RESPONSE OF BROILER CHICKENS FED ON DIETS CONTAINING LOW LEVEL OF AFLATOXIN (B1 AND B2) AND SUPPLEMENTED WITH MYCOTOXIN BINDER

Catootjie L. Nalle*[1], Andrijanto A.H[2]. Angi, Max A. J. Supit[3], Santi Ambarwati[4] dan Ni Sri Yuliani[5]

[1,2,3,5]Polytechnic of Agriculture Kupang
[4]SEAMEO Biotrop Bogor
*Correponding author: catootjienalle@gmail.com

Abstract

The objective of the present study was to evaluate the growth performance and feet colour of broilers fed on diets containing low level of aflatoxin (B1 and B2) and mycosorb. The experimental design was a 4 x 2 factorial randomized complete design consisting of two main factors which were aflatoxin level and mycosorb. The treatments were control diets, control diets supplemented with mycosorb, diets containing 10 ppb aflatoxin, diets containing 10 ppb aflatoxin supplemented with mycosorb, diets containing 25 ppb aflatoxin, diets containing 25 ppb aflatoxin supplemented with mycosorb, diets containing 60 ppb aflatoxin, diets containing 60 ppb aflatoxin supplemented with mycosorb. The aflatoxin levels in the experimental diets obtained by substitution the proportion of corn of the control diets with aflatoxin corn. Variables measured were feed intake (FI), body weight gain (BWG), feed conversion ratio (FCR). Except for feet colour score, the results showed that there was no interaction ($P > 0.05$) between aflatoxin level and mycosorb on FI, BWG and FCR of 7d- and 14 d-old-broilers. The aflatoxin level did not affect ($P > 0.05$) BWG, FI and FCR (7d) but it affected ($P < 0.05$) the FCR (14d) and feet colour of broiler. Mycosorb did not affect ($P > 0.05$) all parameters observed. In conclusion, except for broiler feet colour, the supplementation of aflatoxin, mycosorb and combination between aflatoxin and mycosorb in broiler diets had no effects on the growth performance of broilers during 7 and 14 day experiment. Further research is needed to evaluate the growth performance of broilers fed diets containing high level of aflatoxin.

Key words: *Aflatoxin, Broiler, Performance, Feet colour*

Introduction

The human concern about safety food has been increasing due to the improvement of knowledge and easy access of information. Because of that, it is important for animal farmers to produce healthy animal products, such as free from aflatoxin residue in meat. In order to provide free aflatoxin residue in animal products, animal farmers should provide healthy feed for animals. According to Indonesian Nasional Standard (NSB, 2006), the minimal aflatoxin content in starter broiler complete feed is 50 ppb. Feeding broilers containing aflatoxin (< 1 ppm) could cause detrimental effects on production and reproduction performance and leaving residue in meat, and liver. To reduce the negative effects of aflatoxin

ISBN: 978-602-6906-55-7
Tersedia pada https://ejurnal.undana.ac.id/JKV/index

in birds, so it can be conducted by supplemented mycotoxin binder such as prebiotic, probiotic, yeast, fromycin, zeolite, and mycosorb in a complete feed that has been suspected containing aflatoxin (Barati *et al.*, 2018; Motawe *et al.*, 2016). Mogadam and Azizpour (2011) reported that the supplementation of mycosorb and sodium bentonite into aflatoxin contaminated feed reduced the negative effects of aflatoxin in performance and immunity towards *new castle disease* (ND) on broiler chickens. Nazarizadeh and Pourreza (2019) claimed that supplementation of formycin, anzymit and mycosorb in the complete feeed containing 0,2 dan 4 ppb aflatoxin B1 (AFB1) improve the growth performance, haematology value and serum protein on broiler chickens. Based on all of this information, an experiment has been conducted to evaluate the response of broiler chickens fed on diets containing graded level of aflatoxin and supplemented with mycotoxin binder (mycosorb).

Methodology

A total of 240 one-day-old broilers (Cobb strain, unsexed) with the same initial body weight (45.7 ± 0.2 g/bird) were randomly distributed into 24 pens (10 birds/pen). Materials used in this experiment were corn (free and contaminated with aflatoxin), sago (*putak* meal) and commercial mycotoxin binder (Mycosorb, Alltech Ltd, Indonesia). The dosage of Mycosorb used was 0.750 kg/ton feed. The aflatoxin was produced by naturally growing the *Aspergillus flavus* in healthy corns for a month. To speed the growing of *Aspergillus flavus*, the moisture of corn was increased by adding 20% (w/w) water into corn every other day. The aflatoxin-contaminated corns were then analysed their aflatoxin level using Thin Layer Chromatography (TLC). The result showed that the level of afalatoxin in corn invested by *Aspergillus flavus* was 134 ppb. The aflatoxin contaminated-diets were developed by substitution the proportion of corn of the control diets with aflatoxin-contaminated corn. Treatment diets (crumble form) and drinking water were available for 24 hours.

The experiment was designed using a 4 x 2 factorial randomized complete design consisting of two main factors which were the aflatoxin level and mycotoxin binder (mycosorb). So, there were 8 different treatment combinations all together which were the control diets (< 2.02 ppb aflatoxin), control diets (< 2.02 ppb aflatoxin) supplemented with mycosorb, diets containing 10 ppb aflatoxin (B1 and B2), diets containing 10 ppb aflatoxin (B1 and B2) supplemented with mycosorb, diets containing 25 ppb aflatoxin (B1 and B2), diets containing 25 ppb aflatoxin (B1 and B2) supplemented with mycosorb, diets containing 60 ppb aflatoxin (B1 and B2), diets containing 60 ppb aflatoxin (B1 and B2) supplemented with mycosorb. Variables measured were feed intake (g/bird), body weight gain (g/bird), feed per gain (g/g) and feet colour (FC) score (Score 1= yellow; Score 2= pale).

ISBN: 978-602-6906-55-7
Tersedia pada https://fkh.undana.ac.id/index.php/in/publikasi/proceedings

Results and Discussion

The growth performance and the colour of chicken feed were depicted in Table 1. The statistical analysis showed that there were no interaction between aflatoxin level and mycotoxin binder (mycosorb) ($P > 0.05$) on feed intake (FI), feed conversion ratio (FCR) and body weight gain (BWG) of broilers during 7 and 14 days experiment. Interaction between aflatoxin level and mycotoxin binder (mycosorb) ($P < 0.05$) was found in feed colour score. No differences among all treatments were probably due to the level of aflatoxin applied was low so when they were combined with mycosorb, the effects were still not observed.

The feet colour score of broilers fed on diets containing 60 ppb (with and without mycotoxin binder) were higher ($P < 0.05$) the group of birds fed on control diets and diets containing 25 ppb aflatoxin (with and without mycosorb).

Table 1. Feed intake (FI), feed conversion ratio (FCR), body weight gain (BWG), feet colour (FC) score of broilers fed diets containing low level of aflatoxin and mycotoxin binder (Mycosorb)

Treatment		**Variables**						
Aflatoxin level	***Mycotoxin Binder***	**FI (7d)**	**FI (14d)**	**FCR (7d)**	**FCR (14d)**	**BWG (7d)**	**BWG (14d)**	**FC score (35d)**
		…….g/bird……		**…….g/g……**		**….g/bird……**		
< 2.02 ppb	+	174	552	1.558	1.762	111	305	1.00 [b]
< 2.02 ppb	-	181	576	1.699	2.090	113	279	1.00 [b]
10 ppb	+	198	590	1.588	1.866	107	307	2.00 [a]
10 ppb	-	170	564	1.571	1.946	106	295	2.00[a]
25 pbb	+	159	550	1.578	1.765	104	315	1.25[b]
25 ppb	-	198	664	1.839	1.990	108	325	1.67[b]
60 pbb	+	160	648	1.688	2.314	107	281	2.00[a]
60 ppb	-	168	646	1.747	2.169	97	297	2.00[a]
SEM		**7.779**	**29.544**	**0.108**	**0.113**	**7.121**	**19.580**	**0.118**
Main factor, Aflatoxin level								
< 2.02 ppb		177	564	1.628	1.949[b]	112	292	1.00[c]
10 ppb		168	577	1.579	1.901[b]	106	301	2.00[a]
25 ppb		179	607	1.708	1.847[b]	106	321	1.33[b]
60 ppb		174	645	1.717	2.241[a]	102	288	2.00[a]
SEM		**5.501**	**20.890**	**0.076**	**0.080**	**5.035**	**13.850**	**0.833**
Main factor, *mycotoxin binder*								

ISBN: 978-602-6906-55-7
Tersedia pada https://ejurnal.undana.ac.id/JKV/index

Con		178	613	1.714	2.016	106	299	1.67[a]
Tox		170	585	1.603	1.953	107	302	1.56[a]
SEM		3.889	14.771	0.054	0.057	3.561	9.792	**0.059**
Probability P>0.05								
Aflatoxin Level	NS	NS	NS	NS	*	NS	NS	**
Mycotoxin binder	NS	NS	NS	NS	NS	NS	NS	NS
Aflatoxin Level x *Mycotoxin binder*	NS	NS	NS	NS	NS	NS	NS	*

[a,b] Means of column with the superscripts significant difference (P<0.05), *: Significant (P < 0.05); **: significant (P < 0.01); NS: Not significant (P>0.05)

Except for FCR (14d), the level of aflatoxin did not affect (P > 0.05) the FI, FCR and BWG. The results partly agreed with Yang *et al.* (2012) who reported that birds fed on diets containing low level of aflatoxin (16.3 ppm) did not affect the FI, BWG and FCR. However, the authors found that the FI, BWG and FCR decreased when the birds received diets containing 36.9 to 82.4 ppb.

The FC score of growing broilers were affected by the aflatoxin level. The FCR (14d) of birds received diets containing 60 ppb aflatoxin was significantly (P < 0.05) higher than those fed on diets containing < 2.02n and 25 ppb aflatoxin. The FS score of birds given diets containing 10 and 60 ppb was similar (P > 0.05). This was unaccepted result. Supplementation of mycosorb in broiler diets did not affect (P > 0.05) the growth performance and feet colour score.

The pale feet colour of birds fed on diet containing 10 and 60 ppb aflatoxin was probably due to the decrease in the absorption of carotenoids in the small intestine and carotenoid metabolism in the liver of chickens.

Conclusions

Except for FCR (14d), the level of aflatoxin and supplementation of mycotoxin binder commercial (mycosorb) did not affect the growth performance of broilers. Feet colour score of broilers were affected by the combination of level of aflatoxin and mycosorb. Birds fed on diets containing 60 ppb had pale feet colour compared to those given control diets and diets containing 25 ppb aflatoxin. Further research is needed to evaluate the growth performance of broilers fed diets containing high level of aflatoxin and different level of mycosorb.

ISBN: 978-602-6906-55-7
Tersedia pada https://fkh.undana.ac.id/index.php/in/publikasi/proceedings

Acknowledgement

This research project was fully funded by the Ministry of Research, Technology and Higher Education. The authors say gratefully thank you for the financial support to conduct this research.

References

Barati, M., M. Chamani, S.N. Mousavi, and M.T.A. Ebrahimi. 2018. Effects of biological and mineral compounds in aflatoxin-contaminated diets on blood parameters and immune response of broiler chickens. J App Anim Res. 46(1):707-713.

National Standard Board (NSB). 2006. Broiler Starter Feed. Nasional Standard Board (Indonesian).

Motawe, H.F., A.F. Abdel Salam and Kh.M. El Meleigy. 2016. Reducing the toxicity of aflatoxin in broiler chickens using probiotic and yeast. *Int J Poult Sci*. 13:397-407

Nazarizadeh, H. and Pourreza. 2019. Evaluation of three mycotoxin binders to prevent the adverse effects of aflatoxin B1 in growing broilers. *J App Anim Res.* 47 (1): 135-139.

Yang, J., F. Bai, K. Zhang, X. Lv, S. Bai, L. Zhao, X.Peng, X. Ding, Y.Li, J. Zhang. 2012. Effects of feeding corn naturally contaminated with AFB1 and AFB2 on performance and aflatoxin residue in broilers. *Czech J Anim Sci*. 57:506-515.

ISBN: 978-602-6906-55-7
Tersedia pada https://ejurnal.undana.ac.id/JKV/index