

Balancius®

It's all in the detail



A growing market demand

The world's population will reach over 9 billion by 2050, matched by increased global demand for poultry meat.^{1,2}

9
BILLION



Alongside increasing quantity, consumers are also looking for high quality, affordable animal protein as part of a healthy and balanced diet.



These growing demands put additional pressure on limited natural resources and elevate the need to reduce the environmental footprint of poultry production.¹



Improving efficiency is also a key challenge.³ Broilers need to be able to consume, digest, absorb and convert sufficient nutrients to meet their potential, regardless of the flock or season.⁴




These challenges require game-changing nutritional solutions to ensure profitable growth for poultry producers, while delivering healthy and sustainably produced poultry products for consumers.

dsm-firmenich Animal Nutrition & Health serves the global feed industry with innovative and sustainable nutritional solutions. Pioneers since the earliest days of feed additives, we continue to draw on the latest science to provide a unique portfolio; from vitamins and carotenoids through to cutting edge eubiotics and feed enzymes. We are committed to working tirelessly with our customers to create products that deliver performance and profitability today and for generations to come.

References:

1. Seppelt R, et al. Ecology and Society. 2014;19:50; FAO. How to Feed the World in 2050. 2009. Available at: http://www.fao.org/fileadmin/templates/wsfs/docs/expert_paper/How_to_Feed_the_World_in_2050.pdf Accessed Nov 2017.
2. Penz Junior AM. XXV World's Poultry Congress, September 2016.
3. Porter TE. XXV World's Poultry Congress, September 2016.
4. den Hartog. XXV World's Poultry Congress, September 2016.



Working together to meet the challenges

dsm-firmenich, world leader in animal nutrition and health, and Novozymes, world leader in bio-innovation, joined forces 20 years ago to develop a portfolio of enzymes for improving the digestibility and absorption of minerals, proteins and carbohydrates in animal feed.

The Alliance project team works as one company along one process. Our scientific experts are engaged in developing a unique innovation pipeline that addresses the key challenges of the animal feed industry.

We're tackling these challenges head on to feed the world efficiently, safely and sustainably.



Balancius[®] is a game-changing innovation

We have created Balancius[®], the first ever nutritional ingredient designed to unlock the hidden potential in gastrointestinal functionality.¹ Balancius[®] is a novel microbial muramidase that supports digestion, gastrointestinal functionality and improves animal performance.²

Balancius[®] is designed to address the issues facing our industry. It demonstrates our commitment to bringing breakthrough, novel technology at scale to our customers, allowing them to continue to deliver healthy nutrition to a growing global population at affordable prices. Its unique proprietary technology has been developed through the industry-leading alliance of dsm-firmenich and Novozymes.

References:

1. Cohn MT, et al. IPSF T168, January 2018.
2. Bittencourt LC, et al. IPSF T171, January 2018.



Balancius® has a unique mode of action

- Peptidoglycans (PGNs), the main components of bacterial cell wall debris, are constantly released into the gastrointestinal tract as bacteria multiply, grow and die. This debris is ubiquitous to all animals, regardless of their nutrition or life stage.
- Balancius® is a breakthrough technology. This unique muramidase enzyme hydrolyzes PGNs, improving gastrointestinal functionality and releasing a hidden potential for more efficient animal growth.¹
- *In vitro* analysis has shown Balancius® only hydrolyzed PGNs from bacterial cell wall fragments, rather than from live bacteria.¹
- The accumulation of bacterial cell wall debris on the surface of gut mucosa reduce the adsorption capacity into the bloodstream, reducing the digestibility of the diet and therefore overall feed efficiency.
- Balancius® is active in the pH range of the whole gastrointestinal tract, having a greater effect in the jejunum, where high absorption of nutrients takes place.²
- Balancius® has been shown to improve nutrient digestion and absorption and reduce feed conversion ratio (FCR) by 3–4 points (2%) in broilers.

Experience our virtual reality Balancius® mode of action film at dsm.com/Balancius

References:

1. Wang et al., 2020
2. Cohn MT, et al. IPSF T168, January 2018.

Balancius® supports fat digestibility of young birds, including higher vit A (fat absorbable vitamin) absorption. Higher nutrient digestibility and absorption results in higher growth and better FCR



Balancius® helps broilers get more from their feed

Balancius® research trial, Spain

Trial design

Species: Ross 308 broilers

Location: Spain, EU

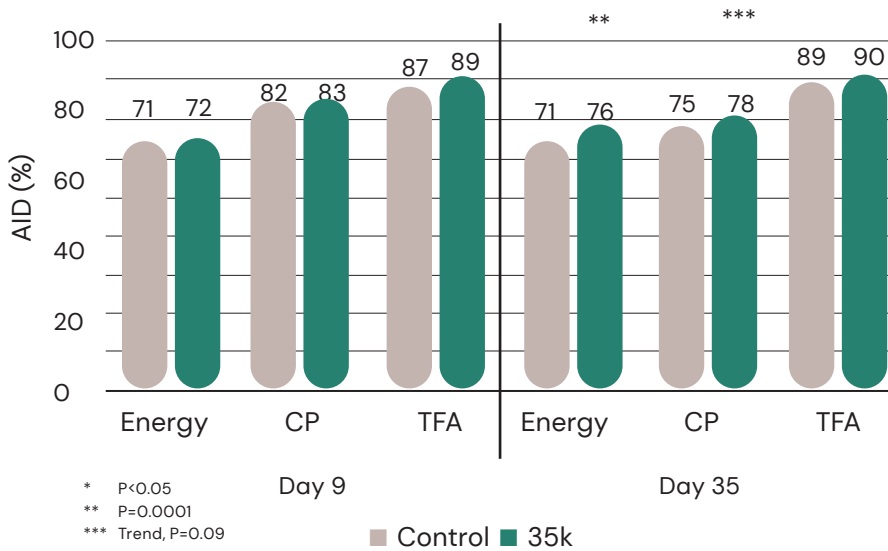
Treatments: 2, 0 vs. 35k Balancius®

Design: 8 replicates/trt x 30 birds per pen

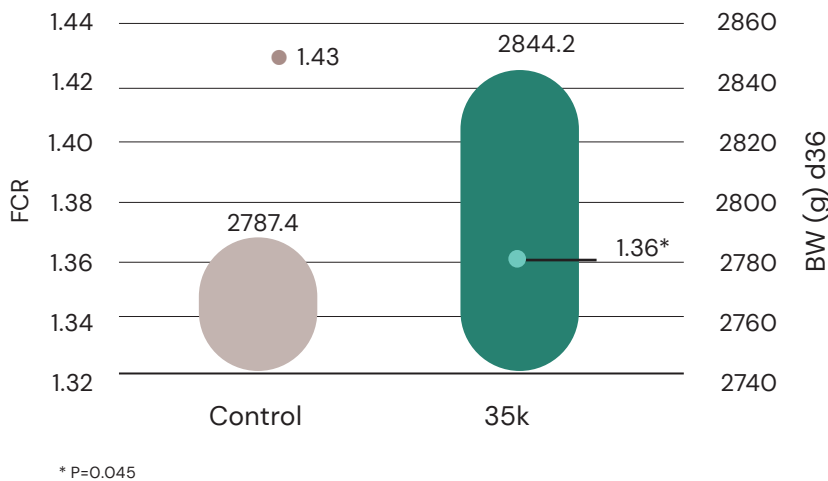
Feeding phases: starter d0-21, grower d21-35

Reference: Sais et al., 2019. Poultry Science 0:1-11

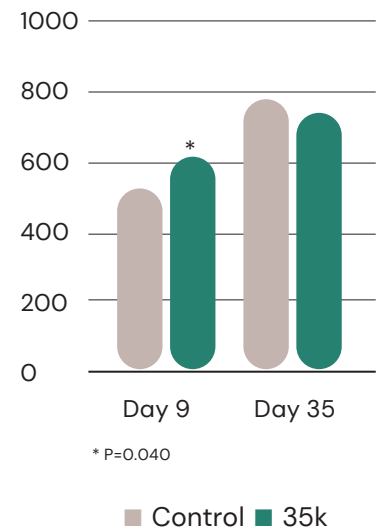
Apparent ileal digestibility*



Performance



Plasma vit A (ng/mL)



Balancius® can have a positive effect on environmental sustainability

Trial design

Species: Ross 308 broilers

Location: Netherlands, EU

Treatments: high vs. low crude protein (CP) x 0 vs. 35k Balancius®

5% contrast in crude protein by replacing rapeseed meal in high CP diet with rapeseed meal in low CP diet

Design: 12 replicates/trt x 23 birds per pen

	High Crude Protein	High CP + Balancius®	Low Crude Protein	Low CP + Balancius®
Weight day 35 (g)	2080 ^b	2118 ^{ab}	2115 ^{ab}	2218 ^a
Growth (g/d)	58.2 ^b	59.3 ^{ab}	59.2 ^{ab}	62.1 ^a
Feed intake (g/d)	86.1 ^b	86.7 ^{ab}	89.5 ^{ab}	91.3 ^a
FCR/FCR1500	1.48 ^{ab} /1.25	1.46 ^b /1.22	1.51 ^a /1.27	1.47 ^b /1.18
Feed margin (€/c)*	0.48	0.49	0.48	0.52

Wheat/SBM/Corn basal diet incl ProAct, WX, HiPhos, no coccidiostats (12.7/13.1/13.3 MJ/kg ME in S/G/F resp.)

a,b significant differences at $p < 0.05$

* Euros per chicken (excl. mortality), NL prices Oct 2019

Balancius® improves performance in both diets, the effect is even higher in the low protein diet. The performance of the low protein diet + Balancius® is better than that of the high protein diet. The benefits of reducing the crude protein in the diet on environmental impact are shown on the next page.



Balancius[®]

compensates the performance drop in the low protein diet versus the high protein diet. This performance improvement with low protein diet has significant environmental benefits:

-4.8%

Climate change

The reformulation of the diet with less soybean reduces the Climate Change land use and land transformation

-6.5%

Respiratory inorganics

The addition of Balancius improves the FCR and thereby reduces the ammonia emissions on farm


-1.7%


Eutrophication

Furthermore, this improved FCR reduces the nitrogen emissions in the manure


For 1 million broilers, the climate change reduction is -2,892 mT of CO₂ eq.

For 1 million broilers the reduction of -2,892 mT CO₂ eq. is a huge positive contribution, for example:

7 million 
miles driven by an average petrol-powered passenger vehicle

351 million times 
of smartphones charged

563 homes' 
electricity use for one year

\$188 million 
Costs savings impact based on \$65/ton of CO₂

Source 1: <https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references>
Source 2: one-ton Co2 eq. cost in EU <https://tradingeconomics.com/commodity/carbon>

Balancius® is made with our customers in mind

Excellent handling characteristics

Balancius® has superior handling properties designed to fit the strict demands of our customers.¹

- Virtually dust free
- Excellent flowability and mixability
- Thermostability
- Dose recommendations
Broilers Dosage – LSU (F)/kg feed
25.000–45.000



Balancius® is a breakthrough innovation



It is the first and only unique enzyme designed to unlock the hidden potential in gastrointestinal functionality.¹



Its breakthrough technology hydrolyzes peptidoglycans from bacterial cell debris in the intestinal tract, thereby improving nutrient absorption and digestibility.^{1,2}



It is the only feed ingredient on the market that targets bacterial cell debris.³

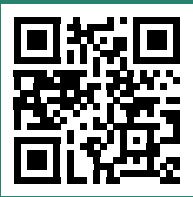


Balancius® has been shown to improve nutrient digestion and absorption and reduce feed conversion ratio (FCR) by 3–4 points (2%) in broilers.



It supports sustainable poultry production.

We bring progress to life



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