



Do enzymes play role in gut health?

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09/03/2015, Bangkok, Thailand

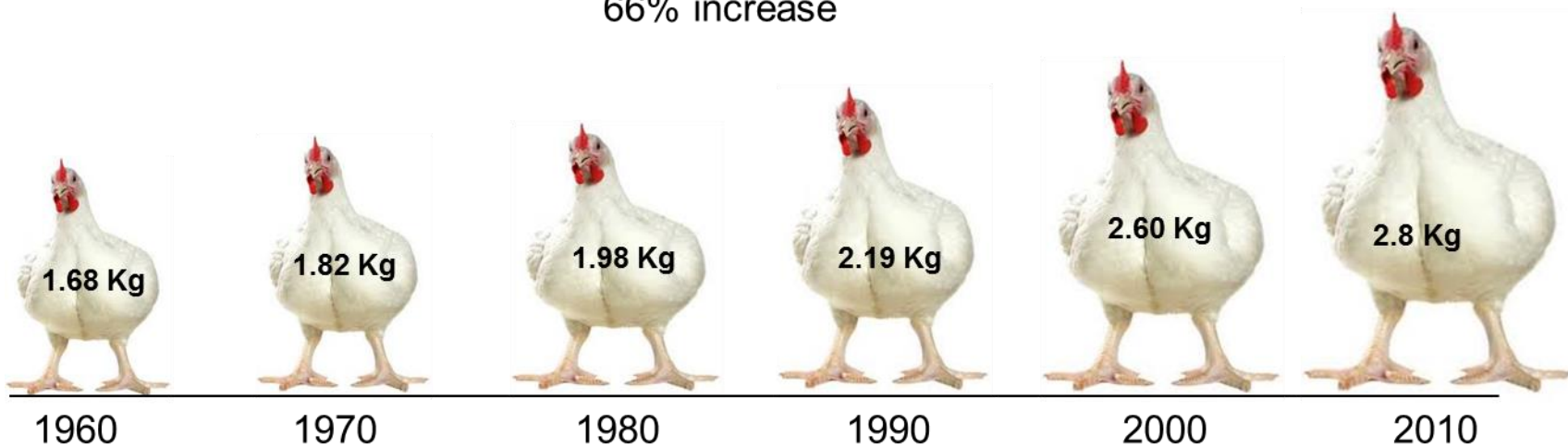
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How animal production contributed to this achievement?

Broiler body weight at 42 days

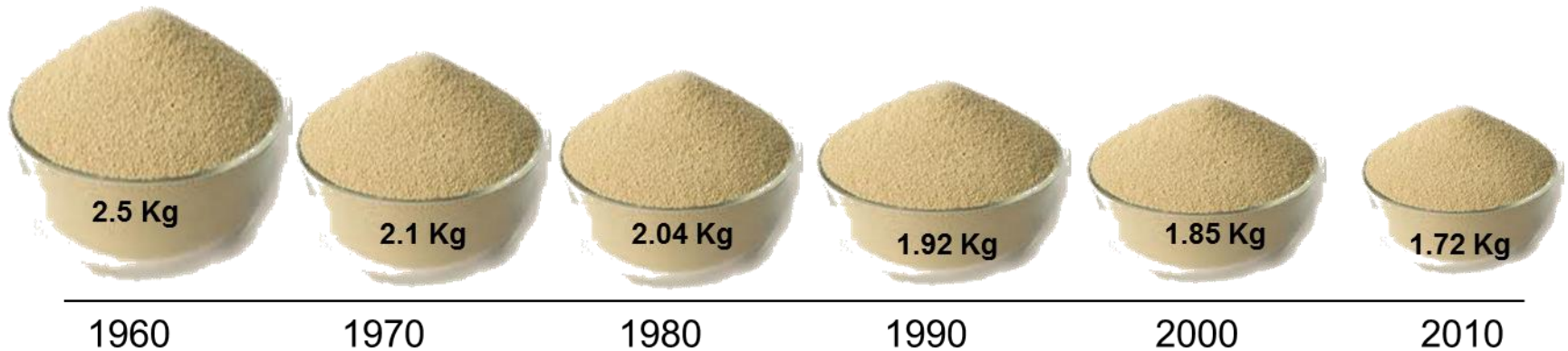
66% increase



How animal production contributed to this achievement?

Broiler Feed Conversion Ratio

32% improvement



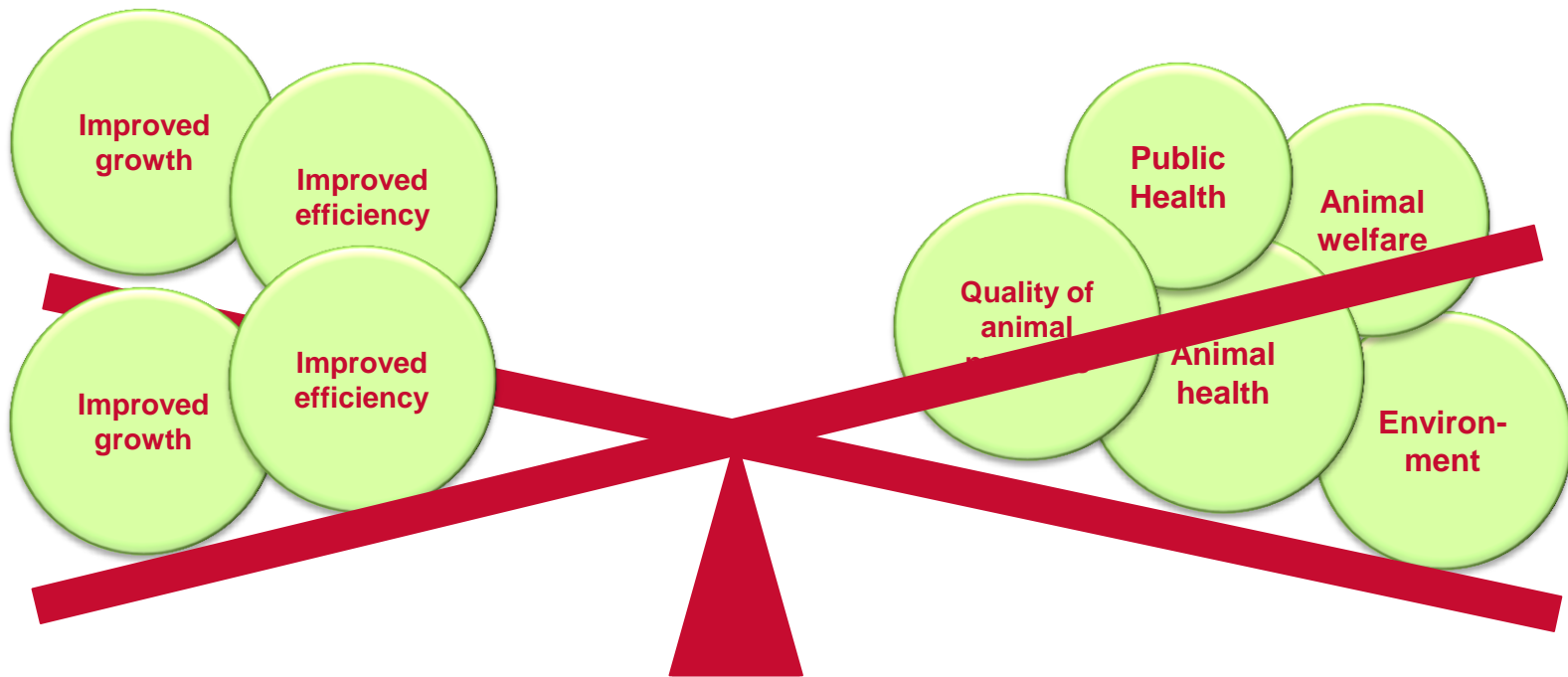
How animal production contributed to this achievement?

Changes in global human population, pig and poultry inventories, and production and international trade of pig and poultry meat between 1996 and 2005.

	1996	2005	Annual growth (%)
Human population	5,762	6,451	1.1
Inventory			
Pigs (million)	859	963	1.1
Poultry (million)	14,949	18,428	2.1
Production			
Pig meat (thousand tons)	79,375	103,226	2.6
Poultry meat (thousand tons)	56,408	81,856	3.7
International trade			
Pig meat (thousand tons)	6,398	9,557	4.0
Poultry meat (thousand tons)	5,359	9,234	5.3

Source: FAOSTAT

Then why 'dream' is still distant?

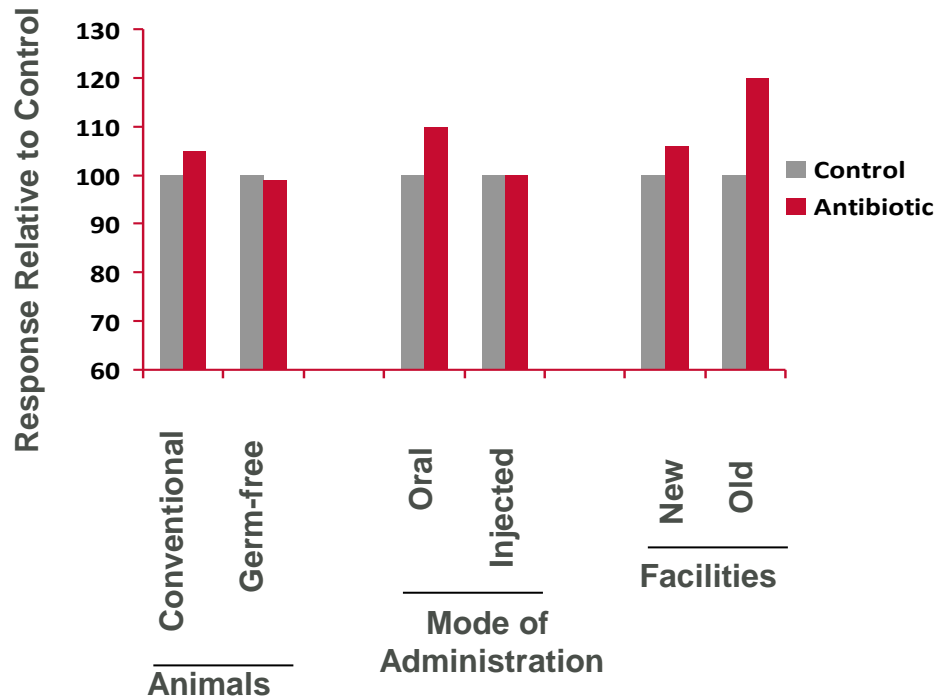


Most of these issues are gut health related

Today's argument:

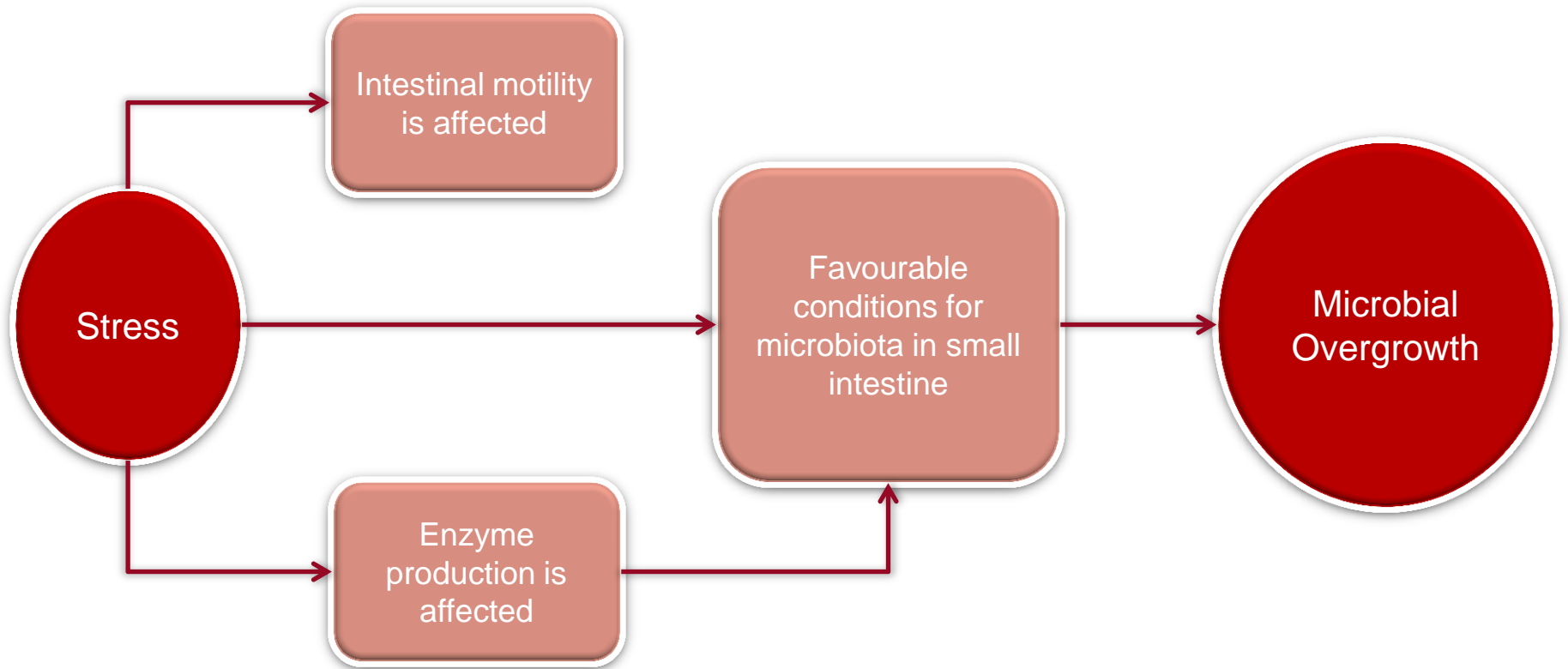
Enzymes with their impact on gut health,
can be an alternative during transition to
post AMGP era

When, how and why AMGPs work?



- AMGPs work more effectively in **gut**
- AMGPs work more effectively under **stress**

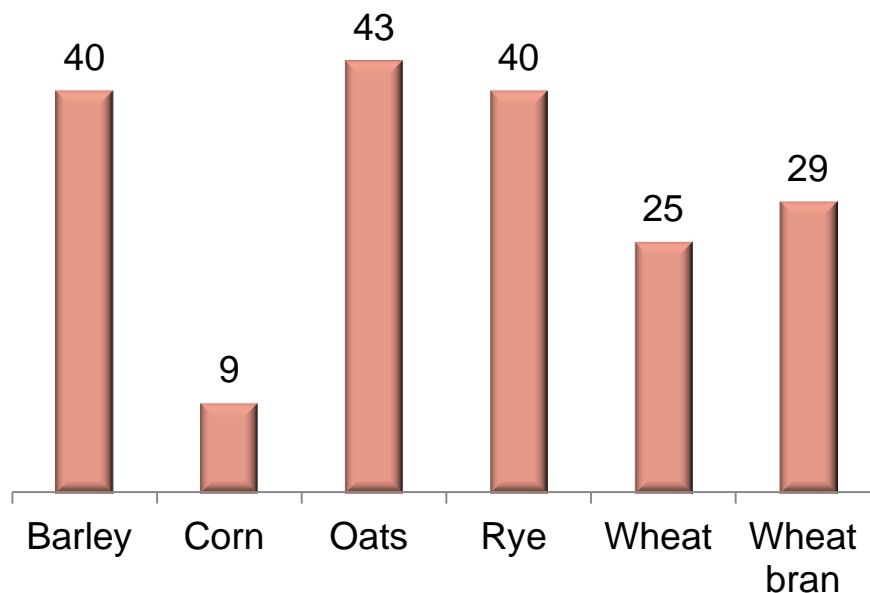
Stress and gut microflora



NSP contents in diet contribute further to the problem

Animal diets
contain
Cereals

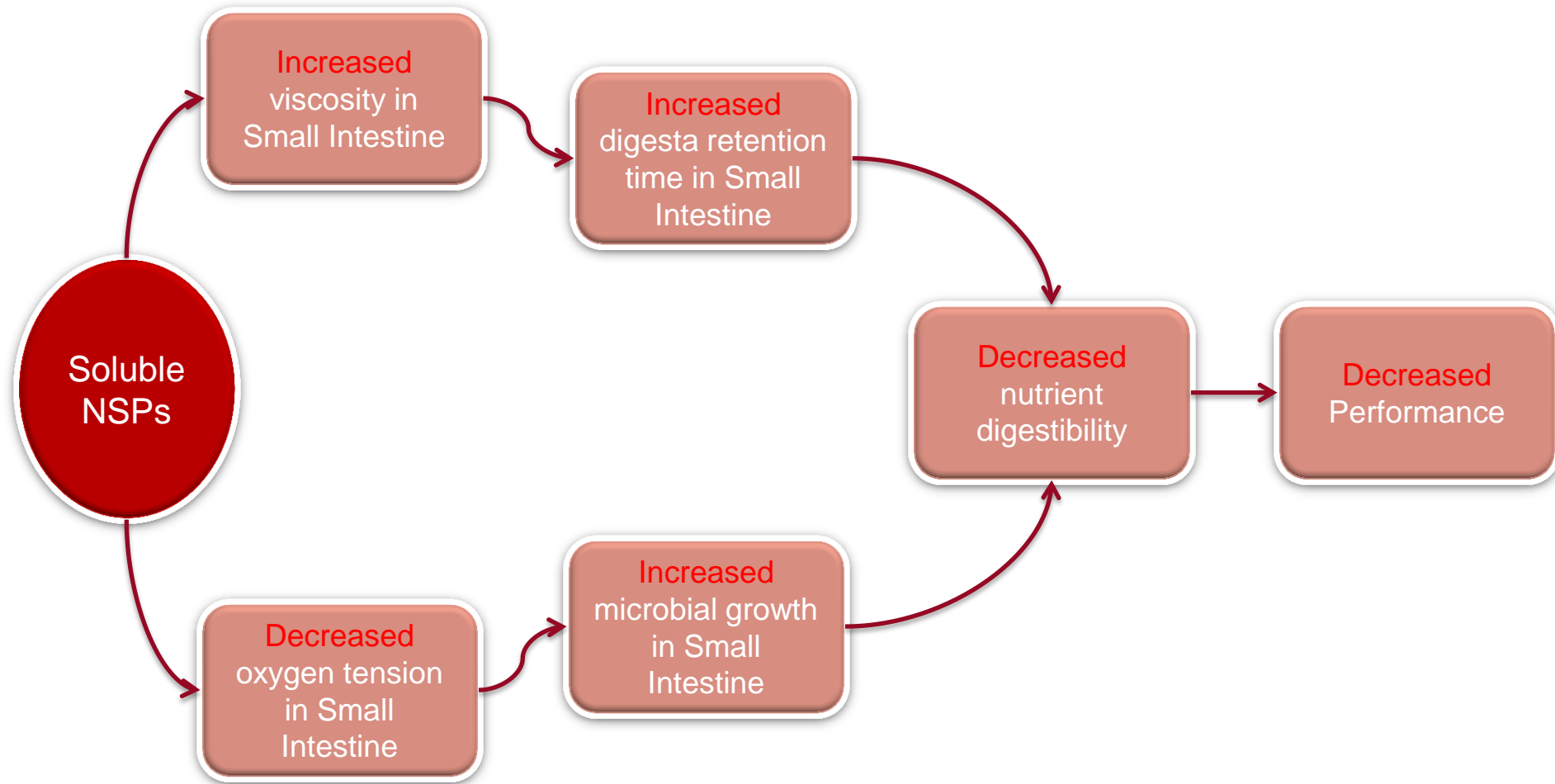
unconventional
cheap
ingredients with
high NSP
contents



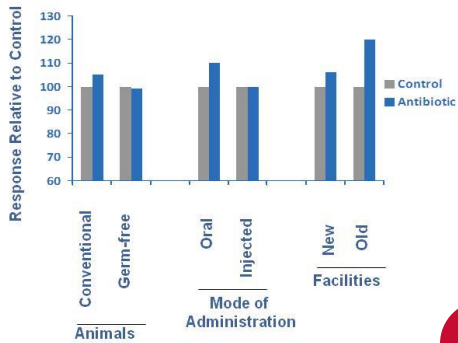
Concentration of soluble NSPs g/Kg DM

Soluble
NSP levels
are high

Soluble NSPs in diet and gut health



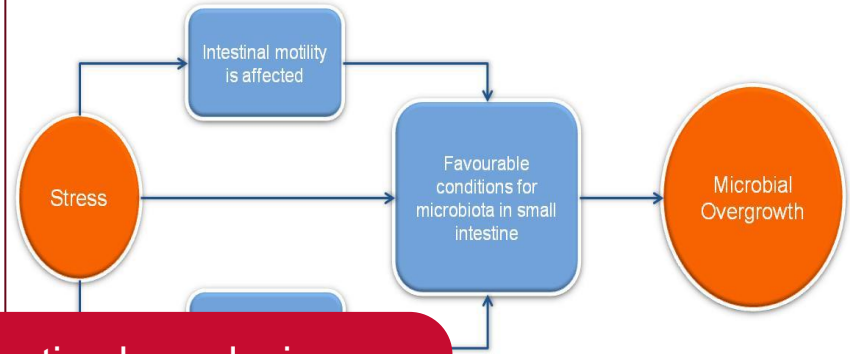
When, how and why AMGPs work?



- AMGPs work more effectively in **gut**
- AMGPs work more effectively under **stress**

Anderson, 1999

Stress and gut microflora

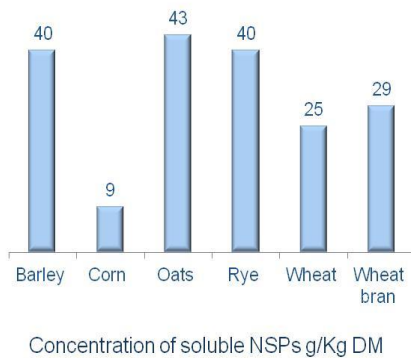


AMGPs were effective by reducing microbial overgrowth in the small intestine caused by stress & soluble NSP content of the diet.

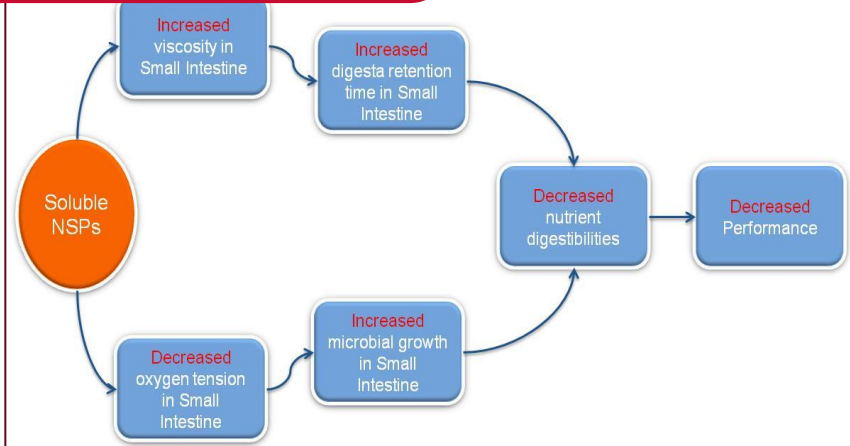
NSP contents in diet contribute to health

Animal diets contain Cereals

unconventional cheap ingredients with high NSP contents



Soluble NSP levels are high



Enzymes can be part of the solution

Small Intestine

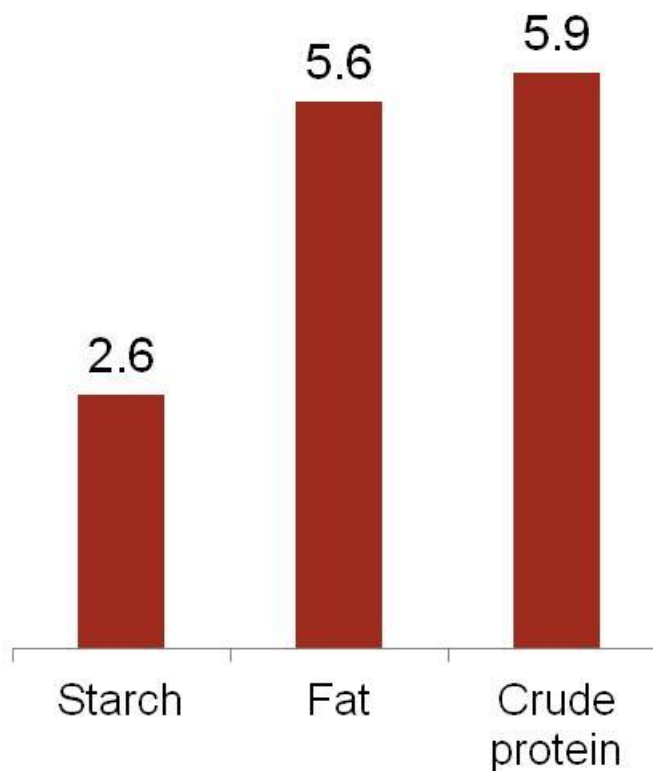
- De-polymerisation of soluble NSPs
 - Reduction in viscosity
 - Increased nutrient digestibility
 - Digesta transit time is better regulated
 - Lesser microbial overgrowth
 - Better nutrient absorption
-

Large Intestine

- De-polymerisation of soluble NSPs produce smaller oligomers which utilized by healthy microflora
 - Increased energy availability by higher VFA production
 - Lower pathogen pressure
-

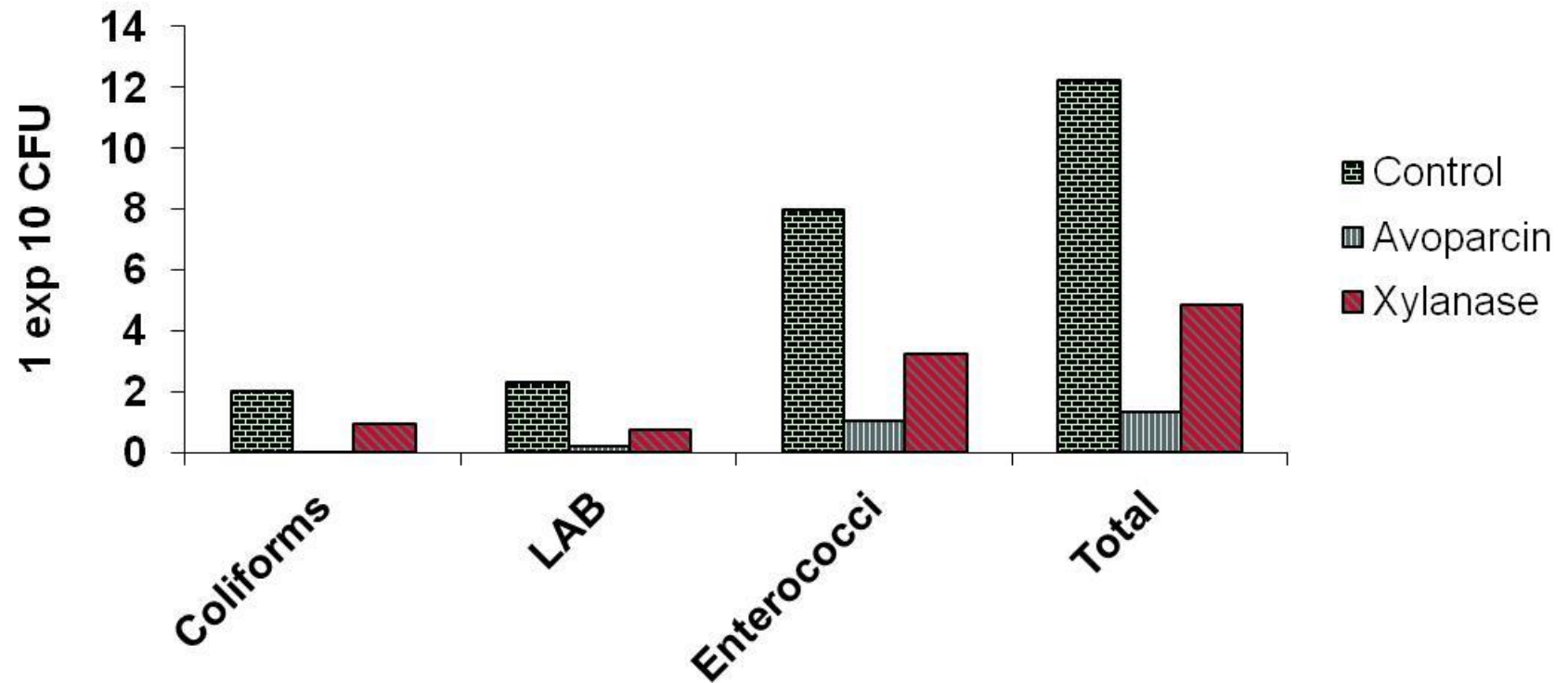
Enzymes: Small Intestine

Improvement in ileal digestibility by use of enzymes vs control %

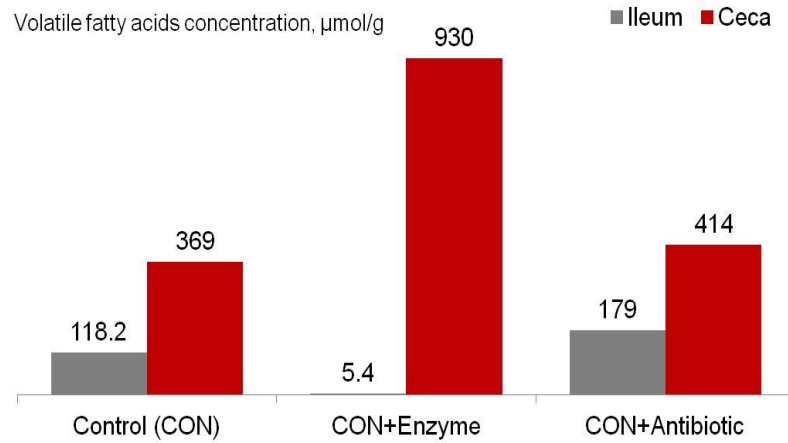


Enzyme source: Combination XAP

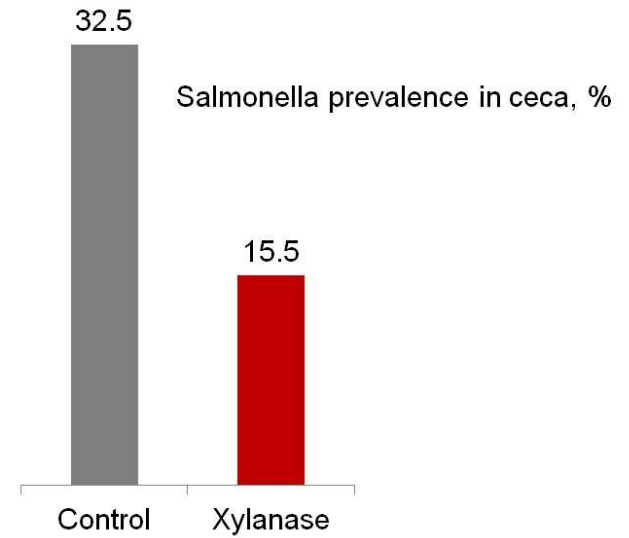
Enzymes: Small Intestine



Enzymes: Large Intestine

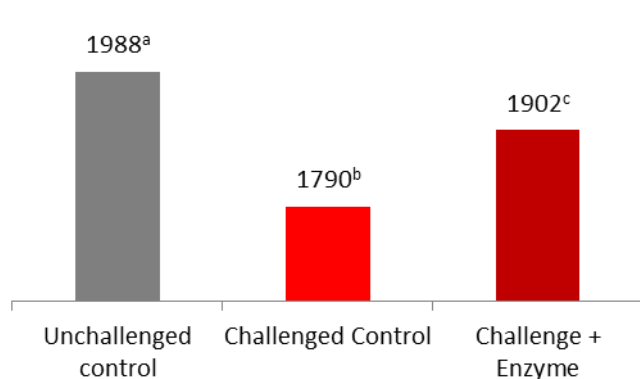


Choct et al. Brit. Poult. Sci. 37: 609-621

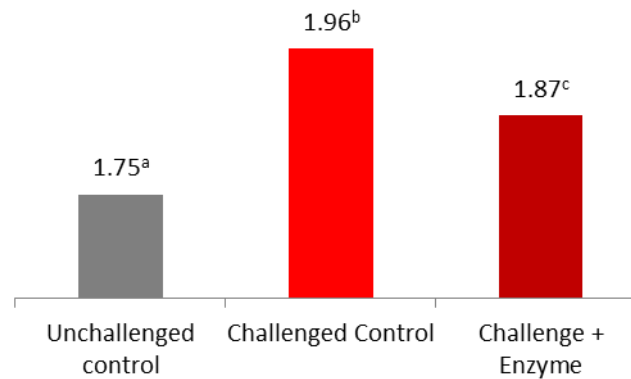


Amerah et al. 2012

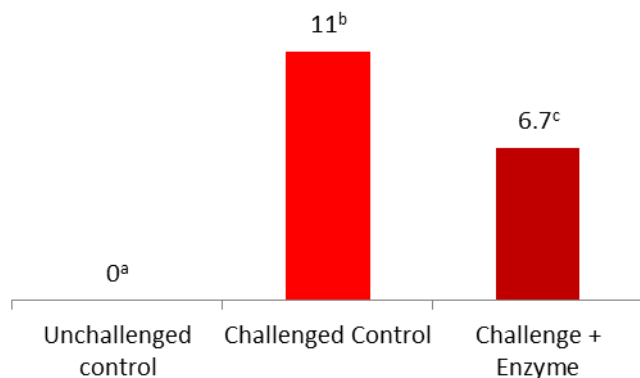
Enzymes and Necrotic Enteritis challenge



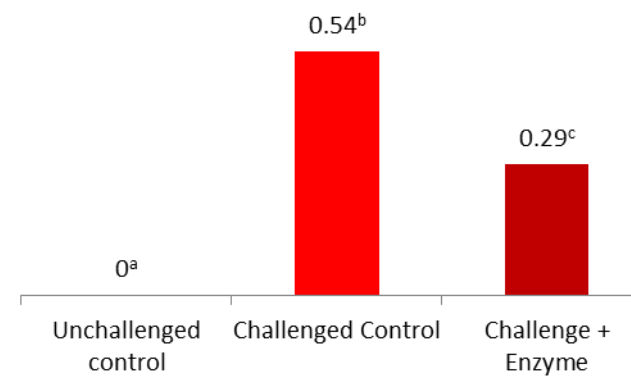
BWG, d0-42, g/bird



FCR, d0-42, g/g



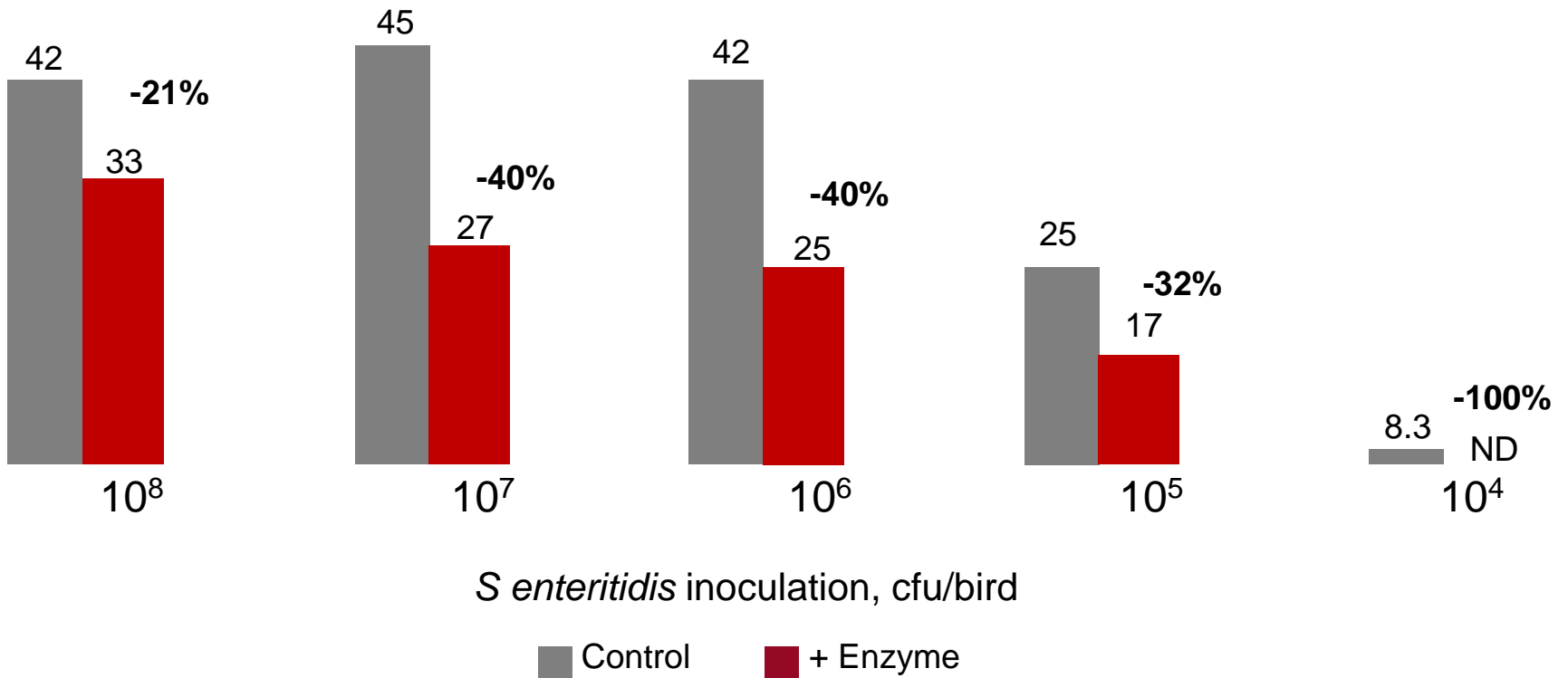
Mortality by NE*, %



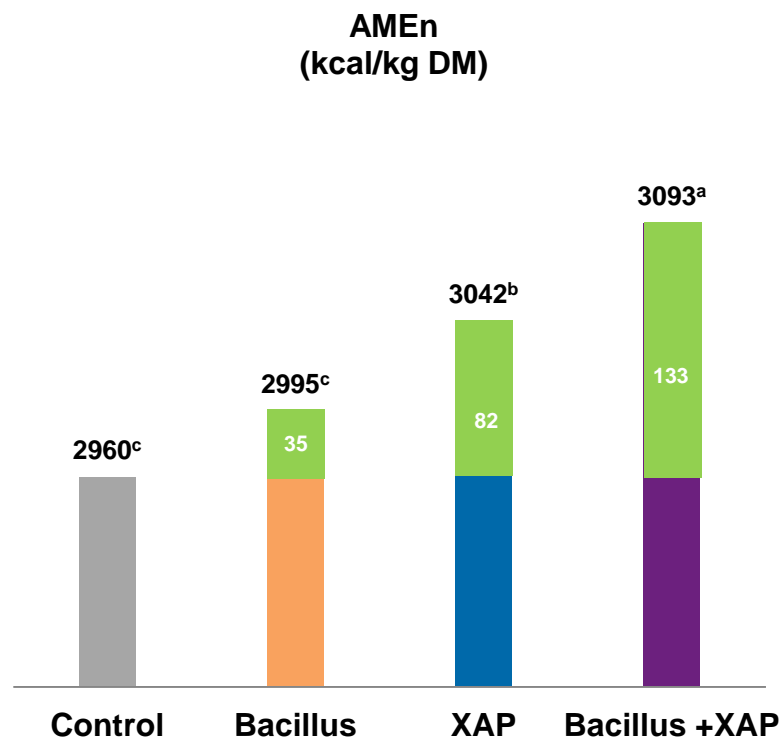
Lesions scores

Enzymes and Salmonella challenge

S. enteritidis-positive birds (birds with $>10^5$ cfu/g), %

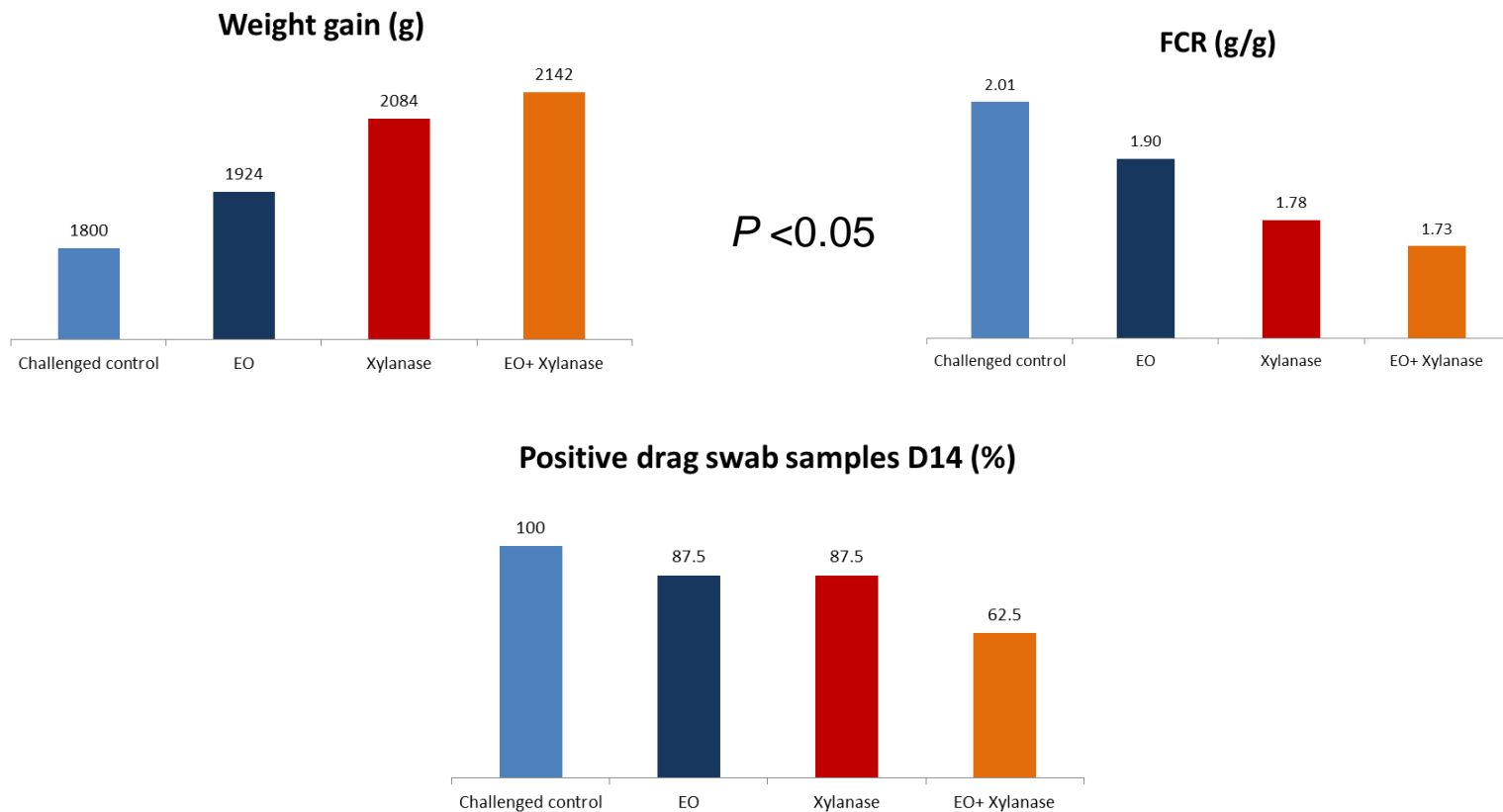


Enzymes show synergy with other feed additives-DFM



Animal: Broilers
Enzyme: XAP; Probiotic: 3 Bacillus strains

Enzymes show synergy with other feed additives-Essential Oils



Enzymes in post AMGP era

AMGPs prevent microbial overgrowth in small intestine by antimicrobial activity

Enzymes prevent microbial overgrowth in small intestine by substrate reduction

Appropriate use of either single or combinations of enzymes through the effects on gut health can play a vital role in sustainable animal production in post AMGP era

Thank you for your attention

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