency

Staff
- Farm
- Management
- Consultants

Biosecurity
- How well adhered to?
- Frequency of 'failure'?

Disease status
- Type of diseases
- Frequency of outbreaks
- Control programs

Hygiene
- Adequacy of cleaning
- Frequency

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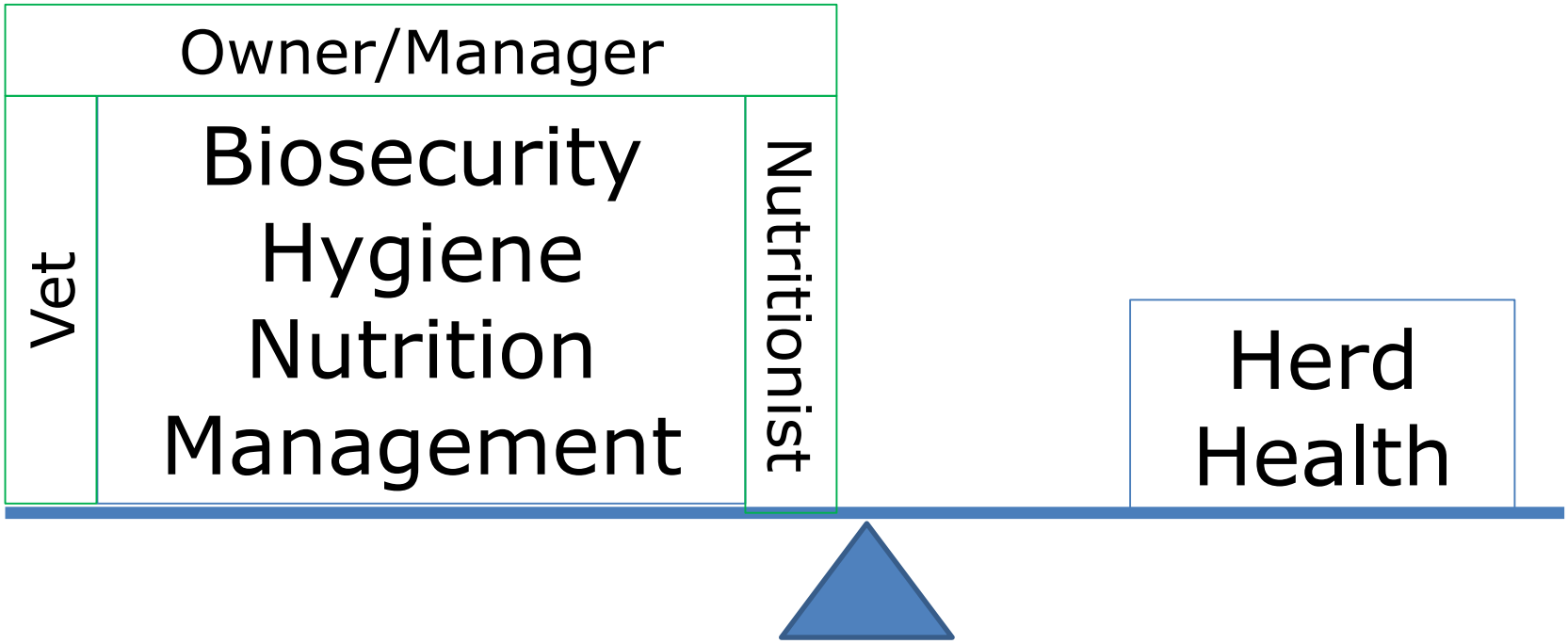
Simple model of animal health



The key to good herd health is to reduce the microbial load at every possible step

Prevention of gut health issues rather than cure is best approach

Gut health management is like fire fighting

Manage properly and early before it gets out of control

Once out of control, more expensive control measures are needed and maybe less effective

Management and Health Strategies for optimising gut health

- Have a biosecurity program
  - Breeder, weaner and growout facilities
- Ensure staff comply with the program

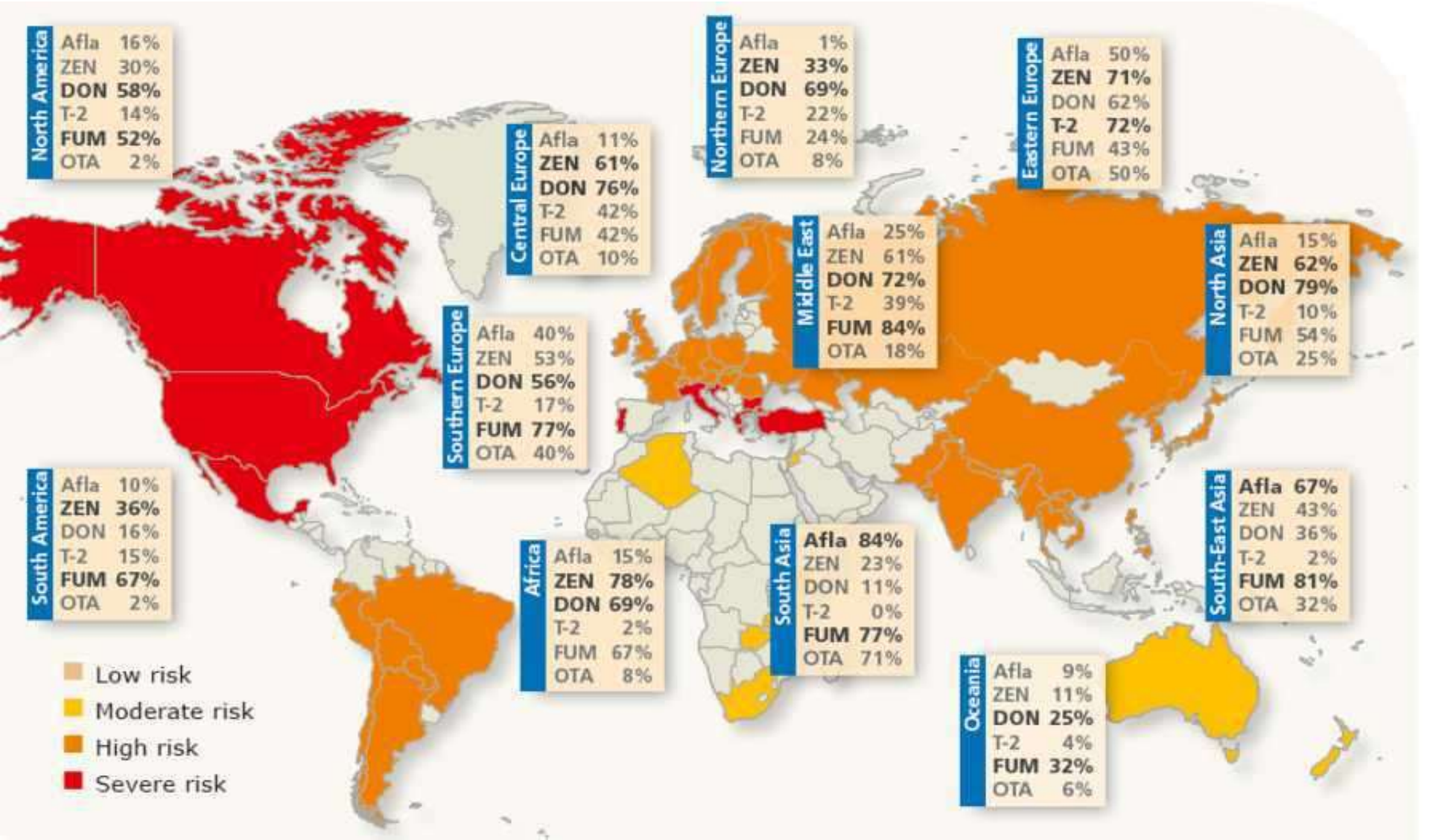
Effective biosecurity

Management and Health Strategies for optimising gut health

- Have a biosecurity program
  - Breeder, weaner and growout facilities
- Ensure staff comply with the program

- Effective use of Vaccines
  - Impact of mycotoxins?

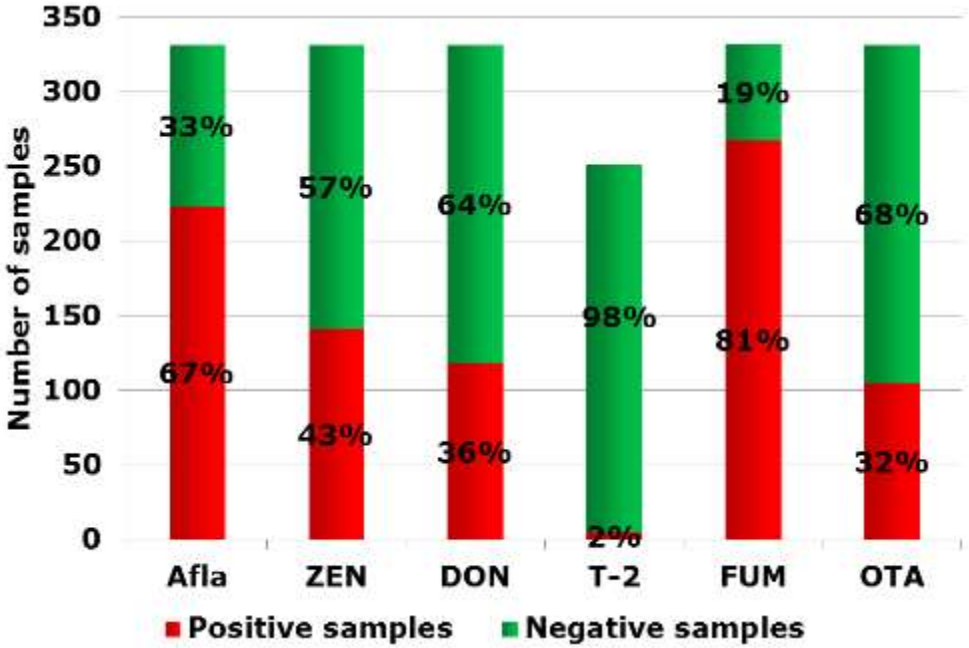
Mycotoxin contamination worldwide (2014)

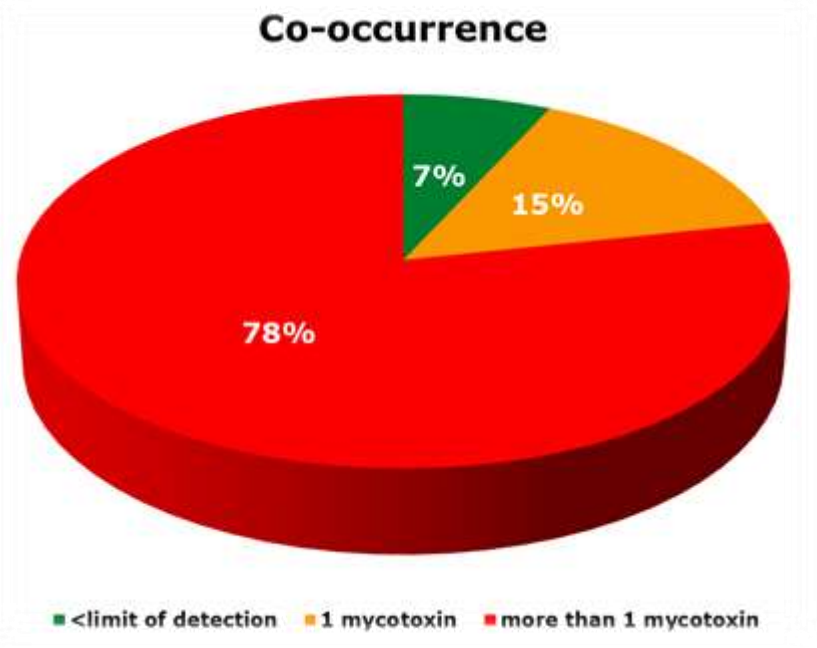


South East Asia

(Malaysia, Philippines, Thailand, Vietnam, Indonesia, Myanmar, Singapore)

	Afla	ZEN	DON	T-2	FUM	OTA
Number samples tested	331	331	331	251	332	331
Average of positive (µg/kg)	27	94	222	13	1,709	6
Maximum (µg/kg)	652	3,600	5,941	14	130,246	66





Management and Health Strategies for optimising gut health

- Have a biosecurity program
  - Breeder, weaner and growout facilities
- Ensure staff comply with the program
- Effective use of Vaccines
  - Impact of mycotoxins?

- Most critical phase is early in the piglet's life, eg Day 0-10 post weaning. Get this wrong and problems will multiply!
  - Feed consumed in the early stage is only ~3% of all feed so very cost effective to use everything at your disposal to ensure good gut health

Nutritional Strategies for optimising gut health

- Manipulation of feed specifications (eg. protein content and digestibility; energy level)
- Restrictions on feed ingredients (eg. choice of raw materials and their quality; frequency of diet reformulation)
- Optimisation of feed presentation (eg. pellets or mash; grind size; whole grain addition)
- Use of feed additives (eg. enzymes, organic acids, phytogenics)
  - I will only focus on organic acids and phytogenics in the remaining time
- Aim is to avoid sudden changes and stress to the pigs !

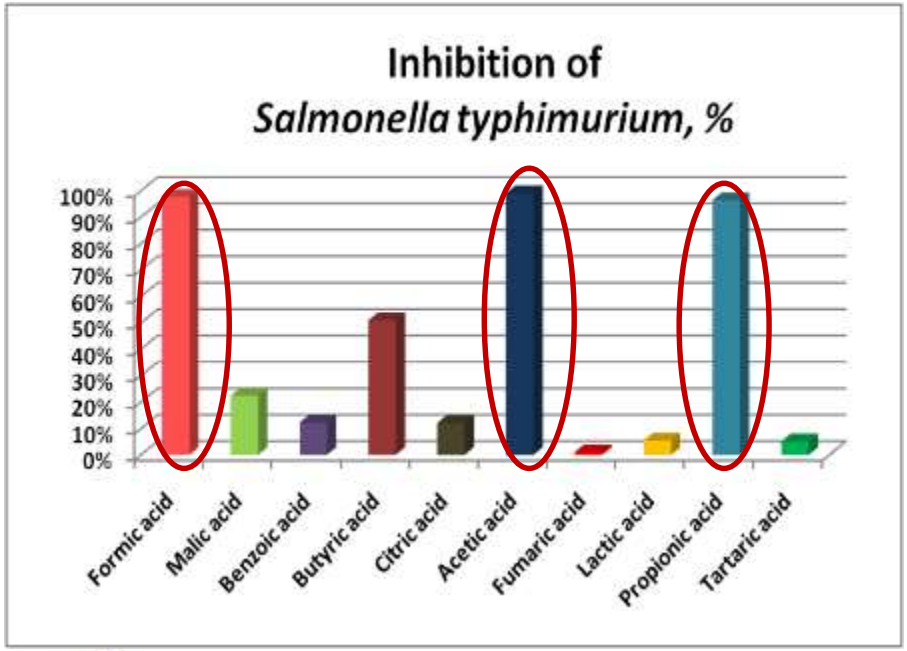
Strategy 1: Organic Acids

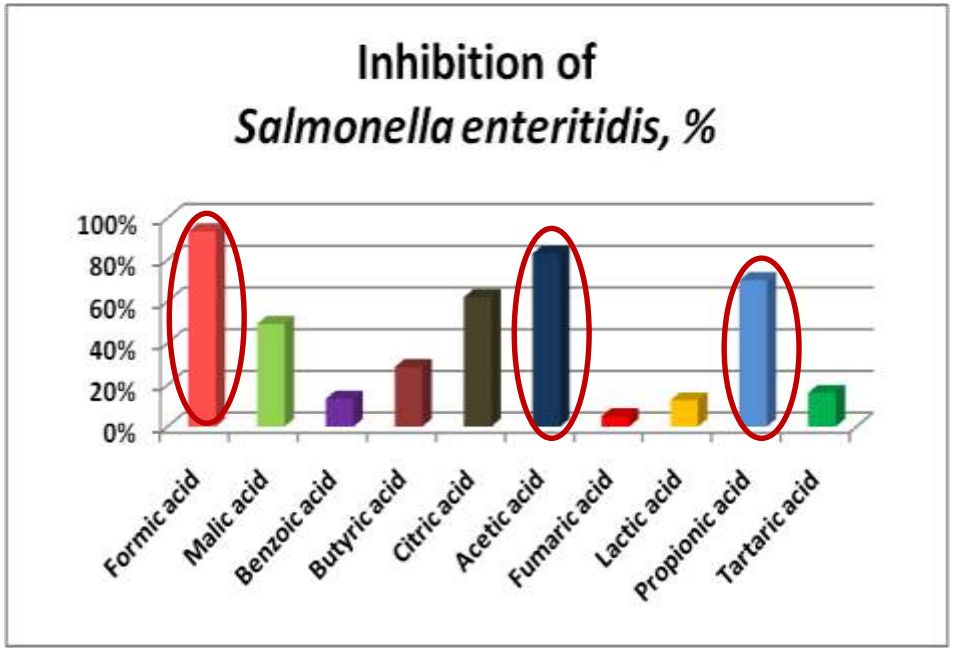
- Organic acids or mixtures have 4 main uses:

1. To aid in feed hygiene as bacteria cannot proliferate in the lowered pH conditions.
2. To decrease the pH in the stomach/ proximal small intestine to create unfavourable conditions for pathogenic bacteria to grow and reduce excessive fermentation.
3. To directly kill bacteria by entering the bacterial cell and causing disruption to cell metabolism.
4. To aid in protein digestion

Antimicrobial effect of organic acids

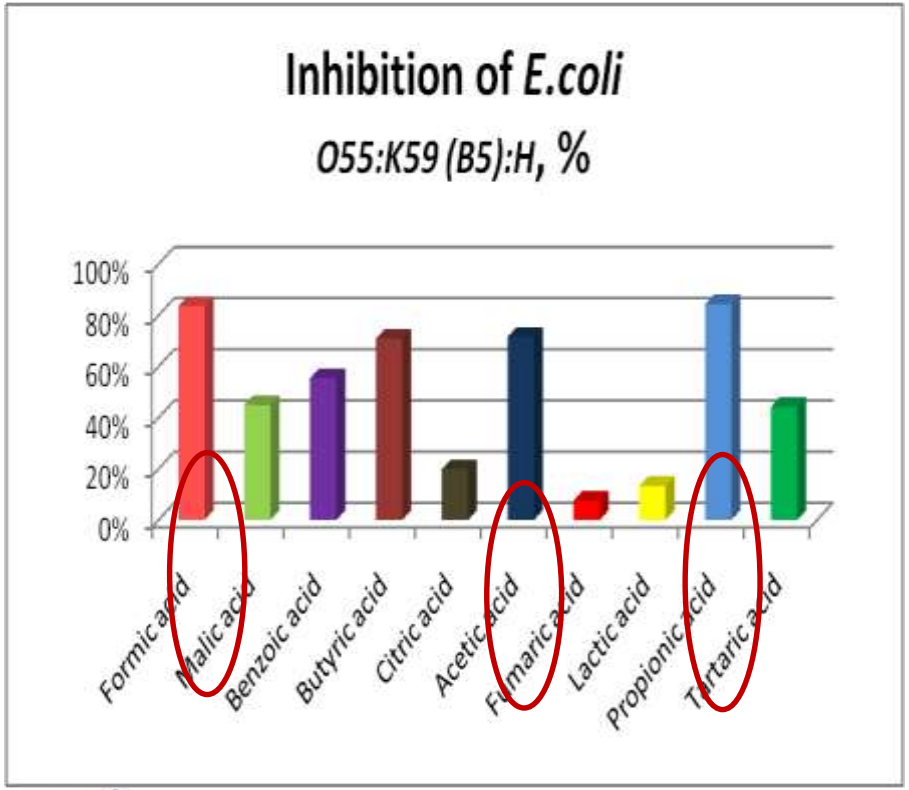
ANTIMICROBIAL EFFECT OF INDIVIDUAL ORGANIC ACIDS AGAINST *SALMONELLA*

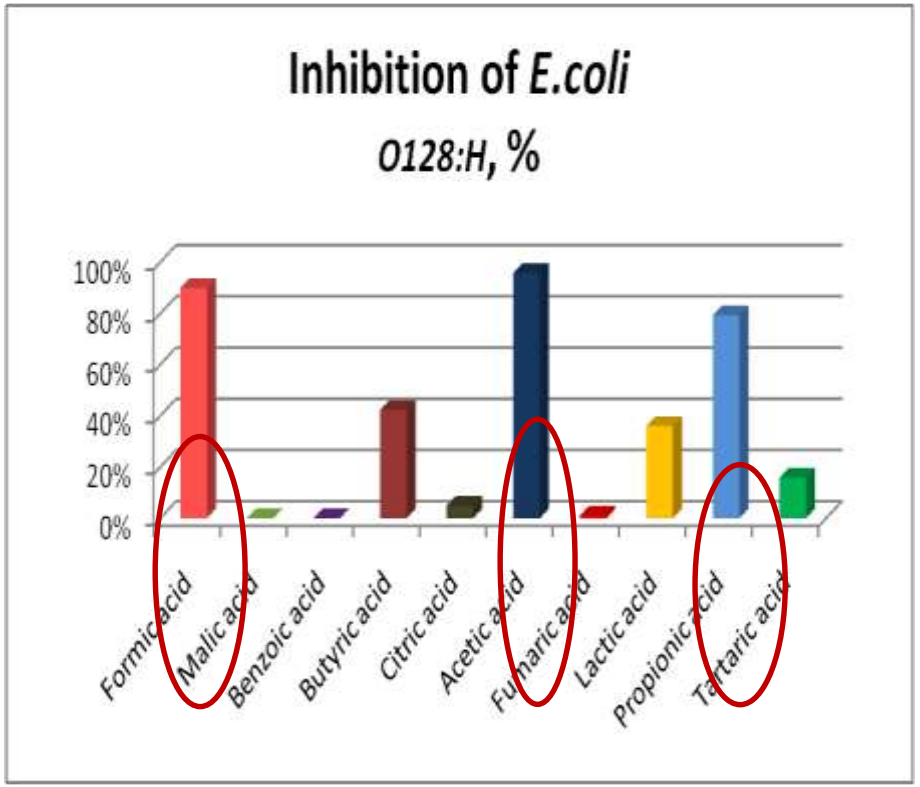




Antimicrobial effect of organic acids

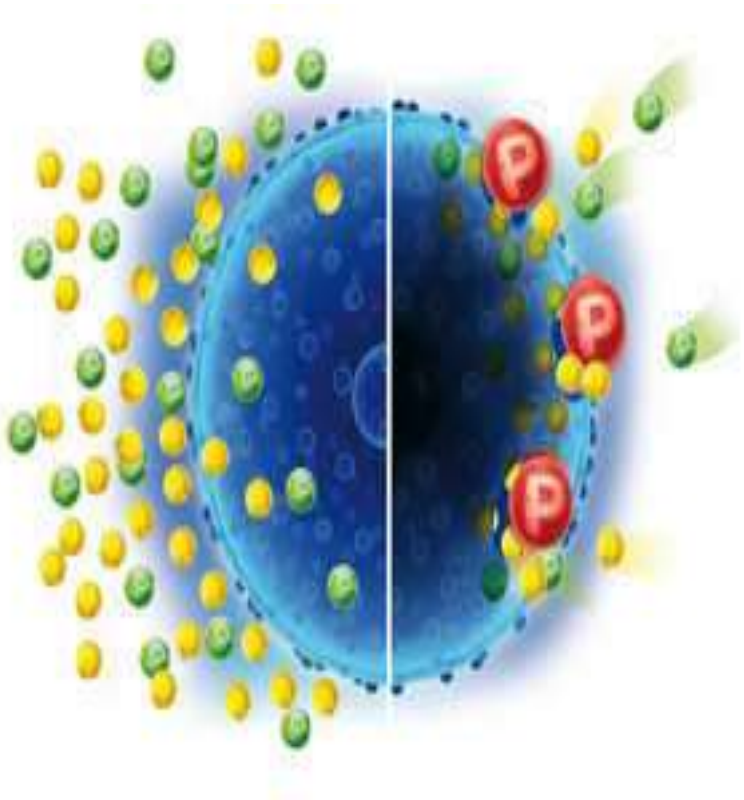
ANTIMICROBIAL EFFECT OF INDIVIDUAL ORGANIC ACIDS AGAINST *E. COLI*





What's new? Permeabilizers

A unique permeabilizing substance identified to enhance the antimicrobial effect of the organic acids and the phytochemical against pathogenic bacteria.

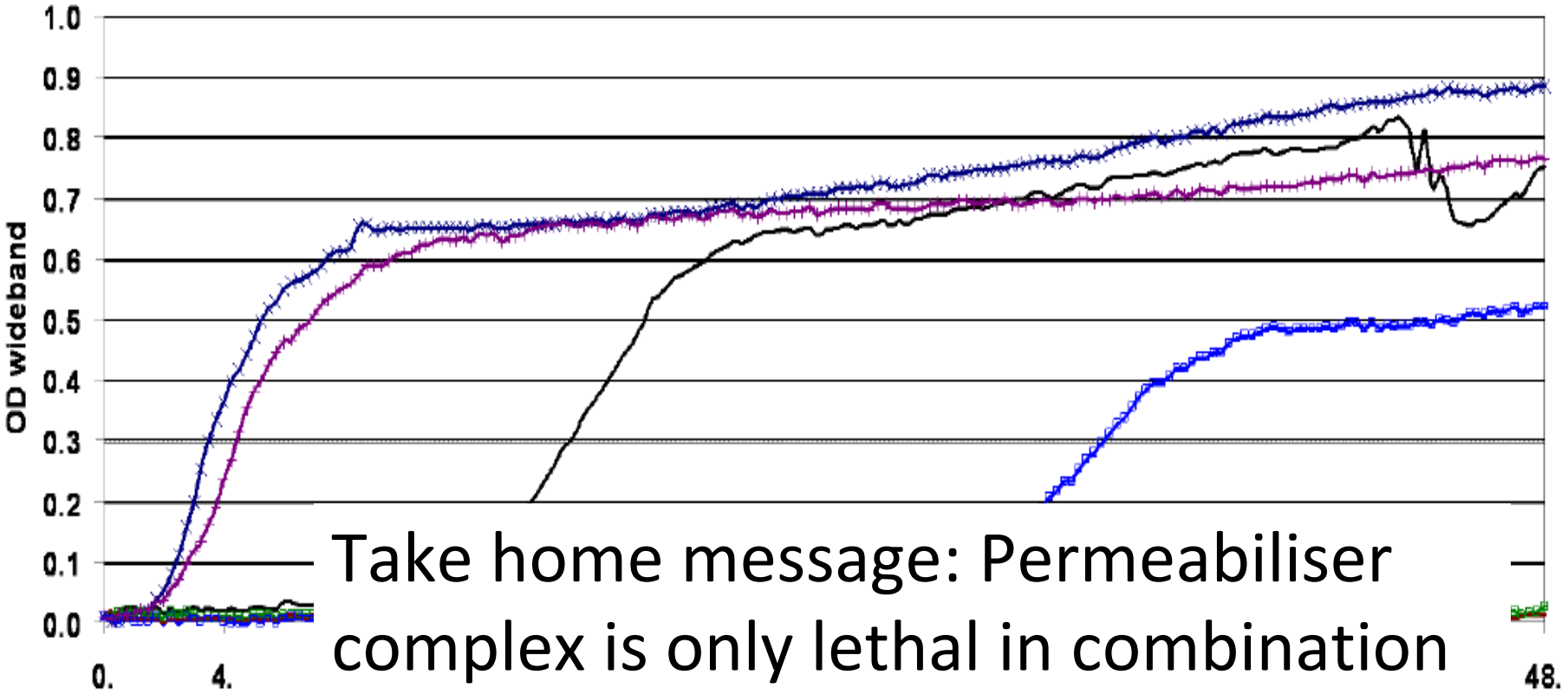


1. **Permeabilizing Complex** weakens the outer membrane of gram-negative bacteria

2. **Permeabilizing Complex** facilitates entry of organic acids, phytochemicals and antibiotics

3. **Lethal injury of bacteria**

Growth inhibition of *Salmonella enterica* subsp. Typhimurium



Take home message: Permeabiliser complex is only lethal in combination with antimicrobial compounds such as acids and antibiotics

Strategy 2:

Phytogenics

What are Phytogenics?

Phytogenics = Functional feed additives of plant origin

Herbs & spices	Plants or parts of plants used directly for their properties in medicine, cooking, amongst other activities.
Essential oils	Concentrated hydrophobic liquid containing volatile aroma compounds from plants.
Essential oil compounds	Individual molecules within an essential oil that are responsible for their biological activity.
Plant extracts (non-volatile)	Other plant derived substances which are used for their specific qualities or flavor.

Background of Phytogenics

Phytogenics

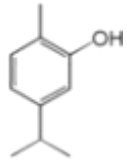
Flavoring properties

- Sensory effect (taste & smell)
- Palatability effect
- Appetizing effect
- Masking unpleasant odor/taste

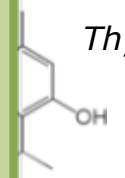
Biological activities

- Anti-oxidant
- Anti-inflammatory
- Soothing
- Stimulating inner secretions
- Anti-microbial
- Fungicidal
- Astringent
- Analgesic

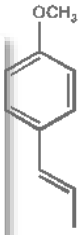

Linalool



Thymol



Eugenol



Anethol

Phytogenics improve digestion, hence help to stabilize the GIT.

Role of Gut as immune organ?

Recent research has highlighted the importance of the gut as the largest immune organ in the body

If gut immunity is stimulated by toxins, antigenic proteins, bacteria, stress etc, an inflammatory response is activated which diverts valauble energy and amino acids away from productive processes such as meat, milk, eggs

Gut intestinal inflammatory response

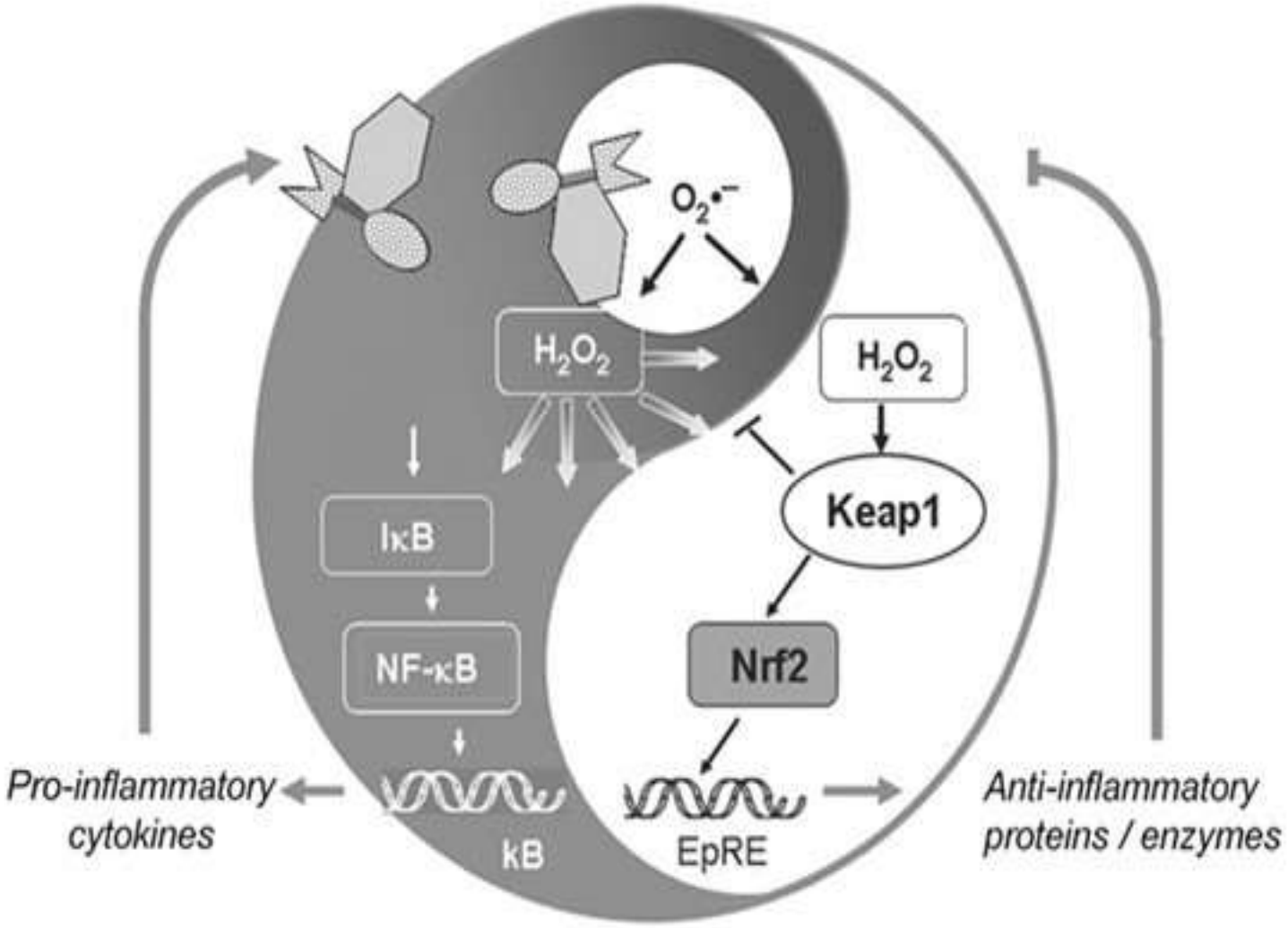
- If not kept in balance, inflammatory response may result in:
- Muscle catabolism
- Inappetence
- Intestinal tissue damage
- Pathogen invasion

Inflammation is inversely related to growth and health.

Inflamation is result of two pathways:

Pro-inflammatory cytokines and anti-inflammatory proteins and enzymes

Yin/Yang of Inflammation



Mode of Action

Quality Phytogenics

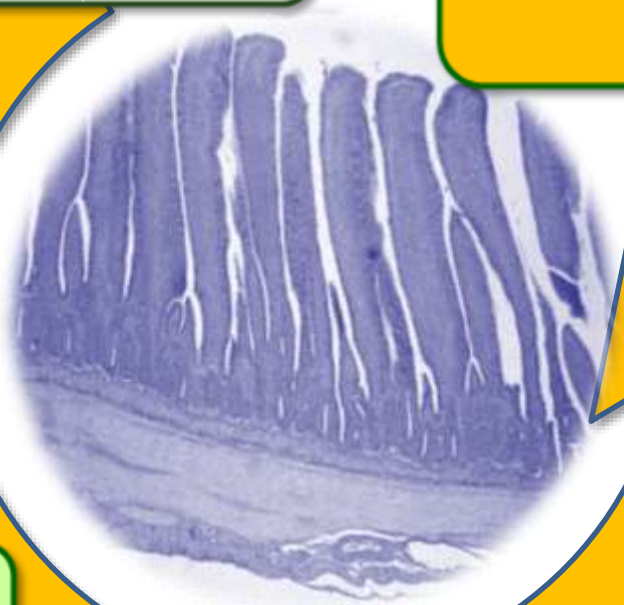
Performance, Livability, Meat quality ↑

Intestinal challenge (inflammation, microbial toxins) ↓

Gut microbiota optimization ↑

Nutrient digestibility ↑

Palatability, saliva & endogenous enzyme secretion ↑



Example of combination strategies

Biomin® Solution for better piglet performance

Production stage	Pre-weaning		Weaning	Rearing
Days	1 – 2	3 – 27		28 – 57
Growth and performance (ADWG, feed intake)	Digestarom® P.E.P. liquid (1.1 ml)		Mycofix® Plus (1 kg/t)	
			Digestarom® Grow (300 g/t) + / Digestarom® P.E.P. MGE 150 (150 g/t)	
			Biotronic® Top3 (1 kg/t) + Biotronic® SE forte (3 kg/t)*	

* on top of Biotronic® Top3 BIOMIN advices as standard acidifier Biotronic® SE forte

Conclusion

- A number of potential strategies and combinations exist for optimising gut health under commercial conditions:

1. Management related solutions
2. Feed related solutions
3. Additive based solutions
4. Combinations of the above

- Sorry, I have no silver bullets

Questions?