

# PRODUCTIVE PERFORMANCES AND ECONOMIC EFFICIENCY OF CHICKEN BROILERS RECEIVING MYCOTOXIN CONTAMINATED FEED AND DIETARY DETOXIFICANT ADDITIVE

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## Abstract

*Fungus development in field crops or in storehouses could lead to nutritional and even physical loss, as well as to mycotoxins production, which could be extremely harmful for humans and animals. Therefore, the economic impact on animals performances could be huge and controlling mould development is in fact a key factor in preventing feedstuffs contamination with fungus and mycotoxins. There have been used several methods to prevent or treat mycotoxicosis in animals, but the usage of certain special feed additives, known as mycotoxins adsorbents of detoxifying agents is the most common one. This paper presents a part of the trial that aimed to estimate the productive and economic effects of supplementary feeding chickens broilers with the Mycofix MTV commercial product, from Biomin, at dietary inclusion rates of 1‰ and 3 ‰. The biological material was represented by 111678 ROSS-308 chicken broilers, reared industrially, in deep litter system, till slaughter at 40 days old. Certain performance parameters have been investigated throughout the entire experimental period: - body weight dynamics, average daily weight gain, feed conversion ratio, mortality, as well as the economic efficacy of detoxificant additive used in broilers feeding, through the calculation of European Broiler Index (EBI) and European Production Efficacy Factor (EPEF). In all production parameters, inclusion of detoxifying feed additive generated better results (+10.8% live weight at slaughter; 6.24% less for feed conversion, hence savings of important feed quantities and moneys; 40.15% decreased casualties). Although the dietary inclusion of Mycofix MTV in chicken broilers feeding imposed supplementary expenses, it also generated better incomes and revenues, which were 1.42 – 33.75% higher in experimental groups L1exp. and L2exp., compared to control group-Lc.*

**Key words:** broilers, mycotoxins, performance, EBI, EPEF

## INTRODUCTION

Fungus development in field crops or in storehouses could lead to nutritional and even physical loss, as well as to mycotoxins production, which could be extremely harmful for humans and animals [6]. Therefore, the economic impact on animals performances could be huge and controlling mould development is in fact a key factor in preventing feedstuffs contamination with fungus and mycotoxins [5]. Fight against mycotoxicosis could be carried on through prophylaxis measures, such as well drying the cereals presenting high humidity values, prior to storage [2, 4]. If they are already contaminated with mycotoxins, they could be

annihilated through absorption inhibition or by usage of some bacteria which consume mycotoxins. There have been used several methods to prevent or treat mycotoxicosis in animals, but the usage of certain special feed additives, known as mycotoxins adsorbents of detoxifying agents is the most common one [1, 7].

Some researchers [1] tried to find out the beneficial effects issued from the usage of certain detoxificant additives. It resulted that feed conversion and weight gain have been improved in chicken broilers which received the protective product. Moreover, when mycotoxins were absent from feed, the used product acted similarly to a growth promoter.

Other products are also in trials, because they comprise micro organisms with natural potential to inactivate mycotoxins such as ochratoxine, through a transamination metabolic pathway [3]. Usage of such product generated 50% cut of mortality rate and also better economic results in those chickens that benefited from dietary supplementation with the detoxificant/mycotoxin inhibitor product.

This paper presents a part of the trial that aimed to estimate the productive and economic effects of supplementary feeding chickens broilers with the Mycofix MTV commercial product.

## MATERIAL AND METHOD

The feedstuffs used in producing mixed feed for chicken broilers in the experiment were contaminated naturally with DON and OTA, as follows:

- \* corn DON → 150 – 377 μg/kg;
- \* wheat DON → 150 μg/kg;
- \* soymeal DON → 369 – 525 μg/kg
- \* soymeal OTA → 14 μg/kg

In mixed feed, DON uptake was 550 μg/kg, while OTA uptake reached 35 μg/kg.

Zearalenone (ZEA) content did not exceed 25 μg/kg in corn.

Quality conditions from the mixed feed were in accordance with the nutritional requirements established by broiler producer.

In order to fight the unpleasant effect of feed contamination with DON and OTA, the Mycofix MTV feed additive, produced by Biomin GmbH, Austria, was used in feed.

The Mycofix MTV product is designed to increase mycotoxins inactivation and detoxification of feed contaminated with deoxynivalenol (DON), ochratoxine (OTA) and zearalenone („ZON”). Apart from other products in Mycofix group, the MTV version comprises a yeast (*T. mycotoxinivorans*) which consumes and digests mycotoxins (feed detoxification). The product is a complex of 4 elements: mixture of synergic minerals for selective mycotoxins adsorption; BBSH 797, involved in molecular disassembling of mycotoxins, fitogenics for

liver protection; fito-fitic compounds for immunitary response stimulation. It inactivates mycotoxins through biotransforming and adsorption; it reduces the wounds in the intestinal tract mucosa, caused by trichotecenes; it stimulates the immunitary system activity, which is commonly inhibited by mycotoxins; does not interact with drugs and other compounds existing in feed.

The biological material was represented by 111678 ROSS-308 chicken broilers, reared industrially, in deep litter system and allocated in 3 experimental groups, as related to Mycofix MTV inclusion rate in feed: Lc – 37226 chickens, feed additive=not present; L1exp. - 37226 chickens, feed additive=1‰; L2exp. - 37226 chickens, feed additive=3 ‰.

The chickens were slaughtered at 40 days old.

Certain performance parameters have been investigated throughout the entire experimental period:

### \*rearing parameters:

- body weight dynamics (g)
- average daily weight gain (g)
- feed conversion ratio (kg feed/kg gain)
- mortality %

### \* economic efficacy of detoxificant additive used in broilers feeding

- European Broiler Index (EBI)
- European Production Efficacy Factor (EPEF)

## RESULTS AND DISCUSSIONS

### Rearing parameters

Dynamics of body weight in chicken broilers naturally intoxicated with DON and OTA and feed supplemented with Mycofix MTV revealed that, at 3 ‰, Mycofix MTV, at 40 days old, live weight was 10.28 % higher than in control group (2188 g in L2exp., vs. 1981 g, in Lc). When dietary level of 1 ‰ Mycofix MTV was used, there were no found significant influences on live weight, at the same age (1984 g L1exp., vs. 1981 g, Lc). (fig. 1).

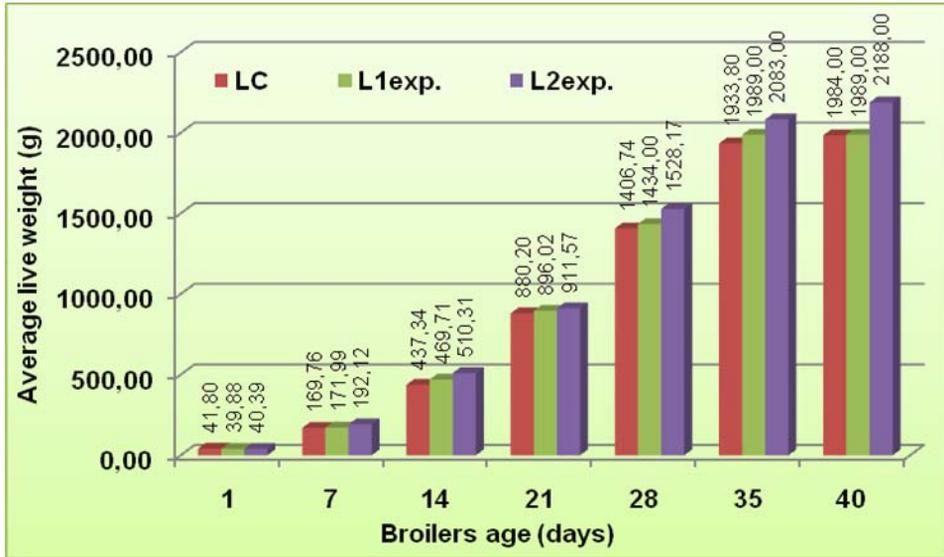


Fig. 1. - Weekly live weight (g) of chicken broilers naturally intoxicated with DON and OTA, supplementary fed with Mycofix MTV

Average daily weight gain (ADG) of broilers have been positively affected by the Mycofix MTV usage, as related to the dietary inclusion rate: at 1‰ Mycofix MTV, the ADG per overall period was 3.22 % better, while at 3 ‰ detoxificant additive in feed, the ADG was 7.58 % higher in L2exp., compared to control group (tab. 1).

Table 1- Average daily gain per weeks, as achieved by the chicken broilers naturally intoxicated with DON and OTA, supplementary fed with Mycofix MTV

Chickens age (weeks)	Lc	L1exp.	L2exp.
1	18.28	18.87	21.60
2	38.20	42.53	45.45
3	63.20	60.90	57.32
4	75.22	76.92	88.00
5	75.30	76.10	79.28
<b>Mean</b>	<b>53.95</b>	<b>55.68</b>	<b>58.04</b>
<b>% din Lc</b>	<b>100</b>	<b>103.22</b>	<b>107.58</b>

Feed conversion level (tab. 2) reached 1.97 kg feed/kg gain in control group, while experimental groups realised FCR values of 1.96 kg/kg gain (L1exp.) and 1.85 kg feed/kg gain (L2exp.). Thus, in the group that received 3 ‰ Myofix MTV adding in feed, feed conversion was 6.24% improved,

compared to the performance of chickens in the control group (Lc).

Table 2 – Feed conversion ratio, achieved by the chicken broilers naturally intoxicated with DON and OTA, supplementary fed with Mycofix MTV

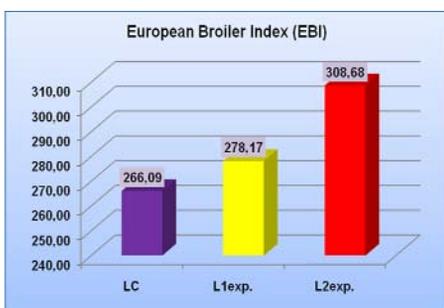
Notice	Lc	L1exp	L2exp
<b>Feed conversion ratio (kg feed/kg weight gain)</b>	1.973	1.964	1.850
<b>% of Lc</b>	<b>100</b>	<b>99.54</b>	<b>93.76</b>

It resulted a saving of 123 g mixed feed/capitis, meaning 13.65 tones of mixed feed per rearing series, within the specified experimental condition.

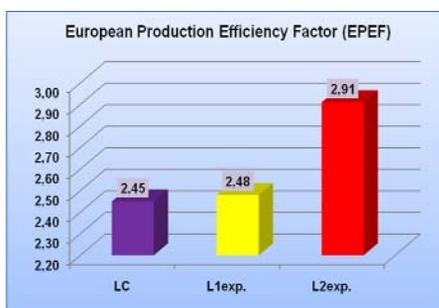
The effect of Mycofix MTV product also influenced health status of the chickens, relatively to the dietary inclusion dose. Thus, at 1 ‰ feed additive, mortality reduced by 30.11%, while at the level of 3% detoxificant in feed, the mortality went 40.15%, compared to control group situation, revealing thus the net protective effect of Mycofix MTV product, against the deoxynivalenol-DON and ochratoxine A-OTA mycotoxins (tab. 3).

Table 3 - Mortality (%) cumulated in chicken broilers naturally intoxicated with DON and OTA, supplementary fed with Mycofix MTV

Chickens age (weeks)	Mortality (%)		
	Lc	L1exp	L2exp
1	0.76	0.51	0.44
2	1.18	0.75	0.69
3	0.61	0.30	0.23
4	0.63	0.35	0.34
5	0.27	0.46	0.35
<b>Cumulated</b>	<b>2.69</b>	<b>1.88</b>	<b>1.61</b>
<b>% of Lc</b>	<b>100</b>	<b>69.89</b>	<b>59.85</b>



a



b

**Fig. 2** – Values of European Broiler Index (a) and of European Production Efficiency Factor (b) in chicken broilers chronically contaminated with DON and OTA, supplementary fed with Mycofix MTV

From the conventional computation method, which consider the ratio between net revenue and overall production expenses, all 3 experimental versions were economically efficient. However, certain interesting aspects were found: revenue rate, in L1exp. group was much closer to that from control group-Lc (27.64%, compared to 27.40%), while the revenue rate in L2exp. was 33.75% higher, compared to reference group-Lc, the absolute value reaching 34.86%. these results also depicts the fact that the higher dietary Mycofix MTV we used (ex. 3‰), the better production and economic results were achieved, grace to inactivation and detoxification properties of the studied product.

EBI values ranged between 266.09 in Lc group and 308.68 in L2exp. group, while the EPEF index showed a repartition of the calculated values closed to those resulted within the common income/ revenue/ efficiency calculations (EPEF = 2.43 in Lc; 2.48 in L1exp. and 2.91 in L2exp.)

### Economic efficacy of using the Mycofix MTV product

The values achieved for the synthetic assessment factors of the productive efficacy: European Broiler Index (EBI) and European Production Efficiency Factor (EPEF) revealed us increased efficacy of rearing in experimental group 2 (+3‰ Myofix MTV in broilers diet), existing thus significant differences, compared to the other analysed groups (Lc and L1exp.) (fig. 2, a and b).

### CONCLUSIONS

In all production parameters, inclusion of detoxifying feed additive generated better results (+10.8% live weight at slaughter; 6.24% less for feed conversion, hence savings of important feed quantities and moneys; 40.15% decreased casualties).

Although the dietary inclusion of Mycofix MTV in chicken broilers feeding imposed supplementary expenses, it also generated better incomes and revenues, which were 1.42 – 33.75% higher in experimental groups L1exp. and L2exp., compared to control group-Lc.

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