

Newsletter

BIOMIN Newsletter Vol. 9, No. 99

> EDITORIAL

Today probiotics and prebiotics are widely used in modern animal nutrition because of their beneficial effect on the gastrointestinal tract of the host. A well-established intestinal microflora is crucial for the health of our animals, especially if we expect high production performance. It is extremely important for the ability to fight off infections with enteric pathogens and for guaranteeing a well-functioning and effective digestion of nutrients. The use of synbiotics (combination of probiotics and prebiotics) have been shown to be an effective means of manipulating or managing the composition of the microbial population in the gastrointestinal tract of poultry and thus protecting newly hatched chicks and young birds against colonization by harmful bacteria. In the layer industry the use of probiotics is more and more accepted as several studies have shown the beneficial effects of the addition of probiotics to layer diets like improved egg production, feed conversion ratio, feed consumption, egg traits and reduction of food-borne pathogens like *Salmonella*. Recent trial data with BIOMINs synbiotic products *Biomin® C-EX* and *Biomin® IMBO* proof their benefits in layer production.

Enjoy reading.

Michaela Mohrl



Biomin® probiotic product line

Naturally ahead in poultry gut health!

Biomin® probiotic product line

The performance of modern commercial laying hens has improved considerably, including an increase in egg production, a reduction in feed conversion and increased livability over the last quarter century. Optimal feeding strategies have to be implemented to meet the huge nutrient requirements of modern laying hens. A fundamental objective in feeding the modern laying hen is to keep its digestive tract healthy in order to ensure a proper nutrient uptake.

Benefits from using Biomin® IMBO in layer production

The first four to six weeks and the time from onset of lay until peak production are two critical times in the life of the pullet which will have the greatest effect on final performance. During both these times, body weight development is crucial if the flock is to perform to breeder standards. Furthermore, potentially pathogenic bacteria need to be reduced or excluded in favor of beneficial bacteria. Many pathogens such as *Escherichia coli* and *Salmonella enteritidis* can compromise the gut structure by damaging the villi in the small intestine which reduces the ability of the gut to absorb nutrients. With *S. enteritidis* this occurs particularly in the first two weeks of life. Control of these pathogens will improve overall feed utilization. Improved gut function through maintenance of gut structure plays a role in the calcium metabolism for eggshell production resulting in improved calcium digestion and absorption.

With the development of the synbiotic products *Biomin® C-EX* and *Biomin® IMBO* which combine the beneficial effects of probiotics, prebiotics and immune-modulating substances on the gastrointestinal tract BIOMIN served the needs of the industry for natural feed additives which can improve the gut health, well-being and performance of animals and are well received by consumers.

The addition of **Biomim® C-EX** and **Biomim® IMBO** to the birds diet supports the establishment of a well-balanced intestinal microflora. This paves the way for a healthy gut, resulting in good growth performance, a better ability to fight off infections with pathogens like *Salmonella* and an improved immune response. The probiotic component *Enterococcus faecium* helps to establish and stabilise a beneficial gut microflora and to prevent pathogen colonization by competitive exclusion. The **immune-modulating components** enhance the weak innate immune system of chicks. The beneficial gut microflora is additionally supported by **prebiotic fructooligosaccharides**.

Effect of Biomim® IMBO in Hy-Line laying hens

A feeding trial was conducted at the Faculty of Agriculture, University of Novi Sad, Serbia to study the effect of Biomim® IMBO on performance and egg quality of Hy-Line laying hens. Results confirmed a positive impact of the synbiotic feed additive Biomim® IMBO in laying hen nutrition.

Trial design

Experimental animals were housed in three-floor battery cages. A total of 360 commercial Hy-Line Brown hens were divided into control and experimental group with six repetitions of 30 hens each. Hens from both groups consumed ad libitum standard diet based on corn soybean meal for pre-laying period (16-18 weeks of age) and diet for laying period. Age of the birds at the beginning of the trial was 16 weeks. Duration of the trial was until week 28. The negative control group received commercial standard laying hen diets with no additive whereas the experimental group received in addition to the commercial standard laying hen diets 0.5 kg Biomim® IMBO per ton of feed.

During the experimental period average body weight, egg production, percentage of second grade eggs (Number of second grade eggs was recorded daily), average egg weight, feed consumption and feed conversion ratio were determined every week.



Results and Discussion

Overall results are presented in *Table 1*, indicating enhanced egg production and improved egg quality traits in hens fed Biomim® IMBO. During the experimental period, hens of the Biomim® IMBO group had a higher body weight compared to control. In the stressful transition from the pre-laying period to the laying period the addition of Biomim® IMBO improved the body weight of

the birds. Higher body weight at the onset of lay is often correlated with a higher egg production later on.

Table 1. Overall results

Parameter	Negative Control	Biomim® IMBO	Difference %
Body weight week 16 (kg)	1320	1330	+0.8
Body weight week 22 (kg)	1695 ^a	1756 ^b	+3.6
Body weight week 28 (kg)	1838	1866	+1.5
Egg production week 22 (%)	68.86	71.83	+4.3
Egg production week 23 (%)	84.60	88.23	+4.3
Egg production week 24 (%)	90.08 ^a	95.68 ^b	+6.2
Egg production week 28 (%)	92.06	92.08	+0.02
Average number of eggs per average laying hen	48.58	49.07	+1.1
Average second grade eggs (%)	3.82 ^a	2.83 ^b	-25.9
Average egg weight (g)	59.32	59.65	+0.6
Average feed consumption (g)	103.4	102.8	-0.6
FCR	2.23 ^a	2.15 ^b	-3.6

*Values within rows with no common superscript are significantly different (P<0.05)

Egg production

As shown in *Table 1* and *Figure 1*, egg production (per hen housed) was higher in hens fed Biomim® IMBO. Moreover, eggs in the Biomim® IMBO group were heavier as compared to control group. Furthermore, number of second grade eggs was significantly lower in the Biomim® IMBO group (*Table 1* and *Figure 2*).

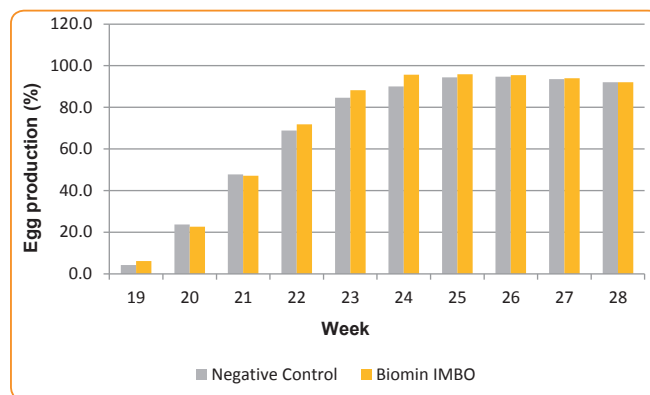


Figure 1. Egg production

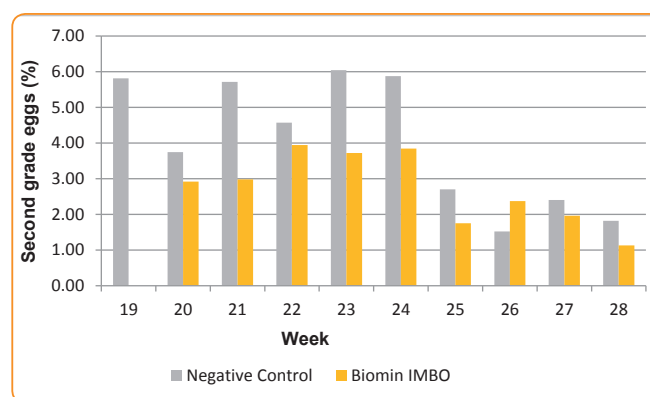


Figure 2: Percentage of second grade eggs

Table 4. Egg quality parameters

	Egg weight	Shell cleanness	Shell breaking force	Shell thickness	Shell weight	Shell weight	Albumen height	Yolk color	Haugh units
	g		(kg)		g	%			
21 weeks									
Negative Control	52.67	4.72 ^b	3.22	34.21	7.26	10.78	10.68	11.97	103.49
Biomini® IMBO	53.19	4.92 ^a	3.20	33.92	7.42	10.79	10.78	11.85	103.70
28 weeks									
Negative Control	64.26	4.88	2.74 ^b	35.38	6.93	10.81	9.85	11.60 ^a	97.18
Biomini® IMBO	64.60	4.87	3.02 ^a	35.33	7.01	10.86	10.02	12.03 ^b	97.05

Values within columns with no common superscript are significantly different (P<0.05)

Feed Efficiency

Feed conversion ratio (FCR) was significantly improved by supplementation of the diet with Biomini® IMBO while feed intake was slightly lower (Table 1 and Figure 3).

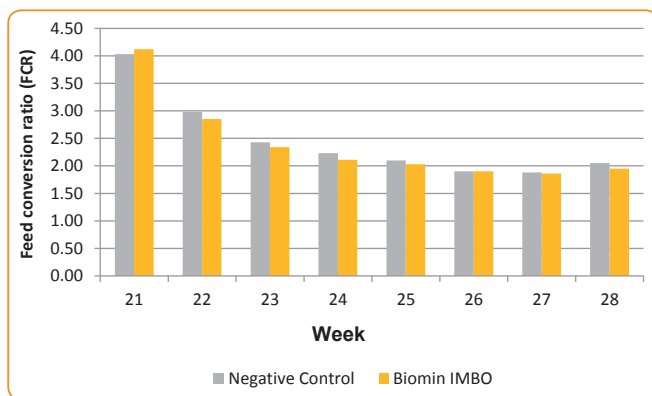


Figure 3. Feed Conversion Ratio (FCR)

Egg quality

Egg quality parameters were slightly different in both treatments (Table 4). Shell breaking force and Yolk colour revealed significantly higher values for the Biomini® IMBO group as the hens grew older.

Conclusion

The addition of Biomini® IMBO resulted in increased laying performance and reduced percentage of second grade eggs. Feed conversion ratio for the entire period was significantly better in hens receiving Biomini® IMBO. The results of this trial showed that Biomini® IMBO is effective in improving layer performance.

Efficacy of Biomini® C-EX + Biomini® IMBO in reducing Salmonella enteritidis in chicks

An experiment was conducted at the Research Institute for Veterinary Medicine Brno, Czech Republic to test the effect of Biomini® C-EX + Biomini® IMBO on spreading of a NaIR strain of *Salmonella enteritidis* with a „seeder model“ (from „seeder“ chicks to contact chicks) in 21 day trial. The seeder model reflects a practical way of Salmonella spreading in the flock.

Trial design

Day-old chicks of ISA brown were provided from a commercial hatchery proven as Salmonella free. 50 chicks per group were placed into plastic boxes with wood shave litter and 2 dish drinkers per box. Water and feed were provided *ad libitum*. 10 „seeder“ chicks were infected with 10⁵ CFU SE 4216 NaIR in 0.1 ml per os per chicken in both, control and test groups. The control group received commercial feed, no additive and was infected with Salmonella. The trial group received in addition Biomini® C-EX and Biomini® IMBO. Biomini® C-EX (20 g/1000 birds/day) was solved in water and sprayed on the chicks in the hatchery when they were placed into the transport boxes. Treatment was repeated at arrival to the test station. Biomini® C-EX was then administered in drinking water on day 2 and 3. Biomini® IMBO was mixed into the feed at 1 kg/ton and fed for the whole 21 days of the trial. 12 contact chicks were killed on day 8 and 14 and remaining 16 contact chicks on day 21. Salmonella CFU numbers (Standard method for quantitative microbial count by dilution technique) were determined individually from all killed chicks and mean number was calculated.

Results and Discussion

The results are presented in Table 1.

Table 1: Mean of CFU of *Salmonella enteritidis* SE 4216 NaIR per g of liver tissue and caecum content in the contact chicks

Chicks age (days)	Control group		Biomini® C-EX and Biomini® IMBO	
	liver	caecum	liver	caecum
8	1.02 × 10 ¹	3.55 × 10 ⁷	1.58 × 10 ¹	7.08 × 10 ⁶
14	5.8 × 10 ¹	1.74 × 10 ⁴	0	2.24 × 10 ⁴
21	0	4.68 × 10 ⁴	0	1.66 × 10 ¹

Residues of Salmonella could substantially be reduced in the group which received Biomini® C-EX and Biomini® IMBO. Based on these results it can be concluded that Biomini® C-EX and Biomini® IMBO were effective in reducing Salmonella in layer chicks.

Conclusion

The present studies show that Biomini® C-EX and Biomini® IMBO can be used efficiently and effectively in layer production to improve on one hand performance and egg traits and also enhance resistance against Salmonella.

> ABOUT THE AUTHOR

Name: Michaela Mohnl

Position: Product Manager

Education: BOKU - University of Natural Resources and Applied Life Sciences, Vienna, Spec. Food and Biotechnology
Master thesis: Medium design and Optimization of the fermentation process for a Ochratoxin A detoxifying yeast
Since 2003 Doctoral thesis: Development of the fermentation process for the production of a competitive exclusion product for poultry meeting the regulatory requirements for registration in the EC

Since March 2005: Product Manager, BIOMIN GmbH Austria

Address: BIOMIN GmbH, Industriestrasse 21, 3130 Herzogenburg, Austria
Phone: +43 2782 803 – 0; Fax: +43 2782 803 - 30
E-mail: michaela.mohnl@biomin.net



> EVENTS

Come and talk to us face to face!

Look at news.biomin.net, where you can find the events BIOMIN participates in.

We are looking forward to meeting you there!

news.biomin.net

©Copyright BIOMIN Holding GmbH, 2011

All rights reserved. Any kind of reprint, reproduction, or any other kind of usage
– whether partially or to the full extent - only allowed upon prior written approval by BIOMIN Holding GmbH.

> IMPRESSUM

Newsletter is published by BIOMIN Holding GmbH

Editors: Michaela Mohnl, Dian Schatzmayr, Verena Starkl, Sigrid Pasteiner, Barbara Rüel,
Ursula Hofstetter, Yuniór Acosta Aragón, Karin Nährer, Tobias Steiner, Elisabeth Mayer
Industriestrasse 21, A-3130 Herzogenburg, Austria

Tel: +43 2782 803-0, Fax: +43 2782 803-40; e-Mail: office@biomin.net, www.biomin.net, Publisher: Erich Erber