

BIOAKTIV FarEast

North Macedonia: A Study by the Ss. Cyril and Methodius University in Skopje



In 2008, the [Ss. Cyril and Methodius University in Skopje](#) did a study on the use of BioAktiv Powder in a small private layer farm in Glogje, a village 10 km from the town of Tetovo. Tetovo is about 40 km from the capital city of Skopje. It is at 469 m above sea level in the northwestern part of North Macedonia¹ and has a continental temperate climate with an average temperature of 11.6°C.

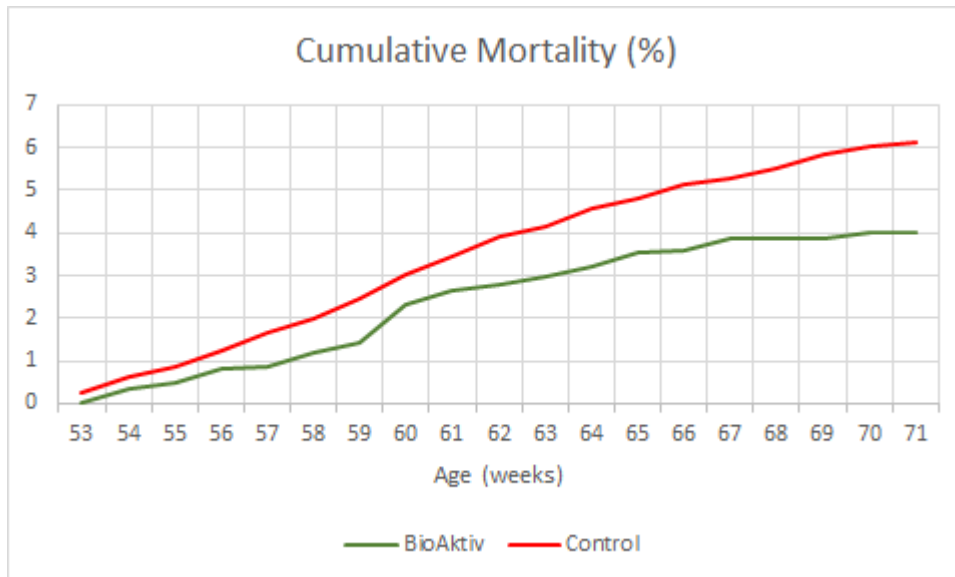
The farm used a fully automated Big Dutchman system which provided climate control to layer houses, where three-tier cases kept the hens. A house with 1,258 Isa-Brown breed layers served as the test group. Another house with 1,267 layers of the same breed served as the control group. The study started on 1 July 2008 and ended on 31 October 2008 or from week 53 to week 71 in terms of the hen's age. We fed both groups of hens the same feed throughout the four-month study. Starting on week 55, we gave 350 g of BioAktiv Powder per tonne of feed only to the test group.



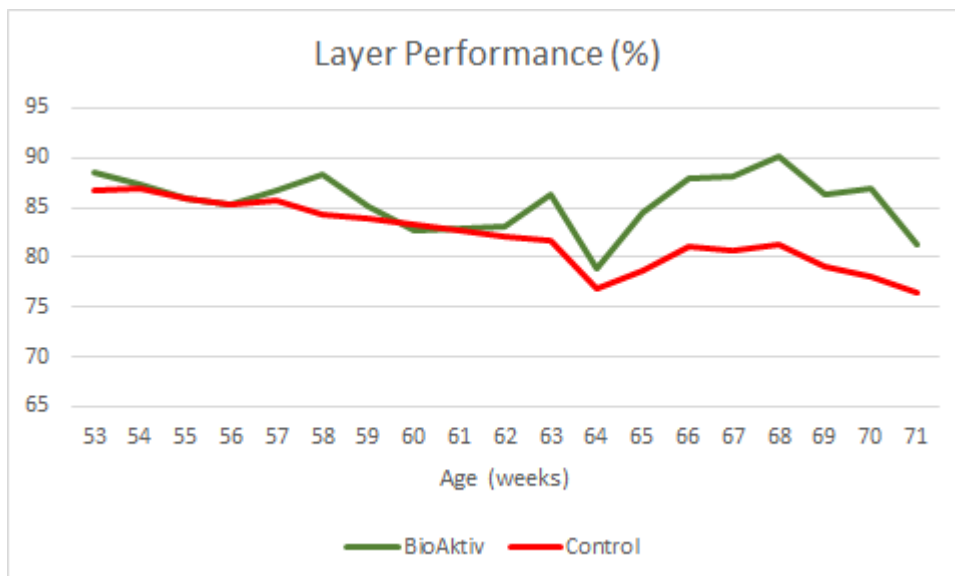
Once a month, we weighed the hens from both groups to get their average weights. The initial hen's weights of test and control groups were 1,990 g and 1,970 g respectively. At week 60 in August, the ventilators in the test group's house broke down causing mortality to rise and the average hen's weight to drop to 1780 g. It adversely affected the egg production and egg quality. We intervened by adding vitamins to the drinking water and the average hen's weight rose to 1,950 g by the end of the study.

During the study, we recorded data such as mortality, eggs laid and broken eggs. Once a week, same weekday and time, we took measurements for egg mass, egg shape index, eggshell mass and thickness at the same locations among the cases. The following describes some of the findings.

¹ Known as the Republic of Macedonia before February 2019.



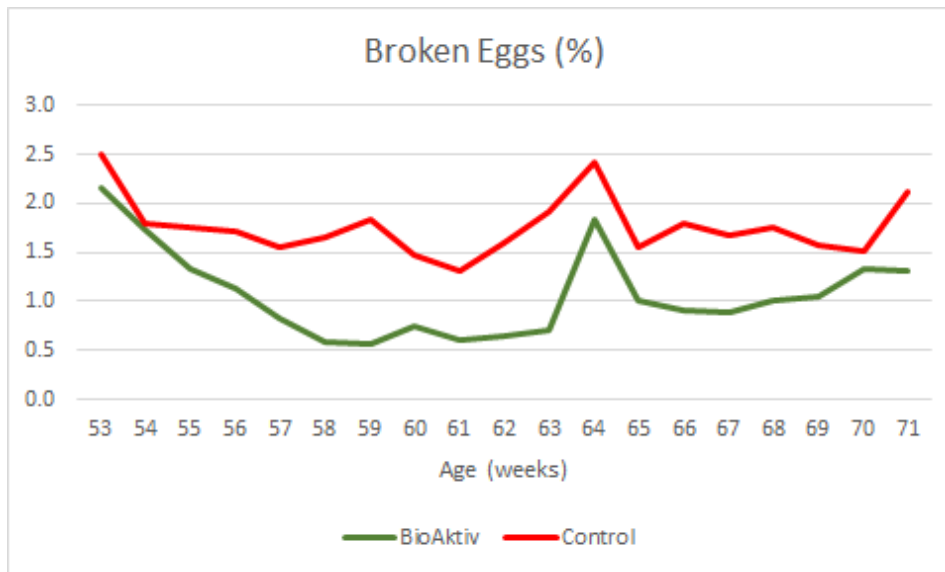
Mortality: The cumulative mortality (at week 71) for the BioAktiv and control groups were 4.01% and 6.12% respectively. The cumulative mortality of the BioAktiv group was 2.11% or 34%² relative term lower than that for the control group. If not because of the spike in mortality for the BioAktiv group at week 60 due to the faulty ventilators, the cumulative mortality of the group would have been lower. Mortality for both groups was the highest during the summer months. It decreased as it got to the fall. The much lower mortality in the test group was due to the use of BioAktiv Powder.



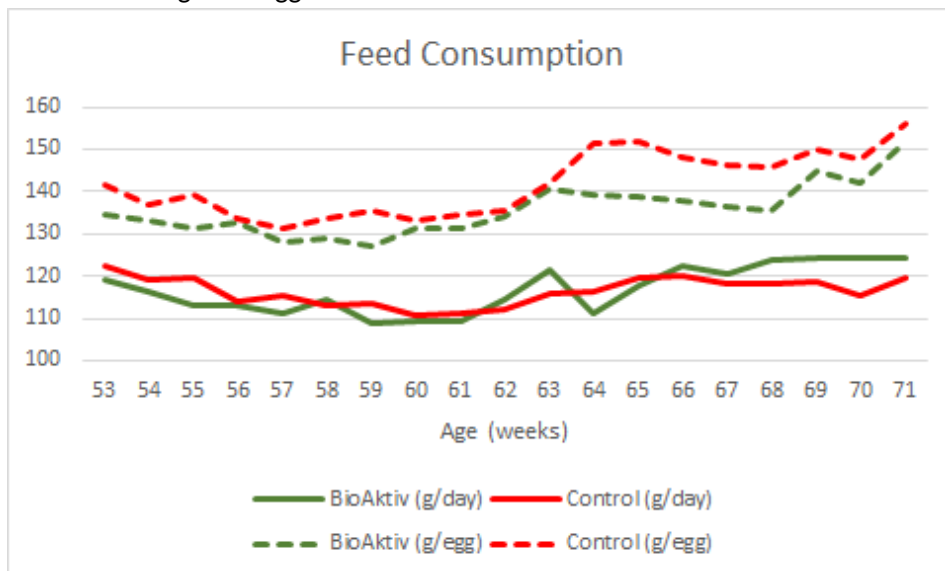
Layer Performance³: Over the four-month study period, the total numbers of eggs produced by the BioAktiv and control groups were 129,625 and 123,034; and their average layer performance were 85.59% and 82.14% respectively. BioAktiv group performed 4% better in relative term, which means more than 6,000 eggs in four months. Interestingly, the performance gap between both groups widened until between September and October instead of narrowing as the hens aged. The gaps for certain weeks were even wider than those in the previous week.

² Indicated as 52% in the original report.

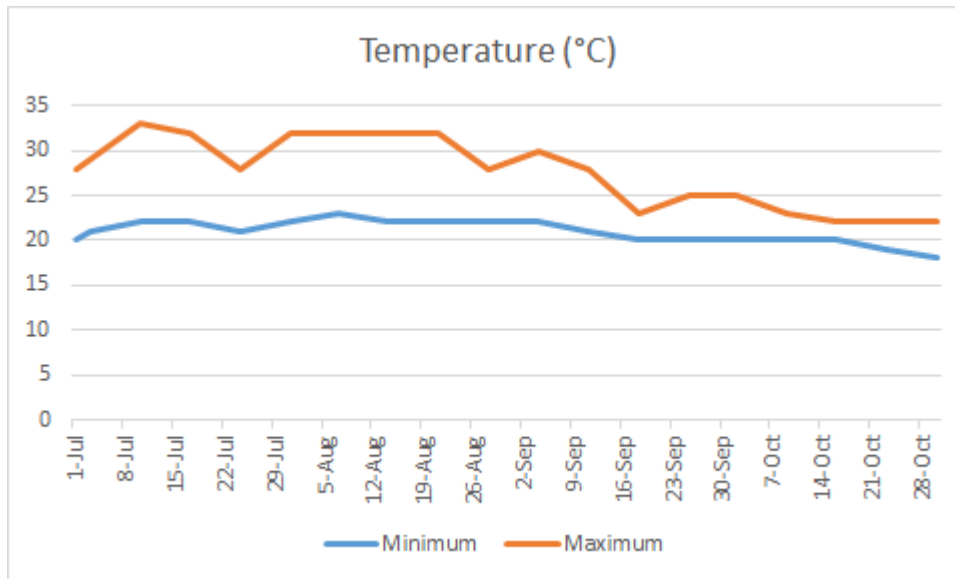
³ The original report used "egg production" instead of "layer performance".



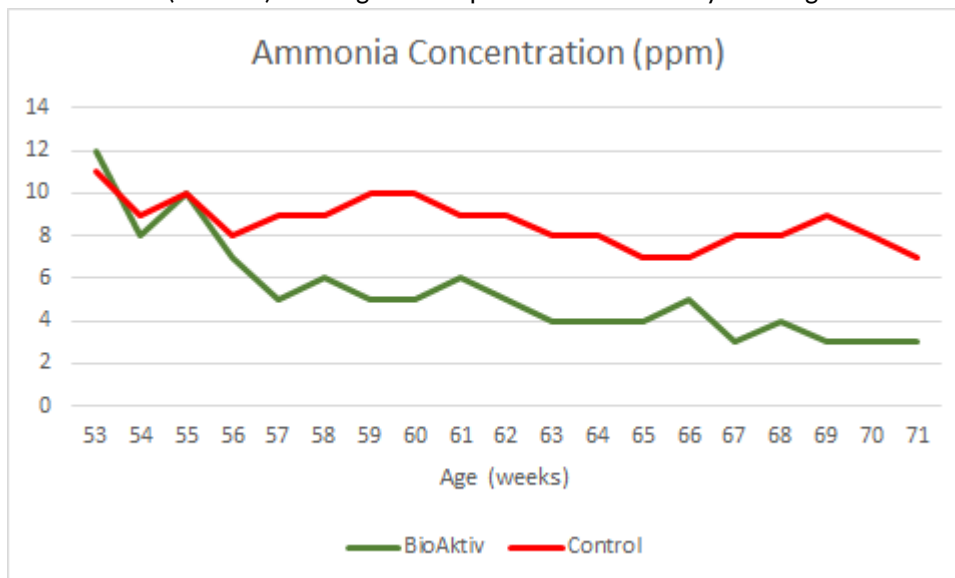
Broken eggs: The BioAktiv group had in total 1,322 broken eggs or on average 1.02% and the control group had 2,144 or 1.72%. The chart above shows that throughout the study period the BioAktiv group had fewer broken eggs than the control group. During summer, when the temperature is high, strong eggshells are difficult to form. There are usually more broken eggs, but in this case the use of BioAktiv had actually reduced broken eggs to almost 41%. A reason was that hens fed BioAktiv produced more medium-size (50-60 g) eggs than large-size (> 60 g) and small-size (< 50 g) eggs. Medium-size eggs have a stronger eggshell than large-size eggs. This is because the same volume of eggshell spreads thinner over a larger surface area of a large-size egg.



Feed consumption: The average feed consumption by the control group over the study period was 116.15 g/day with the highest amount in weeks 53, 66 and 71 and the lowest in weeks 60, 61 and 62. The average for BioAktiv group was 116.30 g/day, which was slightly higher than that of the control group. The highest feed consumption was in week 63 and from week 66 until week 71. The added vitamins in the drinking water had improved the hens' appetite and hence the higher feed consumption. But due to the failed ventilators, there was higher mortality and lower hen's weight, The feed conversion for the BioAktiv group, 135.52 g/egg, was 5.33 g/egg or almost 4% lower than that of the control group, 140.85 g/egg.

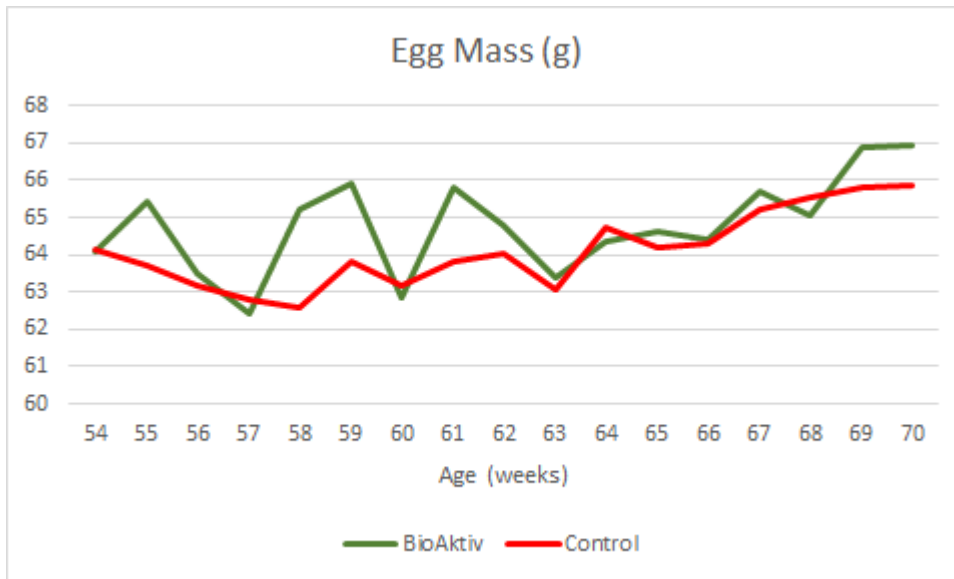


Temperatures: The summer temperatures in North Macedonia are very high and regularly exceed 30°C. It is necessary to provide reliable ventilation in farms and a constant flow of fresh drinking water. During the study period, the average maximum temperature was 27.7°C (22-32°C) and the average minimum temperature was 20.9°C (18-23°C). The highest temperatures were in July and August.

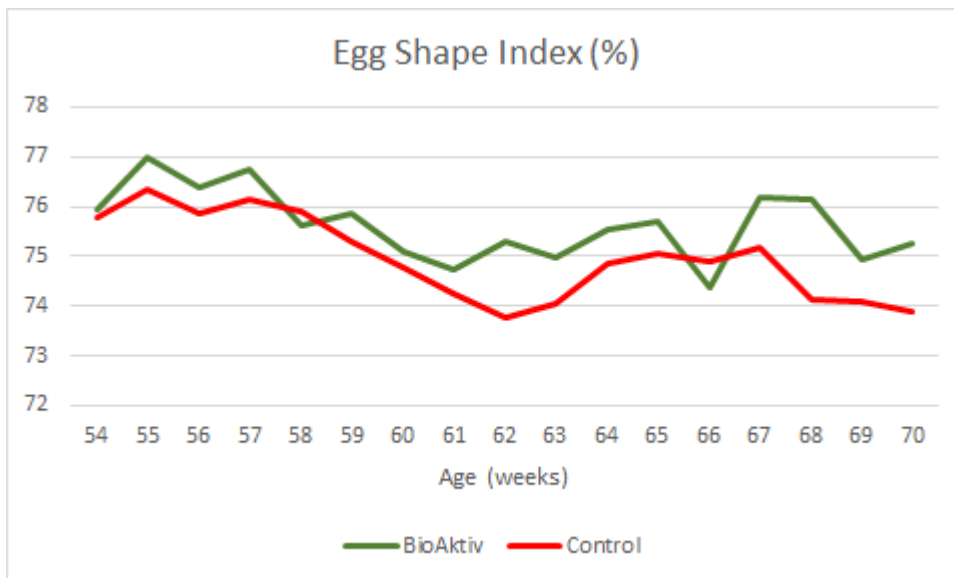


Ammonia concentration in the layer house was one of the important parameters of this study. This is because a lower ammonia concentration means better breathing air for the hens, higher productivity and lower mortality and also a better working environment for the farmers. The average ammonia concentration in the BioAktiv house and control house were 5.37 and 8.63 ppm respectively. The chart above clearly shows that ammonia concentration in the BioAktiv house decreased from 10-12 ppm in July to 4-6 ppm in August and 3-4 ppm at the end of the study. That of the control house ranged from 9 to 11 ppm in the summer was never below 7 ppm in other months. In the control house we smelt the chicken dung and ammonia especially in areas with still air. In the BioAktiv house however there was no odour, no mosses⁴ on chicken dung, and the air was fresh and easy to breathe in. The chicken dung piled up outside the BioAktiv house was also without odour, ammonia emissions, mosses and other pollutants hence preserving the environment.

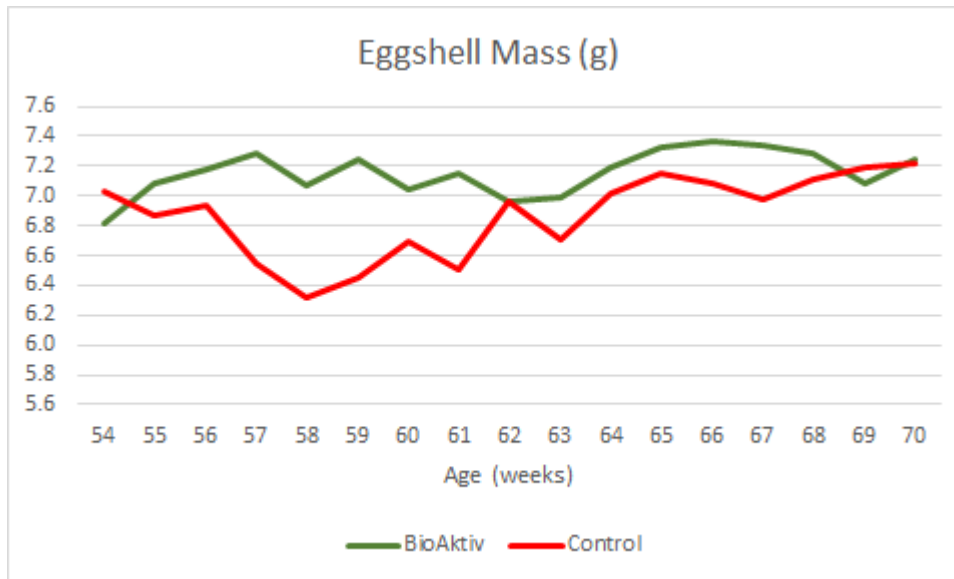
⁴ Translated as "music" in the original English report.



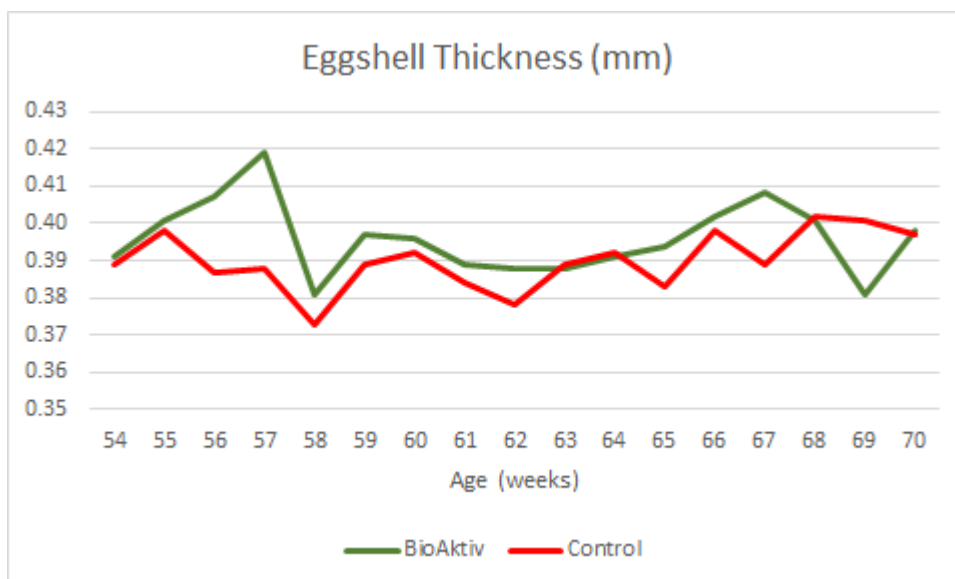
Egg mass: The overall average egg mass for the BioAktiv and control groups were 64.78 g and 64.11 g respectively. The egg mass of the BioAktiv group was 0.67 g or 1.04% higher. The chart above shows that the egg mass for BioAktiv group was nonlinear especially in the summer months, where it varied between 62.40 and 65.82 g. The egg mass for the control group uniformly increased as the hens aged. As the increases in egg mass normalised in September and October, I think high temperatures influence the egg mass to fluctuate.



Egg shape index: The overall average egg shape index for the BioAktiv and control groups were 75.64% and 74.95% respectively. Measuring egg shape index was not essential in the study, because we believed that hen's diet with or without BioAktiv had no major influence on egg shape. Seasons and hen's age had greater influence on egg shape. The chart above shows that both groups had higher egg shape indices or rounder eggs in the summer months, which is common for that period of the year. As the season changed in September and October and the hens aged, the egg shape indices lowered or the eggs getting more oval. Overall the BioAktiv group had a higher egg shape index than the control group, indicating hens fed BioAktiv laid rounder eggs.



Eggshell mass is an important parameter affecting eggshell quality. The overall average eggshell mass for the BioAktiv and control groups were 7.16 g and 6.87 g respectively. The eggshell mass for the BioAktiv group was 0.29 g or 4.19%⁵ higher. For the control group, their eggshell mass dropped in July and August, which is normal during hot summer days because of insufficient uptake of calcium carbonate due to loss in appetite, hens panting, and lack of calcium in the diet. However, for the BioAktiv group, their eggshell mass remained at a constant high level during the same period. We did not see the adverse effect of high temperatures on eggshell mass. It is quite certain that the use of BioAktiv can prevent losses due to low eggshell mass caused by high temperatures.



Eggshell thickness is also another important parameter affecting eggshell quality. The overall average eggshell thickness for the BioAktiv group, 0.396 mm, was slightly greater than that for the control group, 0.390 mm. Eggshell thickness for the BioAktiv group rose and peaked a month after applying BioAktiv. It then dropped greatly before it rose again but not as much as before. This was probably due to the high temperatures and the faulty ventilators then. A reliable ventilation system and proper balanced diet are unavoidable, especially during summer, to prevent problems caused by low eggshell thickness.

⁵ Indicated as 4.22% in the original report.

In conclusion, the use of BioAktiv Powder in layer feed was very effective in reducing the mortality of hens, percentage of broken eggs and ammonia concentration in layer house. It is effective in a lesser extent in improving layer performance, daily feed consumption of hens and feed conversion ratio. Concerning egg parameters, it is more effective in increasing eggshell mass than egg mass and eggshell thickness.

[\[Original report\]](#)