



Smart blend of monoglycerides to target gut health and immunity

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How we investigated or researched the problem

375 one-day-old Arbor Acres
3 treatments x 5 replicates of 25 birds per pen
↳ 2 inclusion levels of Optigut (L1 & L2)

Control starter diet	Control grower diet	Control finisher diet
L1: Optigut 500 g/t	L1: Optigut 250 g/t	L1: Optigut 250 g/t
L2: Optigut 500 g/t	L2: Optigut 350 g/t	L2: Optigut 350 g/t

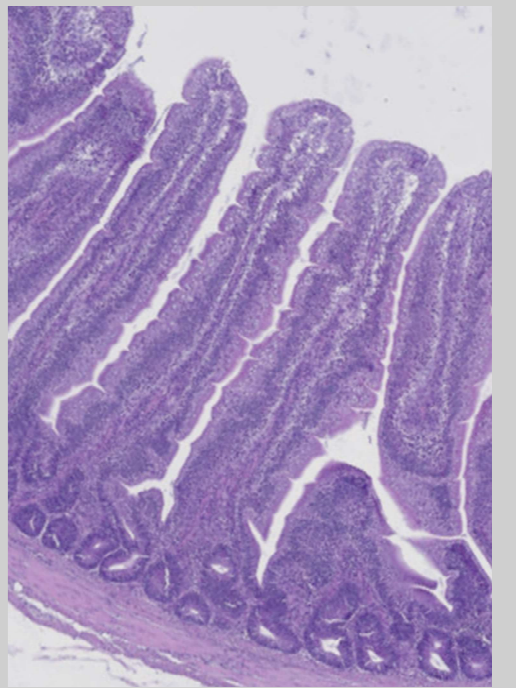


The problem

The gut health status is influencing processes such as:

- nutrient absorption
- intestinal barrier integrity
- immune response and efficiency
- inflammatory status

In gut health management, natural solutions based on monoglycerides have gained attention.



Picture 1: Small intestine cross-section

Explore the potential effect of Optigut on broiler performance & indicators of gut health and immunity

Results

Immunity

Microbiome

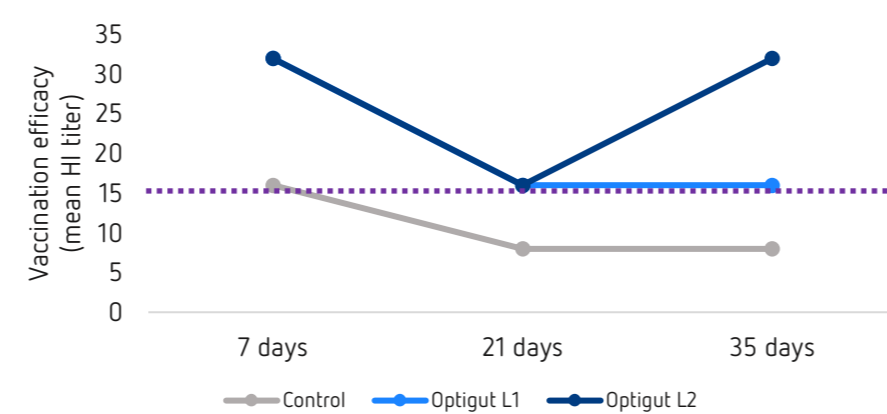
Table 1: Description of the microbiome analysis results.

Target	Result
<i>E. coli</i> counts	no changes
<i>Clostridium</i> counts	reduction to non-detectable
<i>Lactobacillus</i> counts	factor x 2 increase at day 21

Microbiome as indicator of general health and gut resilience

There were no significant alterations in the bacterial counts. However, a positive numerical trend was observed, showing a decrease in unfavorable bacteria such as *Clostridium*, alongside an increase in beneficial bacteria like *Lactobacillus*.

Vaccination efficacy



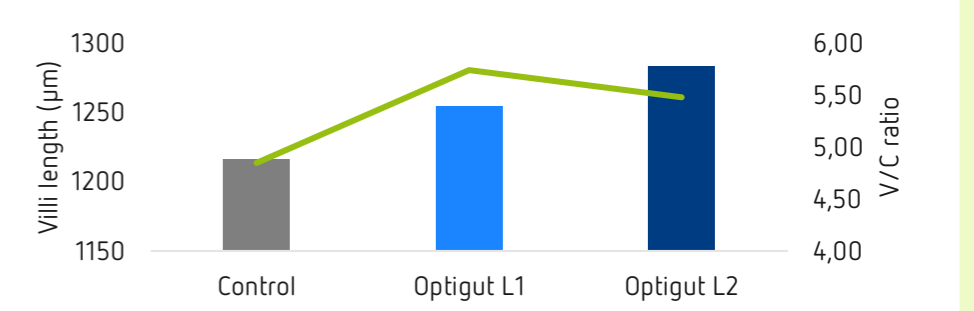
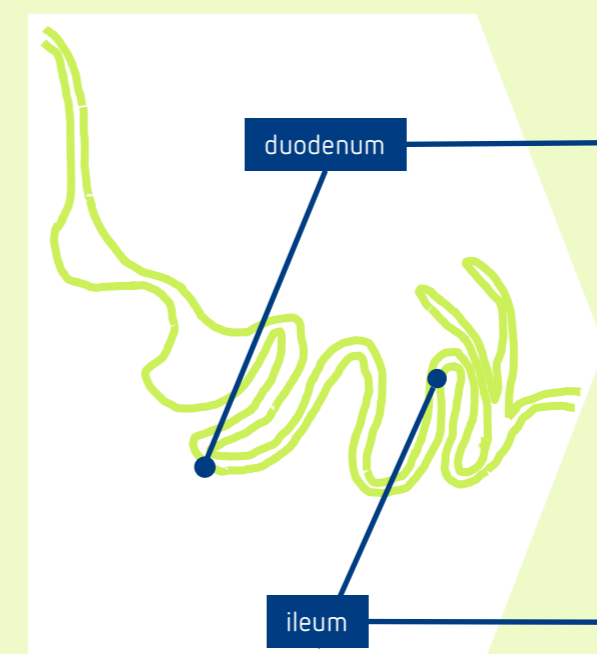
Graph 1: Determination of HI* titers against ND** virus in blood samples taken on day 7, day 21 and day 35. *Hemagglutination inhibition (HI) ** Newcastle disease (ND)

Newcastle disease vaccination

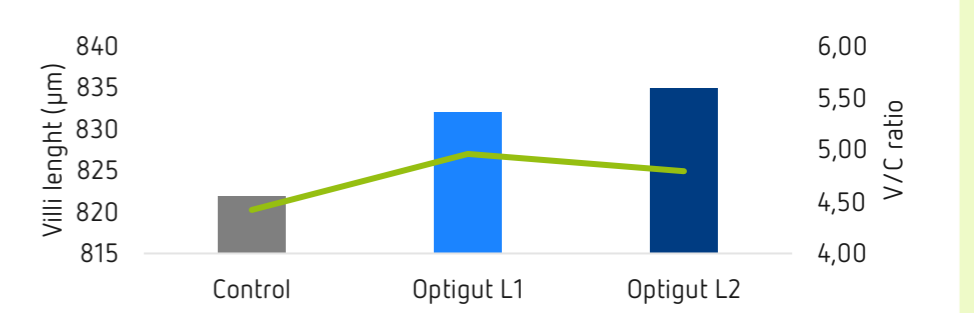
ND vaccination was monitored by assessing HI titers through blood samples taken on day 7, day 21, and day 35. A satisfactory HI titer indicative of protective immunity against Newcastle disease in broiler chickens is typically considered to be 16 or higher. The Optigut treatment groups exhibited numerically higher titers, suggesting a more robust and efficient immune response.

Gut health

Histomorphology



Graph 2: Villi height (bars) and villi height over crypt depth ratio (V/C ratio, line) of the duodenum at day 35 is presented.



Graph 3: Villi height (bars) and villi height over crypt depth ratio (V/C ratio, line) of the ileum at day 35 is presented.

Villi Height and V/C ratio as indicator of gut development and fitness

The degree of gut development of the intestine plays a crucial role in nutrient absorption and digestion efficiency:

- Increased surface area for absorption
- Enhanced nutrient utilization

Supplementation with Optigut led to a numerical increase in villi height and an enhancement in V/C ratio in both duodenum and ileum. These results indicate an improved gut development with Optigut addition.

Performance

Good gut development and enhanced bird immunity lead to optimal performance

Overall, broiler performance exceeded the Arbor Acres performance objectives. Performance is consistent with favorable gut health parameters (intestinal histomorphology and footpad lesion scores) and robust immunity markers (vaccination efficacy). The Arbor Acres standard for broiler performance is an end body weight of 2.2 kg and a feed conversion ratio (FCR) of 1.6.

Inclusion level 1 (L1):

- Increase in end body weight +4,5%
- Improvement in FCR -6%
- Decreased mortality -1,6%

Resulting in a EPEF* of 489 (compared to 432 for the control group)

Inclusion level 2 (L2):

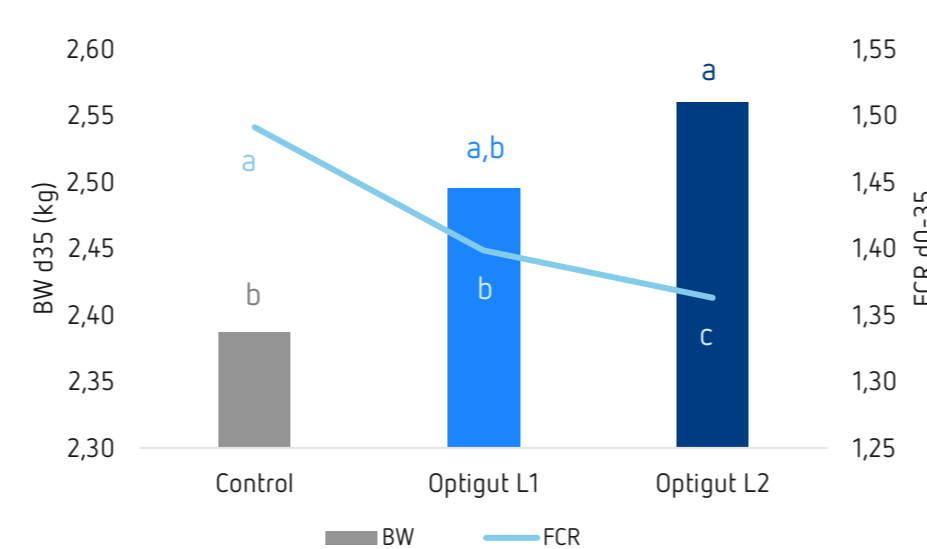
- Increase in end body weight +7,2%
- Improvement in FCR -9%
- Decreased mortality -1,6%

Resulting in a EPEF* of 516 (compared to 432 for the control group)

The addition of Optigut in broiler feed at two different dosages resulted in significant improvements in performance, both in end body weight and FCR.

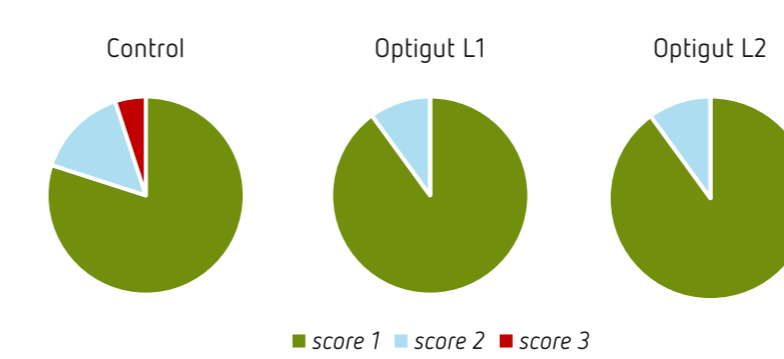
*EPEF = European Production Efficiency Factor

Performance



Graph 5: Performance results of broiler chickens receiving diets supplemented with two levels of Optigut. The end body weight (BW) and feed conversion ratio (FCR) are presented. *% significant differences (p<0,05)

Footpad lesion score



Graph 4: Footpad lesion scoring of 20 birds per treatment, using the 1-3 scoring system. Score 1: healthy footpads with no visible lesions, Score 2: mild to moderate footpad lesions, Score 3: severe footpad lesions

Footpad lesion scoring as indicator of gut health

Footpad lesions scoring is an essential aspect of assessing the welfare and health of broiler chickens, particularly in relation to their gut health.

The footpad lesion scoring results indicate a generally favorable welfare status. Supplementation of Optigut (L1 & L2) resulted in a numerical decrease in the number of chickens with a score of 3 (from n=1/20 to n=0/20) and score of 2 (from n=3/20 to n=2/20).

The footpad lesion scores align with the gut health and performance results, demonstrating superior performance compared to the Arbor Acres standard.

Implications Conclusion

Optigut enhances performance at low inclusion levels and exhibits a dose-dependent response.

The positive impact on gut morphology in duodenum and ileum observed in this study aligns with the proposed mode of action, suggesting a targeted effect along the entire small intestinal tract. The significant performance results and positive trends in gut health and immunity, are consistent with the fragmented literature available.

Overall, the results suggest that Optigut supplementation has the potential to improve the performance of broiler chickens by promoting growth and optimizing feed efficiency.

High broiler performance in low dosage with Optigut



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