Using micro-organisms to improve profitability in poultry production

By Lindi Botha |16 August 2022 | 11:41 am

Increasing production, reducing mortality rates, and managing diseases and pests are the three pillars of success in chicken production. Studies show that a way of achieving this winning combination may lie in the use of effective micro-organisms, a unique mix of bacteria, fungi and yeast.

Effective micro-organisms added to the drinking water of chicks improve their overall health, thus reducing mortality rates.
Photo: Lindi Botha

As more and more producers realise the benefits of using large populations of micro-organisms on their farms, so the number of different ways to apply these micro-organisms grows.

With the development of effective micro-organisms (EM) in the form of inoculants, these organisms are moving beyond crop farms and being used in livestock concerns, where they aid animal health and sanitation, improve nutrition, and reduce pests such as flies.
EM inoculants function as biological control measures in that they introduce beneficial micro-organisms into the environment that suppress or control pests and pathogens through natural processes.

Numerous studies conducted worldwide have proved the efficacy of EM in boosting poultry health and production. In White River, Mpumalanga, poultry farmer and nursery owner Frikkie Roux conducted his own studies under local conditions to test the capabilities of EM.

Roux found that when used in rearing sheds, EM reduced the incidence of respiratory diseases and eliminated or controlled the smell of the ammonia produced when chicken manure breaks down. They also helped to repel flies.

Roux even found that the overall quality of his poultry meat improved, increasing profit between R0,50 and R1 per bird.

Application

EM work by balancing microflora in the chickens' intestines and improving their immune systems. Roux advises farmers to dilute EM in drinking water at a ratio of one part EM to 1 000 parts water (1:1 000).

"Where dripper systems are used for drinking water, the yeast in EM should be filtered out, as it can lead to blockages in the system. [As an added precaution], the system should be rinsed out with clean water every week," he says.

When including EM in chickens' diets, an EM bokashi mixture should be used in the feed and applied at a rate of 1% for layer hens and 3% for broilers. The latter should be given a 1% ration in the first week, building up to 3% over the following two weeks.

Roux explains that EM bokashi should be strewn over the cleaned floor of the chicken coop to prevent the birds from rushing towards the feeding trays, where they are often trampled.

“Spreading the bokashi across the floor also forces the chickens to move around in order to pick at it, thereby reducing the incidence of heart attacks.”

As mentioned, adding EM to the chickens’ diets significantly lessens the odour of their droppings. To reduce the smell even further, the coops, bedding and surrounding areas should be sprayed with an EM-water mixture at a ratio of 1:100.

“This will suppress any harmful micro-organisms that can cause disease among the chickens. Since EM feed on fly larvae, applying this mixture will also greatly reduce pest populations,” says Roux.

Local tests

Bokashi, which was developed in Japan, holds benefits for virtually every type of farming activity. When researchers first started testing the effects of EM bokashi on poultry, they found that it increased the profitability of egg production by reducing the mortality rate, and increasing egg weight and quality. Broiler production, too, benefitted from lower mortality rates and better average daily weight gains.

Roux confirmed these studies by using one control group of layers, one group that received feed of 1% EM bokashi, and a third that received drinking water treated with an EM ceramic ball. The ball is made by fermenting clay with effective micro-organisms for several months.

The clay is then formed into a ball and fired in an oven. Finally, it is placed in the drinking water tank, where it gradually releases EM into the water (see Table 1).

TABLE 1: EFFECTS OF EM BOKASHI ON EGG WEIGHT AND QUALITY

	Control group	EM bokashi feed	EM-treated water
Ratio of egg production	100%	102,2%	104%
Average weight of eggs/day	54,3g	55,7g	56g
Percentage of broken eggs	4,8%	0,6%	1,6%
Egg yolk colour measured on DSM Yolk Colour Fan	10,11	10,19	10,15

Roux conducted a second study of another farmer’s chickens to determine the effects
of EM bokashi on feed conversion ratio, growth, and carcass weight in broilers. Chicken coops were cleaned with a concentrate of 2% EM bokashi.

Before the arrival of the chickens. a concentrate of 0,5ℓ/m² was sprayed onto the roof and walls, and a concentrate of 3ℓ/ m² was sprayed on the floors. Wood shavings were used as bedding and sprayed with 2% EM bokashi before the chicks arrived. These treatments were repeated every Wednesday and Sunday throughout the cycle.

The 90-day-old chicks were placed in three groups at a density of 30 chicks per 6m² (see Table 2 for details on feed).

TABLE 2: FEED SUPPLIED TO CHICKS IN SECOND STUDY

	Week 1 to 2	Week 3	Week 4	Week 5 to 6
Group 1	Conventional* chick starter feed	Conventional chick grower feed	Conventional chicken grower feed	Conventional chicken finisher feed
Group 2	Organic chick starter feed with 5% EM bokashi	Organic chick starter feed with 5% EM bokashi	Organic chick finisher feed with 5% EM bokashi	Organic chick finisher feed with 5% EM bokashi
Group 3	Organic chick starter feed with 10% EM bokashi	Organic chick starter feed with 10% EM bokashi	Organic chick finisher feed with 10% EM bokashi	Organic chick finisher feed with 10% EM bokashi

*Including the antibiotics coccidiostat and zinc bacitracin (15%)

The chicks in Group 1 were given normal drinking water without EM bokashi additives, while EM bokashi was added at a ratio of 1:1 000 to the drinking water of chicks in Group 2 and Group 3.

Profit was calculated based on all the costs required to produce and slaughter the broilers, the respective EM bokashi additions (or lack thereof, in the case of Group 1), and the income received from the broilers.

Results

The most expensive chicks to produce were those in Group 3, as the feed costs were higher due to the greater percentage of EM bokashi. However, the ‘organic’ chickens of Group 1, which received no EM bokashi, could be sold at a higher price, which resulted in a higher profit than that realised for Group 3.

“Group 2, which received the added 5% concentration of EM bokashi, showed the highest profit, best average daily gain, and lowest mortality rate. The mortality rate indicates that EM contribute to building stronger immune systems in the birds.

TABLE 3: EFFECTS OF EM BOKASHI ON MORTALITY RATE, FEED CONVERSION RATIO, GROWTH, CARCASS WEIGHT, AND PROFIT GAIN PER BROILER			
	Group 1	**Group 2**	**Group 3**
Mortality rate (%)	6,67	3,33	9,6
Total weight gain (kg)	2,36	2,4	2,3
Average daily gain (g/day)	56,46	57,1	54,58
Total feed intake (kg)	4,47	4,62	4,72
Feed conversion ratio values	1,77	1,78	1,88
Carcass weight (kg)	1,6	1,71	1,64
Increase in profit	R1,57	R2,01	R0,89

“Although the 10% EM bokashi concentration [group …] scored the lowest in terms of profitability, [its] profitability still increased. This shows that organic broiler production can be done profitably, and even more so than conventional broiler production with antibiotics,” says Roux.

After the chickens were slaughtered, their intestines were tested for internal parasites. Of all the chickens, only one from Group 2 tested positive for an internal parasite.
Roux notes that the trials conducted showed that EM play a significant role in reducing the stench from chicken manure, urine, and the coops in general.

“The smell of ammonia and presence of flies were reduced dramatically.”

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