



**Zootechnical efficacy of B.I.O.Tox® Farm in T-2 challenged broiler**  
 B.I.O.Tox® Farm: Efficacy trial in broiler chickens, Instituto SAMITEC, Brazil  
 Bullet Point 22.18

### Introduction

T-2 toxin is one of the most critical mycotoxins for poultry. The major effect of T-2 toxin in poultry is an inflammatory reaction in the oral cavity that progresses to necrosis and invasion of the normal microflora. Other effects of exposure to dietary T-2 toxin at levels between 1 and 4 ppm and different exposure times include decreased feed intake and body weight gain [Diaz *et al.*, 2005].

Under the current conditions in agricultural practice the presence of trichothecenes such as T-2 toxin cannot be completely avoided and can result in economic losses. One way to minimize the effects of T-2 toxin on animal health, is to reduce its bioavailability by using mycotoxin binder, such as B.I.O.Tox® Farm, in the feed.

The aim of the present study was to investigate if B.I.O.Tox® Farm can improve the performance of broiler chickens during T-2 toxin exposure.

### Material and methods

The trial was conducted at the Instituto SAMITEC (Instituto de Soluções Analíticas, Microbiológicas e Tecnológicas Ltda, Brasil) to evaluate B.I.O.Tox® Farm as a potential protection against adverse effects of 2.0 ppm dietary T-2 toxin in male growing broiler chickens.

A total of 360 one-day-old broiler chicks (Cobb 500) were individually weighed, wing-banded and randomly allocated to the different experimental groups. The experimental design consisted of a completely randomized multifactorial arrangement of treatments. The different groups are presented in Table 1. The response variables measured included the following:

Body weight	BW	Day: 1, 7, 14 and 21
Body weight gain	BWG	Day: 7,14 and 21
Feed intake	FI	Day: 7,14 and 21
Feed conversion ratio	FCR	Day: 7,14 and 21

Each experimental treatment was replicated 6 times with 10 birds per pen for a total of 60 birds per treatment. BW and BWG were obtained by weighing each bird individually. FI and FCR were analysed using the replicate pen as experimental unit (n = 6).

**Tab. 1:** Trial design (total mycotoxin concentration = 2 ppm; 82% T-2 toxin and 18% HT-2 toxin)

Treatment		T-2 [ppm]	BTF [kg/MT]
PCG	Positive Control Group	-	-
NCG	Negative Control Group	2.0	-
BTF-0	B.I.O.Tox® Farm	-	4.0
BTF-1	B.I.O.Tox® Farm (1)	2.0	1.0
BTF-2	B.I.O.Tox® Farm (2)	2.0	2.0
BTF-4	B.I.O.Tox® Farm (4)	2.0	4.0

All birds were given ad libitum access to feed and water during the whole experimental period (d1 to 21). The animals received an iso-nutritive diet formulated according to NRC (National Research Council, 1994) demands, after NIRS evaluation of the raw materials: maize, soybean meal and vitamin-mineral premix. Table 2 presents the main nutritional values of the diet.

**Tab. 2:** Analysed nutrition contents of diet (averaged over all groups; conversion factor: 1 kcal = 4.19 x 10<sup>-3</sup> MJ)

ME <sup>1)</sup>	DM <sup>2)</sup>	XP <sup>3)</sup>	XF <sup>4)</sup>	XL <sup>5)</sup>	XA <sup>6)</sup>
[MJ/kg]	[%]				
13,23	11,51	21,68	2,19	5,43	5,78

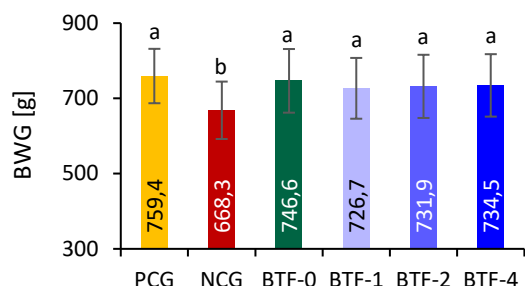
<sup>1)</sup> ME = Metabolizable Energy; <sup>2)</sup> DM = Dry matter; <sup>3)</sup> XP = Crude Protein; <sup>4)</sup> XF = Crude Fibre; <sup>5)</sup> XL = Crude Fat; <sup>6)</sup> XA = Crude Ash

The experimental diet was analysed for aflatoxins, deoxynivalenol, zearalenone, diacetoxyscirpenol, fumonisins, ochratoxin A and T-2 toxin and no detectable levels of any of these mycotoxins were found.



## Results and Discussion

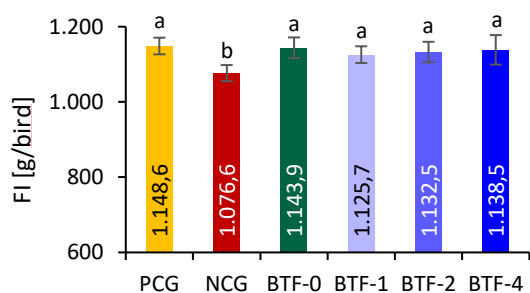
Figure 1 shows body weight gain at 21 d.



**Figure. 1:** Effect of the dietary supplementation of B.I.O.Tox® Farm on BWG in broiler chickens receiving 2 ppm dietary T-2 toxin ( $p < 0.0001$ ; <sup>ab</sup> = significant differences).

BWG was not significantly different between PCG and the four groups receiving B.I.O.Tox® Farm, with or without T-2 toxin (BTF-0, BTF-1, BTF-2 and BTF-4). However, BWG was significantly lower in the negative control group receiving 2.0 ppm T-2 toxin alone ( $p < 0.0001$ ). The BWG in this group was 12.0 % lower compared to the positive control group.

Because of T-2 toxication the reduction of BWG may be due to inflammation and irritation of the GIT resulting into decrease in FI and consequently decrease in BW of “poisoned” birds. The measured FI (cf. figure 2) proves this assumption.



**Figure. 2:** Effect of the dietary supplementation of B.I.O.Tox® Farm on FI in broiler chickens receiving 2 ppm dietary T-2 toxin ( $p < 0.001$ ; <sup>ab</sup> = significant differences).

The FI during the whole experimental period was significantly lower in the negative control group

receiving only T-2 toxin compared to the group receiving T-2 toxin plus B.I.O.Tox® Farm (BTF-1, BTF-2 and BTF-4). In contrast to the PCG, the FI reduction of the negative control group was 6.3 %. Birds in group BTF-0 did not differ from the positive control group at any of the sampling times evaluated.

Cumulative 21-day FCR did not differ significantly in the experimental group:

FCR (PCG) = 1.15	FCR (NCG) = 1.16
FCR (BTF-0) = 1.16	FCR (BTF-1) = 1.16
FCR (BTF-2) = 1.15	FCR (BTF-4) = 1.17

The results of figure 1 and 2 show that the supplementation of B.I.O.Tox® Farm is capable of counteracting the adverse effect of T-2 toxin on BWG and FI.

Mortality averaged 2.2% and no effect of treatment was detectable.

## Conclusion

Mycotoxins, particularly type-A trichothecenes like T-2 toxin, are well-known for their adverse effects on poultry performance. The results of the present trial confirm these effects, since 2 ppm dietary T-2 toxin significantly decreased 21-d BWG and FI. These adverse effects on performance were completely overcome by the dietary supplementation of B.I.O.Tox® Farm.

The present study shows also that there were no toxic effects of the mycotoxin binder B.I.O.Tox® Farm on health status and performance of broiler chickens.

The ratio between T-2 toxin and B.I.O.Tox® Farm was 1:500, 1:1,000 and 1:2,000, respectively. Generally, mycotoxin control is dosed empirically without any scientific report. Consequently, the observation described above could be relevant for user. Based on results in this study it could be recommended to add B.I.O.Tox® Farm into the contaminated feed in a ratio of 1:1,000, after determination of T-2 concentration.