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Q-Biotic® 1DP Adds Value to Egg Production

A commercial hen's egg production rate typically peaks at about 30-35 weeks of age and then declines, with the biggest reduction generally observed after 60 weeks. Such a decline negatively influences the potential for significant egg mass production. The popularity of feeding direct fed microbials (DFMs) continues to increase in poultry production, including in the egg industry. Quality Technology International, Inc. has been successfully offering DFMs for over 2 decades. QTI recently launched new series of DFM products, made up of single-strain, multi-strain probiotics or combinations of probiotics and prebiotics. Evaluations of these products under controlled research conditions have shown that they can add significant value in poultry production. The goal of one of such trials was to evaluate Q-Biotic® 1DP, a new QTI-proprietary single-strain Bacillus subtilis probiotic, in late stage egg production.

Q-Biotic® 1DP Is A Select Probiotic

The Q-Biotic proprietary Bacillus subtilis strain was selected through extensive testing and evaluations. Additionally, multiple battery and floor pen trials in broiler chickens have shown that Q-Biotic® 1DP can significantly reduce the effects of necrotic enteritis, and improve weight gain, feed efficiency, livability, and profitability. Enabling proliferation of beneficial bacteria in the intestinal tract, production of organic acids, enzymes, and anti-microbial compounds, and modulating the response of the immune system are all potential modes of action underpinning the performance improvements observed.

Probiotics Can Assist Egg Production Evolution

The egg industry's diverse systems of production fuel its innovation, enhances its ability to meet evolving consumer demands, and may challenge its productivity and profitability. According to the United Egg Producers, 28% of all U.S. hens were in cage-free production at the end of 2020. About 66% of U.S. hens must be in cage-free production by 2026, according to USDA's Agricultural Marketing Service.

Efficiency and profitability of egg production is a function of a number of factors; including management, housing, biosecurity, production systems, health and nutrition, and egg market economics. The use of probiotics, as feed additives, has shown their ability to enhance feed efficiency, egg production, and reduce food borne pathogens. The health benefits of probiotics may become greater under cage-free production due to potentially greater health challenges and exposure.

Q-Biotic® 1DP Improves Late Cycle Egg Production

In 2021, a U.S. University evaluated the effects of Q-Biotic® 1DP on late stage egg production of Hy-Line W-80 layers in cages. The trial consisted of a control and a Q-Biotic® 1DP treatment, and used 24 replicates and 144 hens per treatment. The hens were fed the control feed or Q-Biotic-containing feed for a period of 12 weeks from 63 to 74 weeks of age. Q-Biotic® 1DP was added to the feed at a target dose of 300,000 cfu/g feed. The results showed that on average, hen-day egg production (HDEP), egg weight and egg mass of hens fed Q-Biotic® 1DP were significantly increased by approximately 1.8%, 0.5 gram/egg and 1.1 gram/egg, respectively (Table 1). Average hen weight, feed conversion and mortality were not significantly different between the two treatments.

Research has shown that a more balanced gut microflora towards more beneficial bacteria can enable a better poultry performance. The 16% higher ratio (1.51 Vs. 1.30) of beneficial bacteria to detrimental bacteria for hens fed Q-Biotic® 1DP compared to the control (Figure 1) hens suggests a better gut microflora environment and supports the egg production improvements observed.

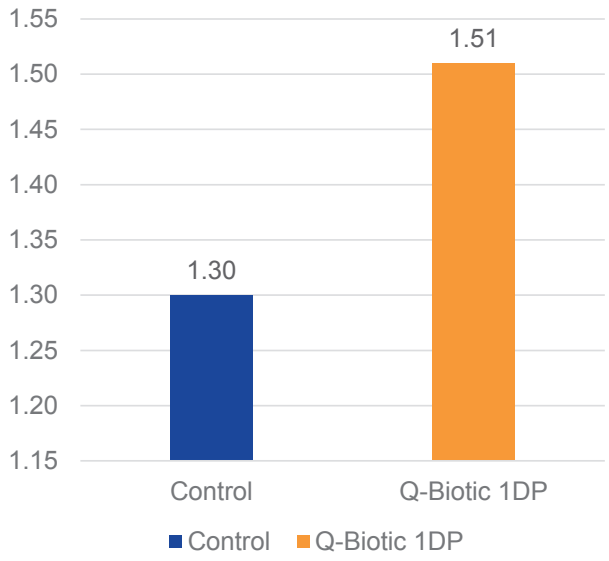
A commercial hen's improved egg production late in the cycle can improve its overall cycle profitability.

Table 1. Effect of Feeding Q-Biotic® 1DP on Egg Production of Hy-Line W-80 Hens from 63 to 74 Weeks of Age[1]

Production Parameters	Control	Q-Biotic® 1DP	Difference	P-value
Hen Day Egg Production, %	86.95	88.73	+1.78	0.0357
Egg Weight, g	58.85	59.35	+0.50	0.0003
Egg Mass, g	51.45	52.52	+1.06	0.0381
Feed Conversion (Kg Feed/Kg Eggs)	2.1091	2.1000	-0.0091	0.7005
Mortality, %	13.9	11.8	-2.1	0.6865
Hen Weight, Kg	1.5538	1.5590	+0.005	0.2469

[1]Production values are averages of 12 weeks. Averages within a row with a P-value lower than 0.05 are significantly different.

Figure 1. Ratio[1] of Beneficial Bacteria to Detrimental Bacteria of Hy-Line W-80 Fed the Control or Q-Biotic®1DP



[1]Ratio of bio-indicators (Lactobacillus spp. + *Bifidobacteria*) to (*Clostridium perfringens* + *E. coli*). Intestinal fecal samples collected at 68 weeks of age.

Table 2. Value Estimation For Egg Production Improvements of Hy-Line W-80 Hens Fed Q-Biotics®1DP from 63 to 74 Weeks of Age[1]

Producer Type	$/Dozen Eggs	$/Hen	Equivalent Value/Ton Feed
Non-Breaker	$0.0143	$0.077	$7.7
Breaker	$0.0172	$0.092	$9.2

[1]Q-Biotic®1DP Vs. Control: +1.78 percentage point hen day egg production; +0.5 gram/egg.

[1]Assumptions: Egg prices, $/dozen eggs (USDA/08-16-2021): L:$0.93, M:$0.55, S:$0.44. Cost of production: $0.60/dozen eggs (USDA-WASDE 08-12-2021). Hy-Line W-80 production guide parameters from 63-74 weeks of age.

Q-Biotic® 1DP Can Add Value To Egg Production

Economically, a number of variables can influence the value of a feed additive in commercial egg production, including type of operation, management goals, layer genetics, cost of production, market egg value, and other factors. An estimate of value for feeding Q-Biotic® 1DP to Hy-Line W-80 from 63 to 74 weeks of age in the current trial can be calculated for a breaking and a non-breaking egg operation using assumptions for market egg prices, cost of egg production and guide production parameters of Hy-Line W-80.

Using the Q-Biotic® 1DP vs. control HDEP, egg weight and egg mass values from the trial along with assumed production cost and egg prices, a benefit of approximately $0.014 and $0.017 per dozen eggs can be calculated for a non-egg breaking and an egg breaking operation, respectively (Table 2). While such values can change as a function of the assumptions used, they represent an indication that feeding Q-Biotic® 1DP can add significant value to an egg production operation.

Intestinal Integrity™

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