Veterinary Feed Directive, A Burden or An Opportunity?

Haitham Yakout

Nutriad technical meeting,
Midwest Poultry federation Meeting. 14 - 16 Mar., 2017.

Veterinary Feed Directive (VFD)

January 1, 2017

Animal producers

Treatment, NOT prevention

Veterinary prescription required

Can NOT use in Feed for

Growth Promotion or
Feed Efficiency

What is the VFD "Rule"?

VFD Rule

FDA

Permits veterinarians to authorize use of certain drugs Approved as VFD drugs

In animal "*Poultry*" feed

OTC to VFD drugs

- Chlortetracycline
- Sulfamethazine
- Penicillin
- Hygromycin B
- Oxytetracycline
- Neomycin
- Tylosin
- Virginiamycin

Current VFD

- Availmycin
- Flofenicol
- Tilmicosin
- Tylvalosin

http://www.fda.gov/AnimalVeterinary/DevelopmentApprovalProcess.htm

AGPs *vs.* NGPs "Benefits"

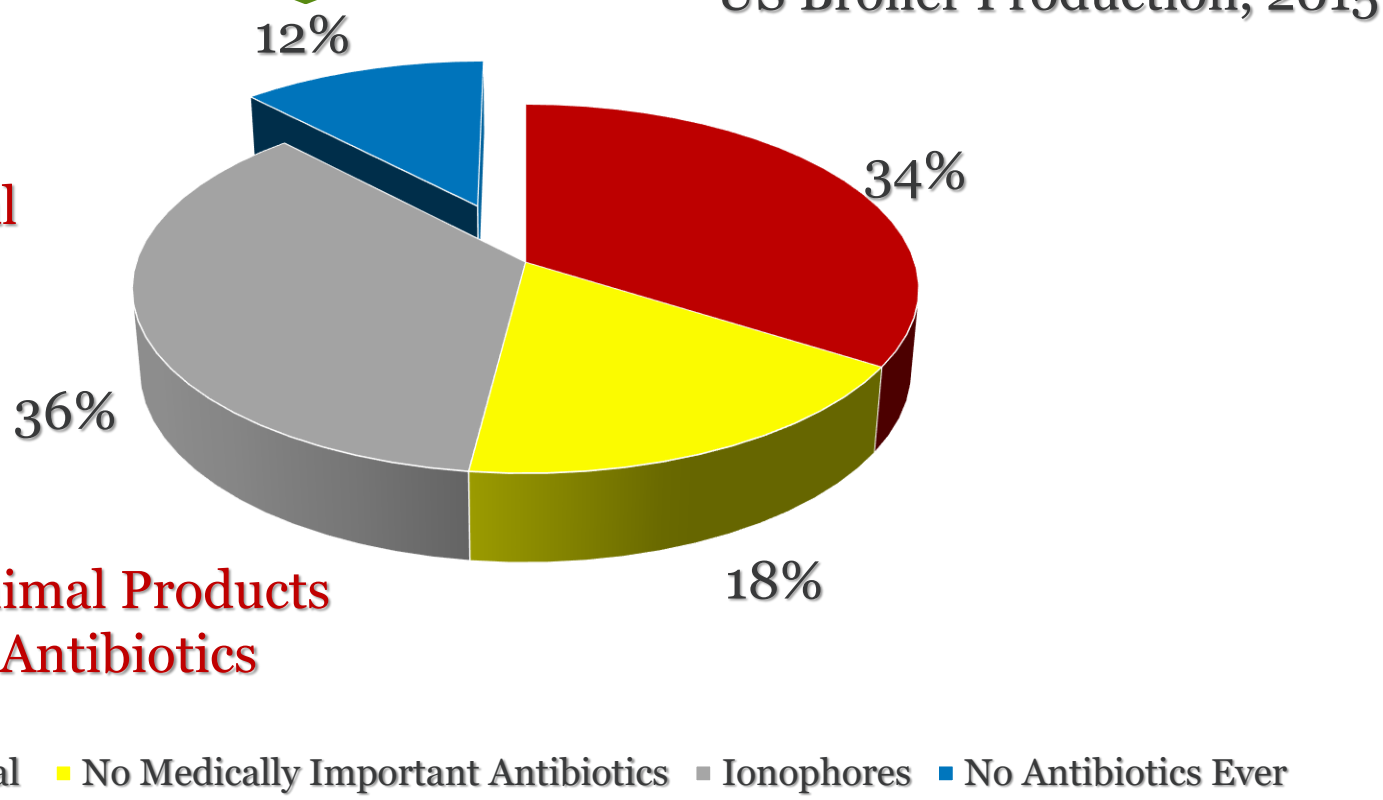
	NGPs	AGPs
Improving growth performance	✓	✓
Improving FCR	✓	✓
Diseases prevention	✓	✓
Improve the quality of the product, ↓ fat % ↑ meat protein content	✓	✓
Control/ inhibit pathogens (*Salmonella, Campylobacter, Escherichia coli & Enterococci*)	✓	✓
Favor useful bacteria	✓	✓
Bacterial resistance	✗	✓
Residues in animal products (meat, milk or eggs)	✗	✓
Rapid development of a healthy gut microflora	✓	✓
Stimulation & enhancement of the immunity	✓	✓

nutriad
applying nature

US Broiler Production - Breakdown

2X in 2017

- Conventional
- APF
- RWOA
- NAE
- Veg
- ABF All Veg
- ABF with Animal Products
- All Veg with Antibiotics

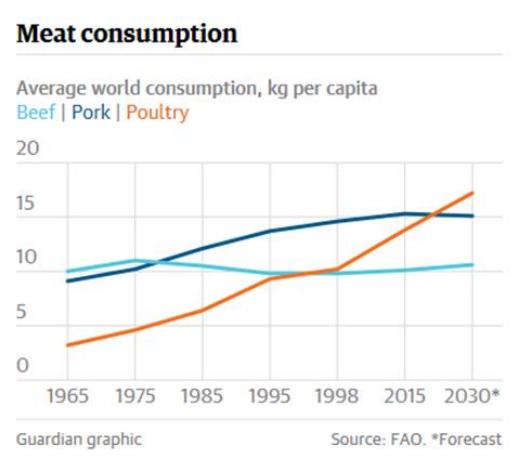


Source: Poultry health today

nutriad
applying nature

Globally & in the US, Chicken consumption, is increasing.

- Globally, chicken is expected to comprise nearly one-half of the increase in global meat production over the next decade.
- In the US, chicken accounts for about one-half of all meat eaten, which is up from one third in the early 1990s.
- Poultry farmers are expecting per capita consumption of white meat in the US to exceed that for red meat for the first time in 2016.



- According to the USDA, the per capita consumption of poultry and livestock on a per pound basis is expected to continue increasing across all meat categories into 2016.

Year	Beef	Pork	Chicken	Turkey	Commercial Fish & Shell-Fish
2000	67.8	51.2	78.2	17.4	15.2
2001	66.3	50.4	78.0	17.5	14.7
2002	67.8	51.6	82.2	17.7	15.6
2003	65.0	51.9	83.2	17.5	16.3
2004	66.2	51.5	85.5	17.1	16.6
2005	65.6	50.1	87.3	16.7	16.2
2006	65.9	49.5	87.9	16.9	16.5
2007	65.3	50.8	86.4	17.6	16.3
2008	62.5	49.5	84.9	17.6	15.9
2009	61.1	50.2	81.1	17.0	15.8
2010	59.6	47.8	83.8	16.4	15.8
2011	57.3	45.7	84.3	16.1	14.9
2012	57.3	45.9	81.8	16.0	14.2
2013	56.3	46.8	83.1	15.9	14.3
2014	54.1	46.4	84.7	15.7	14.6
2015	53.9	49.9	90.1	16.0	NA
2016	54.3	50.4	92.1	16.5	NA
estd.					

Take Home Message

- There is an increasing pressure regarding raising and producing farm animals (beef cattle, swine, poultry, *etc.*) with fewer or no AGPs or even similar drugs.

- An increase need to find/ use other "***alternative(s)***" to replace AGPs in farm animals feeds.

- **More NGPs** in farm animals feeds

nutriad
applying nature

What does this mean?

The Producer

Antibiotics are important/ essential part of managing disease and achieving health, growth & production goals.

The Consumer-Safety

Fears of antibiotics overdose that may lead to higher populations of "super bug" that are RESISTANT to our normal practice antibiotics.

nutriad
applying nature

Essential Keys to ABF Production

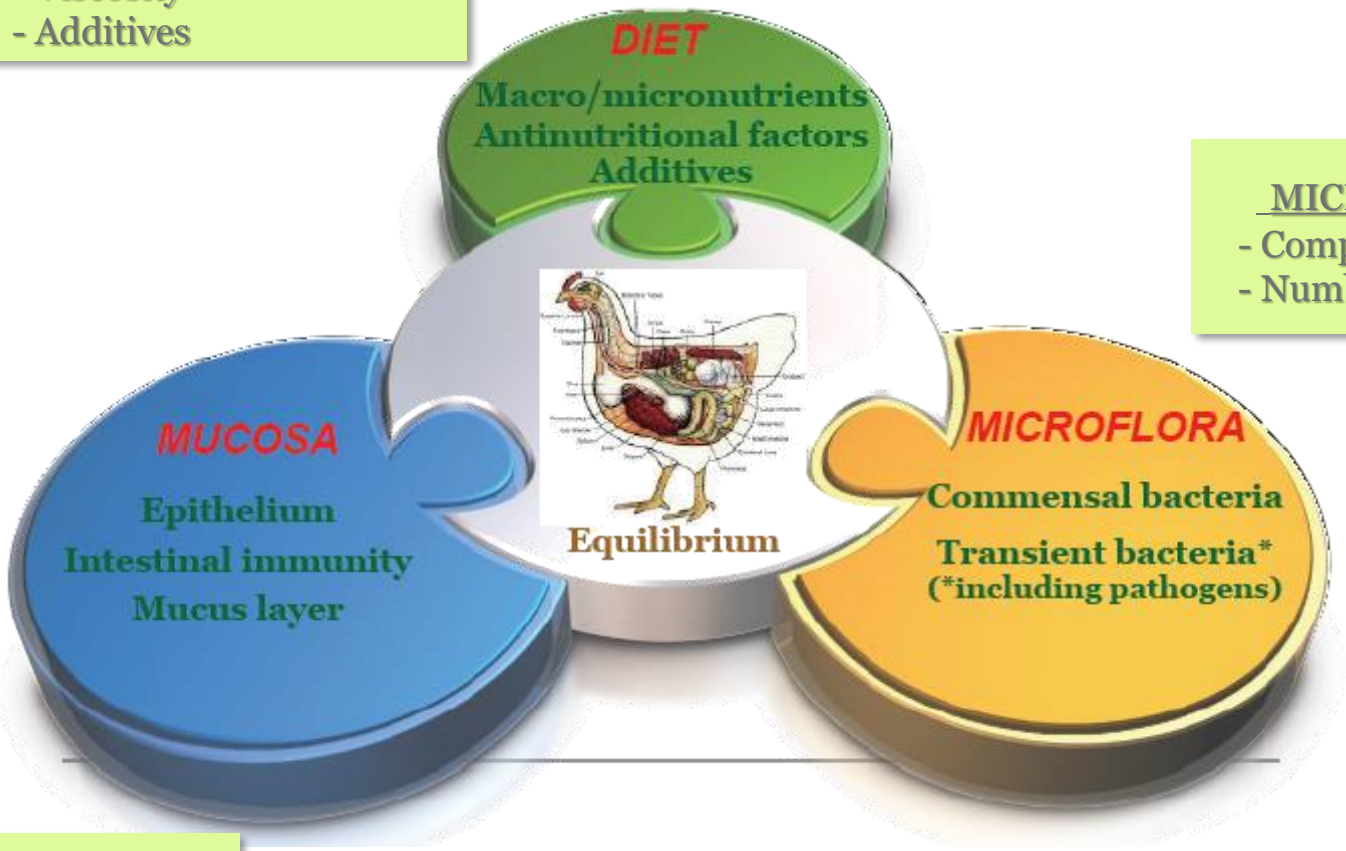
- Currently with the VFD in place
  - Q: are there certain products replacing AGPs?
  - A: No logical substance

- Biosecurity?
- Mortality disposal
- Reduce stress
- Monitor and manage flocks/ farms
- Vaccine & vaccination
- Quality ingredients
- Feed/ feeding programs alternatives?

nutriad
applying nature

Gut health: the result of interactions

FEED COMPOSITION:
- Nutrients (=substrate)
- Viscosity
- Additives



MICROBIOTA:
- Composition
- Number

HOST:
- Gut integrity
- Immune status (innate & acquired)

nutriad
applying nature

Product Testing…

- Lab trial – TRC/ target release efficacy
- Research Growth trial - Dose response
- Growth trial – Combinations (1, 2, …)
- Challenge model – Cocci or NE
- Research trial
- Field trial (1, 2, …)
- Safety study PUBLISHED research

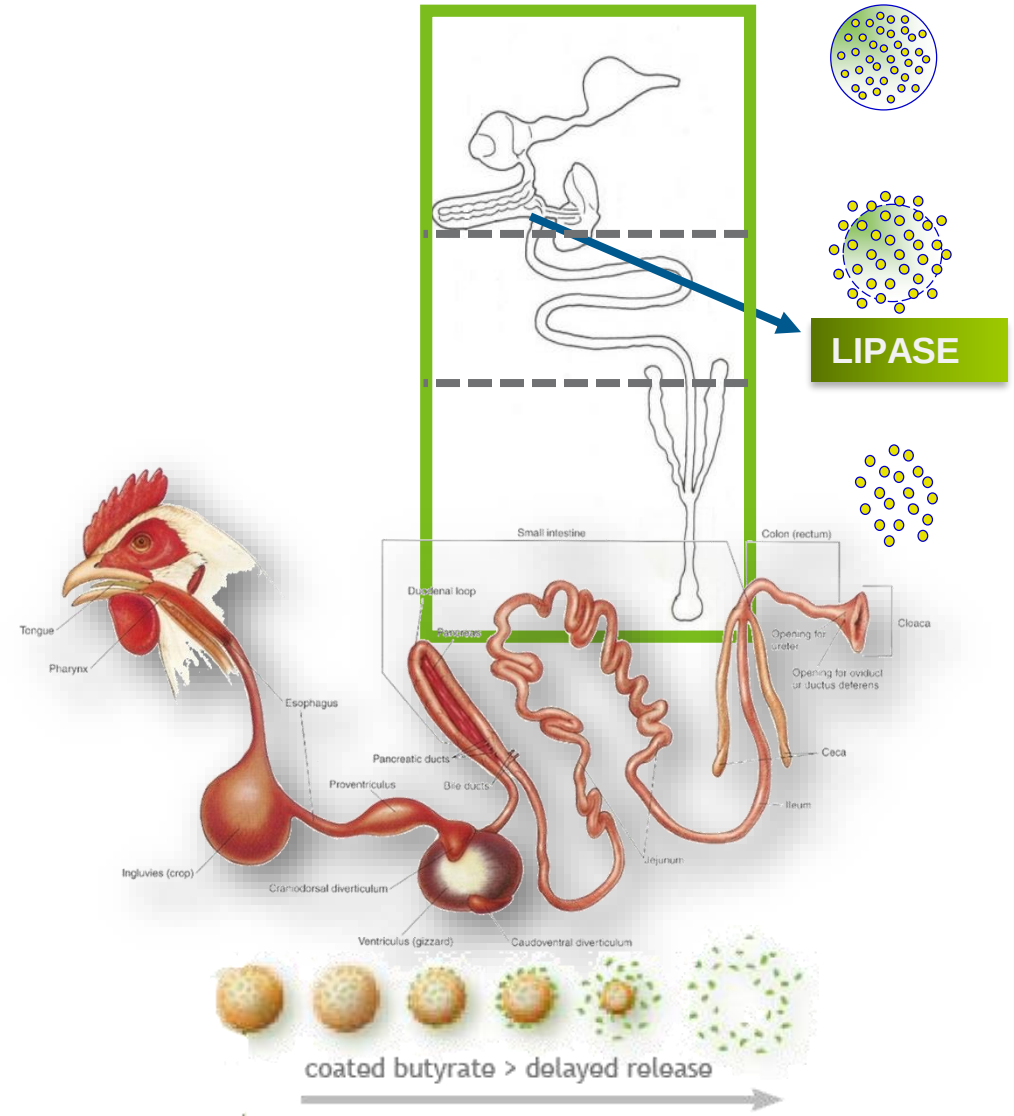
nutriad
applying nature

Gut Support

ULTRAMIX C®

nutriad
applying nature

Why do you need a good coating?

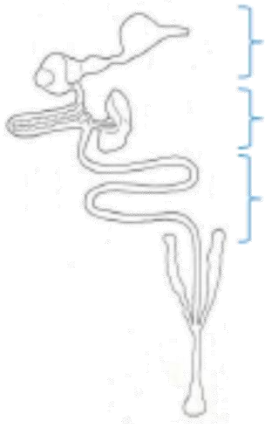


- 30% butyrate, embedded in protective fat matrix
- butyrate on outside of pearls:
  → released in stomach
- majority of butyrate released when lipase breaks down fat
  → released in intestine

nutriad
applying nature

Target Release Capacity (*TRC*): relative to UltraMix C® Coated

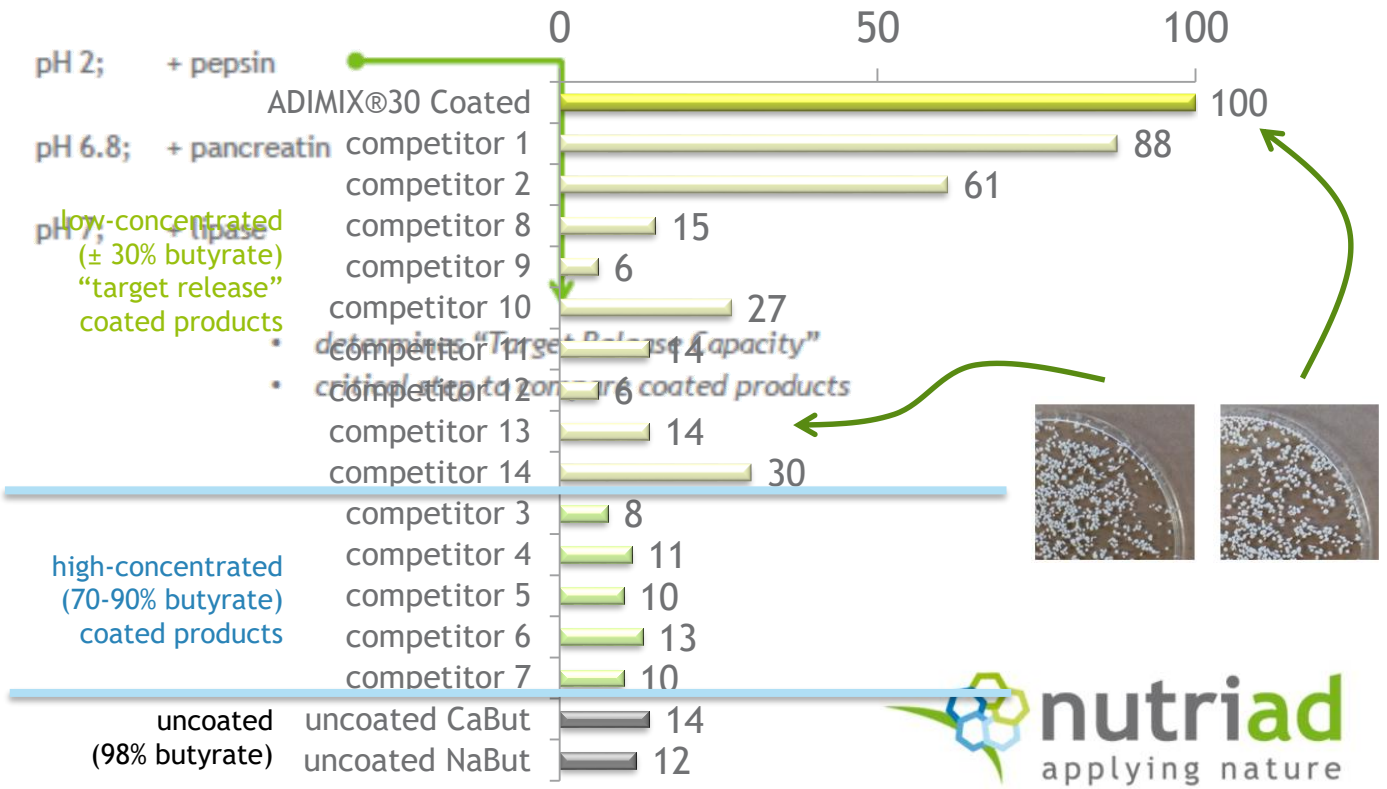
- in our lab in Belgium
- based on Boisen & Fernández, 1997
- incubate product, mimicking conditions in digestive tract
- measure release of butyrate over time



step 1 pH 2; + pepsin

step 2 pH 6.8; + pancreatin

step 3 pH 7; + lipase



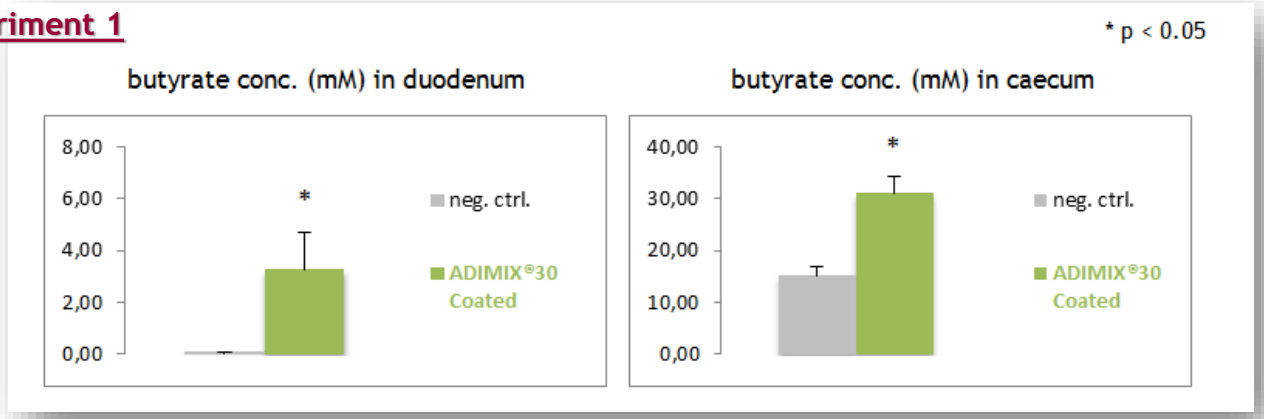
- determines "Target Release Capacity"
- critical step to compare coated products

nutriad
applying nature

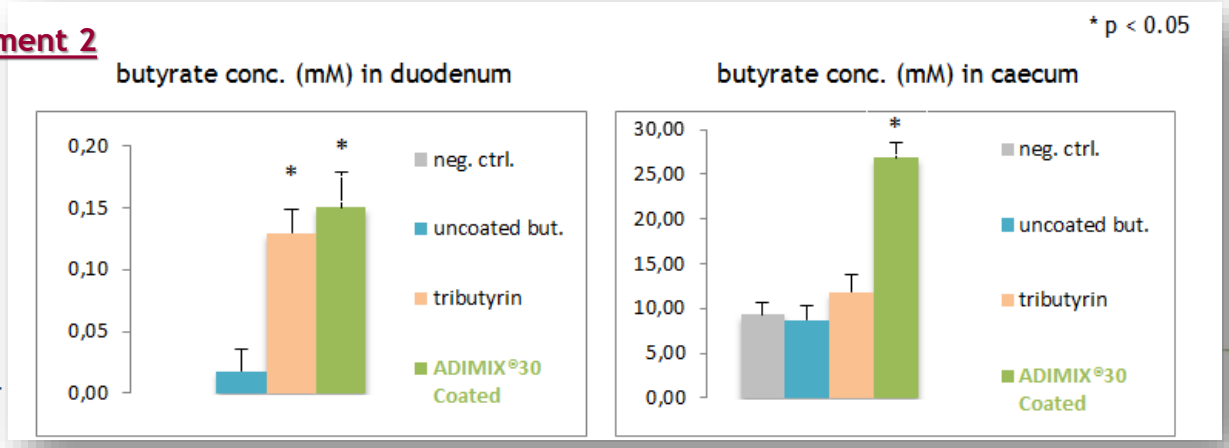
Butyrate analysis *in vivo*: Poultry Experimental setup

- In 2 experiments, broilers were supplemented with butyrate products (each corresponding to 3 g sodium butyrate/kg of feed) or not.
- Afterwards, birds were euthanized and their intestinal content, collected from different parts of the digestive tract, was analyzed for butyrate concentration
- Experiment 1:
  - mash feed
  - 2 x 6 broilers:
    1. negative control
    2. ADIMIX®30 Coated (d 26-27)
- Experiment 2:
  - pelleted feed
  - 4 x 8 broilers:
    1. negative control
    2. uncoated butyrate (d21-28)
    3. tributyrin (d21-28)
    4. ADIMIX®30 Coated (d21-28)

Experiment 1



Experiment 2

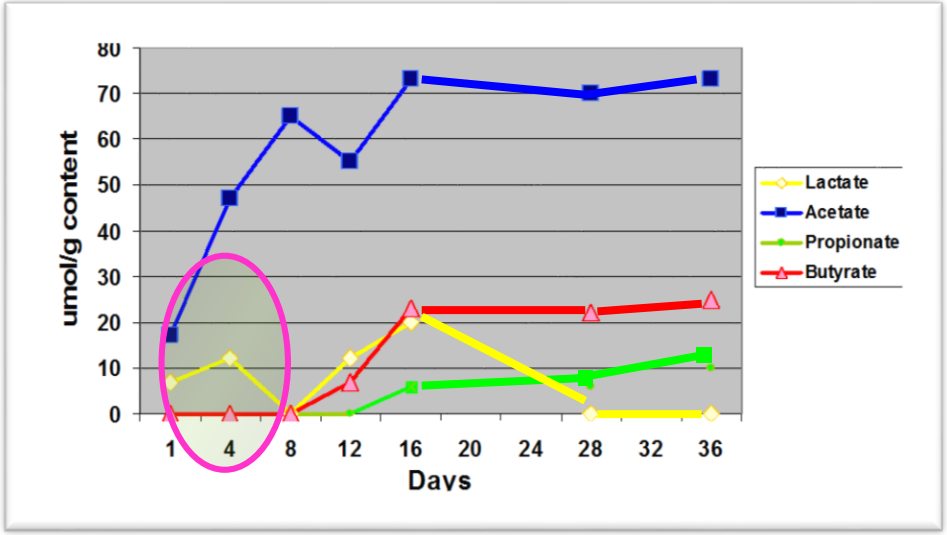


UNIVERSITEIT GENT

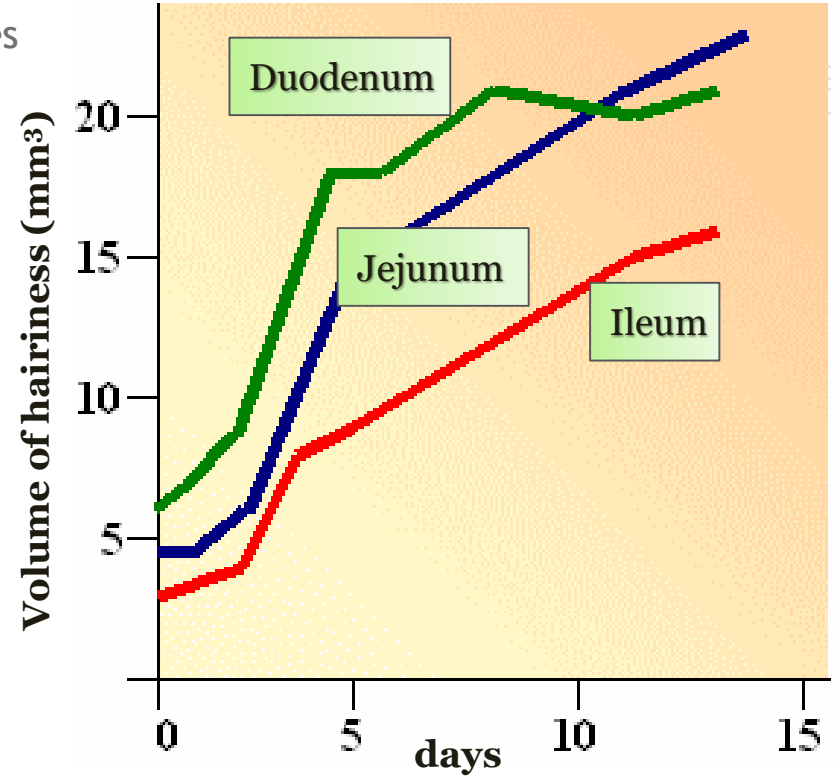
nutriad applying nature

Butyrate analysis *in vivo*: Poultry

- Well-known role of butyrate in intestinal wall development: Langhout *et al.*, (2010); Antongiovanni *et al.*, (2007); Friedman & Bar-Shira, (2005); Leeson *et al.*, (2005); Van Immerseel *et al.*, (2004); Dierick *et al.*, (2002); Van der Wielen, (2002); …
- But: endogenous butyrate only present at later stages



Adapt. from van der Wielen, 2002



Changes In Villi Growth After Hatching

NORTH CAROLINA STATE UNIVERSITY
NC STATE UNIVERSITY

nutriad
applying nature

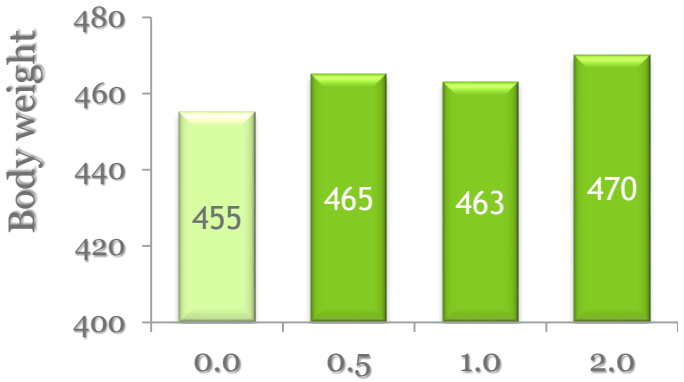
UltraMix C® in starter feed - Experimental setup

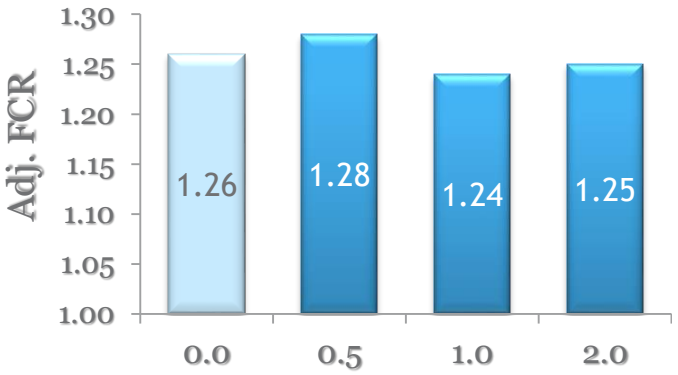
- Commercial broilers were randomly assigned to 32 floor pens
- Each pen containing 32 birds; 8 rep./ treatment
- Feed and water provided ad libitum until 42 d
- Starter feed (pellet-crumbled) treatments consisting of 4 dietary supplementation levels of UltraMix C® from 1 - 14 d
  - 0.0 kg/T UltraMix C® (*negative control*)
  - 0.5 kg/T UltraMix C®
  - 1.0 kg/T UltraMix C®
  - 2.0 kg/T UltraMix C®
- Subsequently, all birds were fed common grower & finisher diets

UltraMix C® in starter feed Effect on performance

d1-14: -/+ ULTRAMIX® C

Day 14



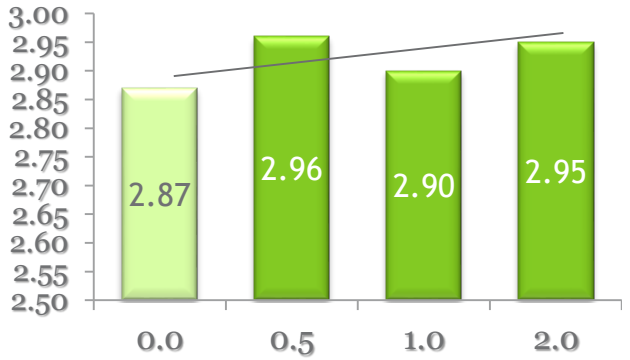


ULTRAMIX® C (kg/T)

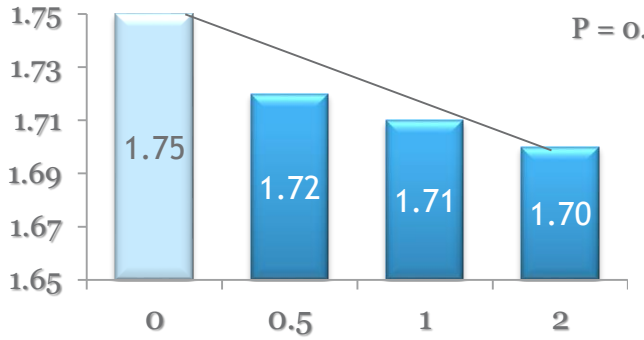
d15-42: - ULTRAMIX® C

Day 42

P = 0.0175



P = 0.045

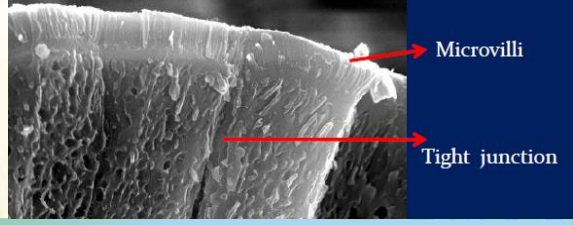


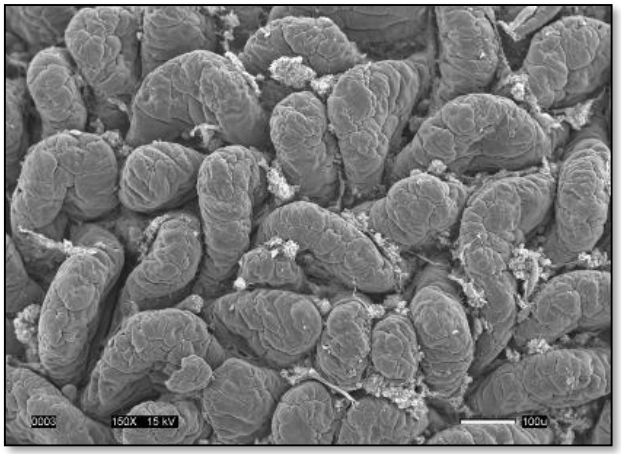
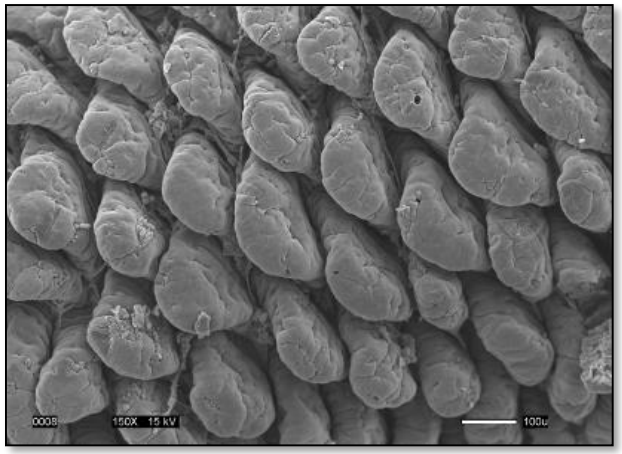
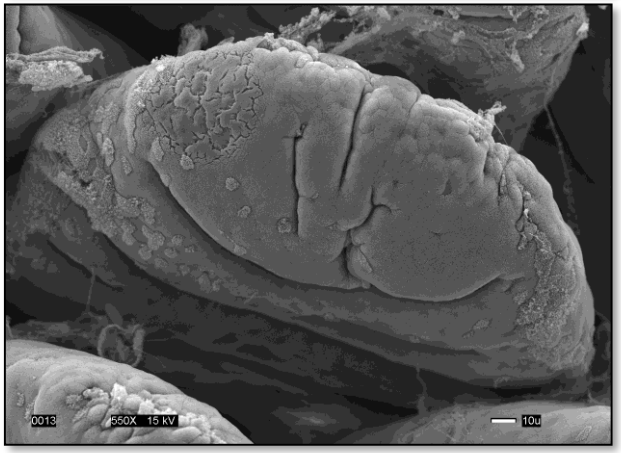
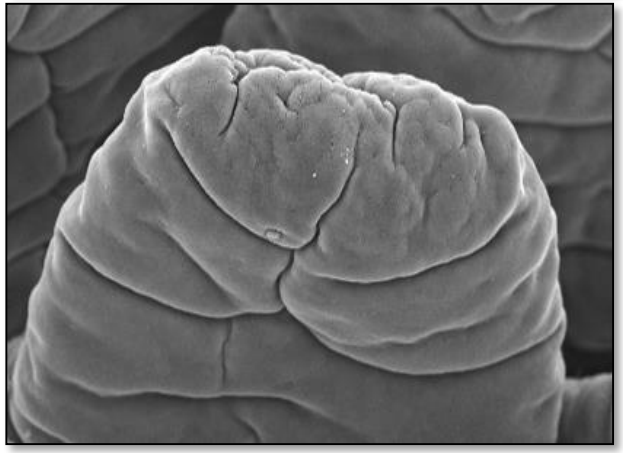
ULTRAMIX® C (kg/T)

NORTH CAROLINA STATE UNIVERSITY
NC STATE UNIVERSITY

nutriad
applying nature

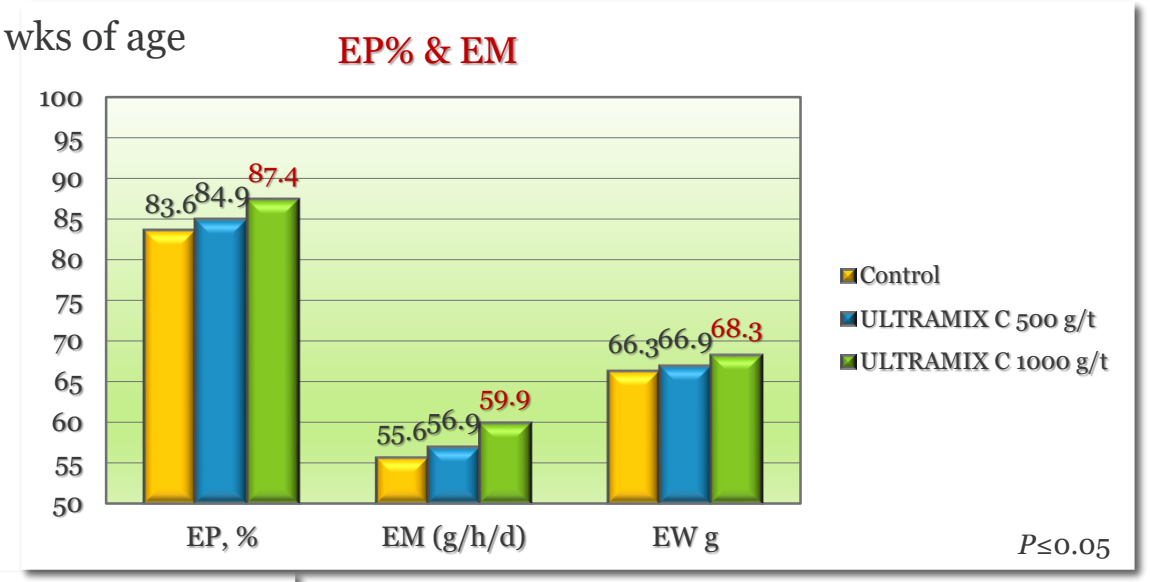
ULTRAMIX C® in starter feed: villi morphology

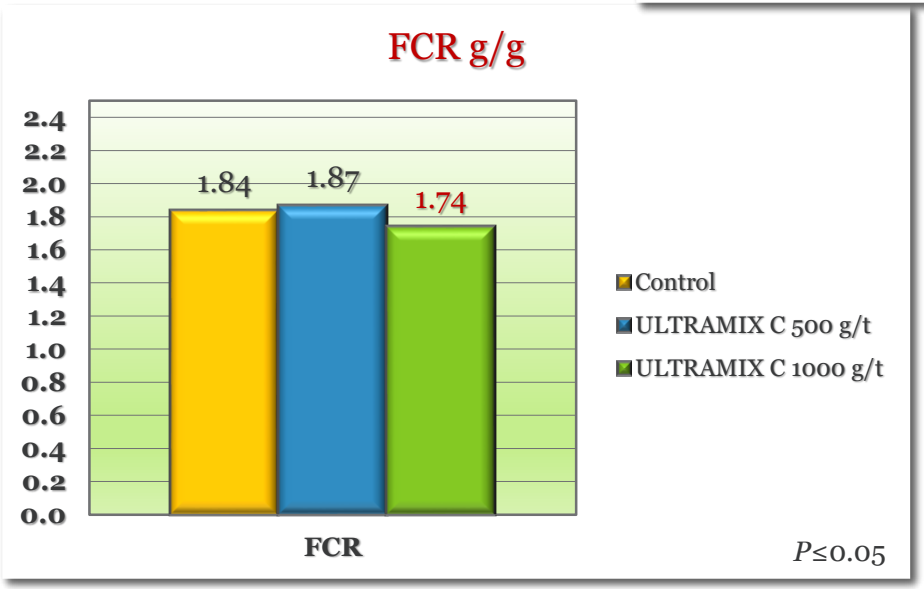


	Negative control	+ ULTRAMIX® C
3-day old chicks		
7-day old chicks		

Layers Trial

- Spain; 162 Hy-Line W-98 at (54 to 84) wks of age
- 3 Treatments
  - Control
  - UltraMix C at 500 g/ton
  - UltraMix C at 1000 g/ton
- 9 replicates per treatment
- 18 hens per replicate(6 cages x 3 hens)



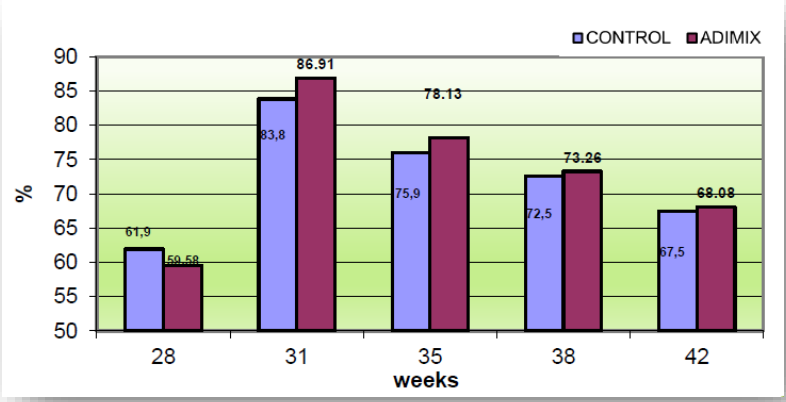


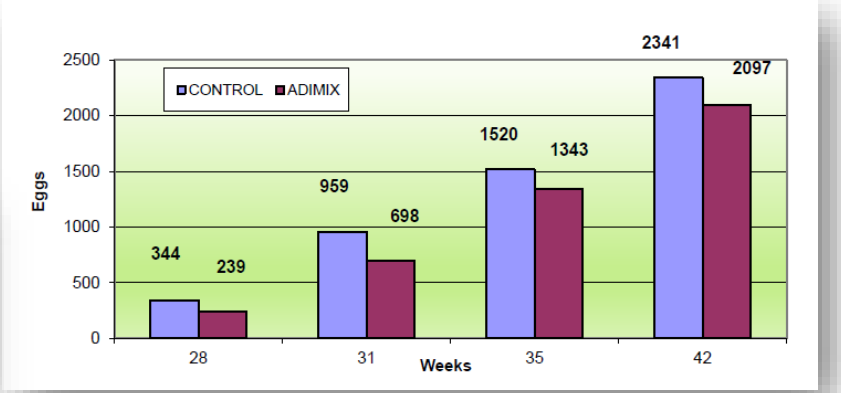
nutriad
applying nature

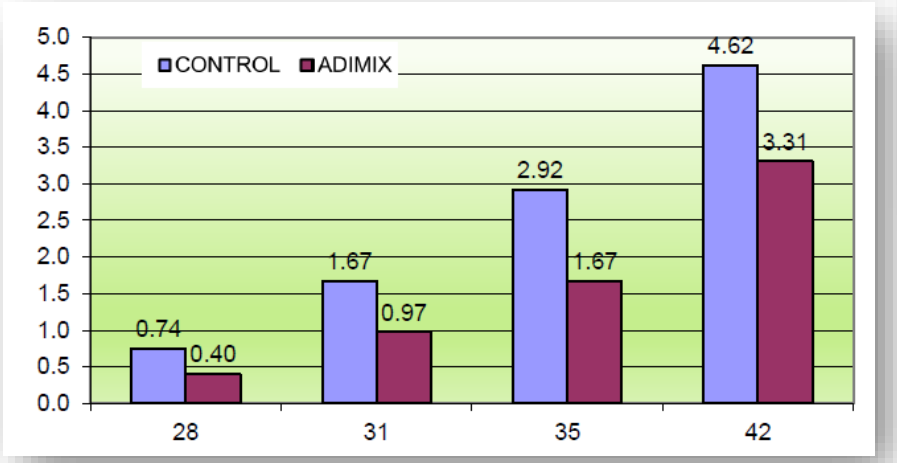
Field trial (Hy-line) - Breeders

- Brazil; 36,000 Hy-Line hens at 28 to 48 weeks of age
- 2 treatments:
  - 18.000 with **UltraMix C : 250 g/Ton**
  - 18.000 without Adimix (Control)
- 3 lots of 6.000 layers per treatment

- EP% ↑
- Broken eggs ↓
- Mortality ↓



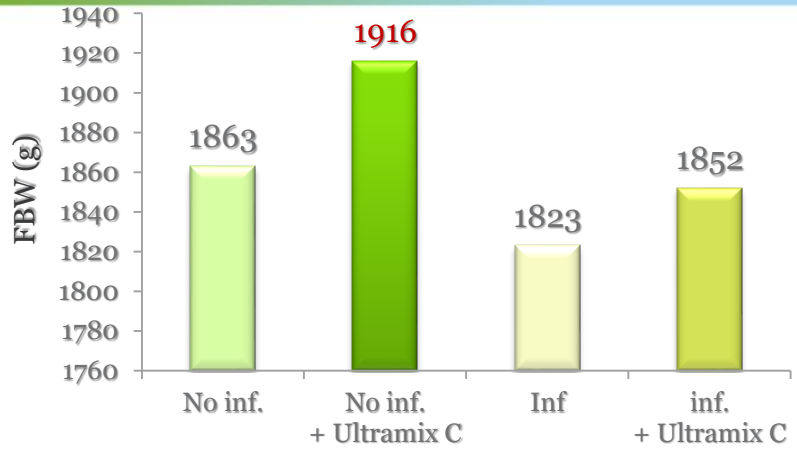


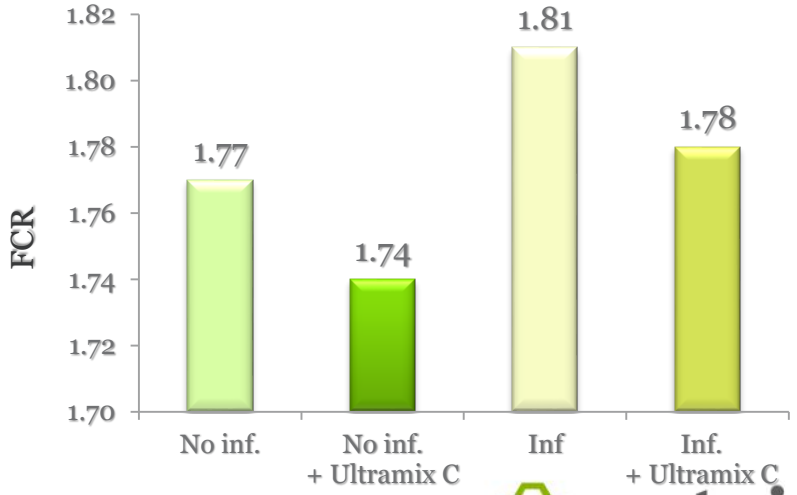


nutriad
applying nature

NE challenge - Experimental setup

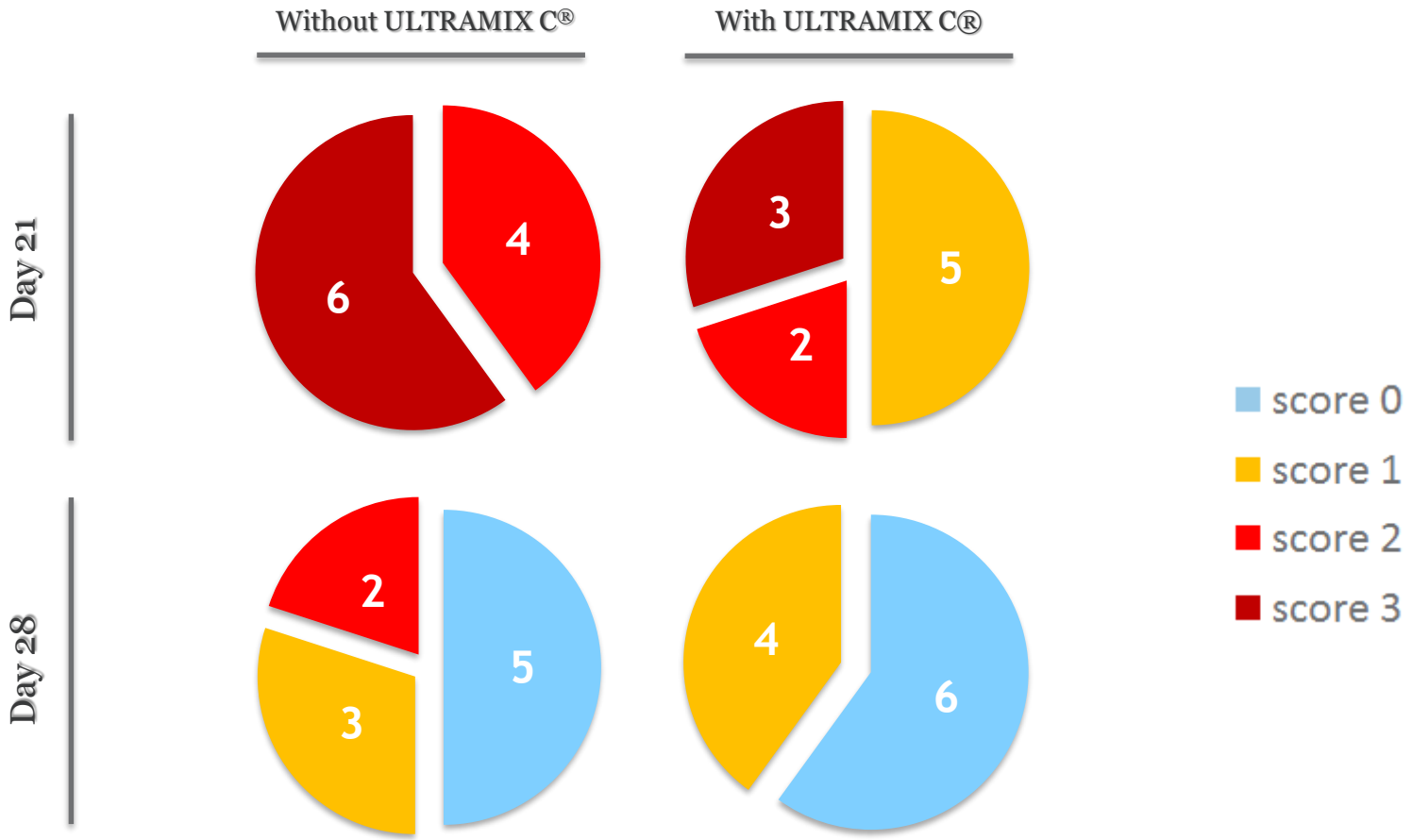
- Cairo University, Egypt
- 800 Arbor Acres Plus broilers
  - 4 treatments
  - 10 replicates
  - 20 birds/rep
- **Treatments**
  - No infection
  - Infection
  - No infection + ULTRAMIX C
  - Infection + ULTRAMIX C
- **ULTRAMIX C supplementation**
  - Starter (d 1-14) 1,00 kg/T
  - Grower (d15-28) 0,50 kg/T
  - Finisher (d29-35) 0,25 kg/T
- **Infection (@ day 14)**
  - 4 x 10^8 cfu/ml *C. perfringens* NETB for 4 successive days
  - IBD-vaccination





nutriad
applying nature

NE challenge - Lesion score in infected birds *



** in the non-infected groups, NE score was 0 for all birds*

nutriad
applying nature

Conclusion

- The majority of AGPs alternatives showed positive effect on health and performance of poultry", however further research is needed related to:
  - Mode of action of these compounds &
  - Their interaction with other factors of production is necessary.

- Conduct test trials is a **MUST**,
  - Responses may vary…

- Product rotation & minimal products number to be effective (use less tools from the toolbox)

- Effective feeding program(s)

nutriad
applying nature

Thank you.
Questions?

nutriad
applying nature