www.roavs.com EISSN: 2223-0343
RESEARCH OPINIONS IN ANIMAL & VETERINARY SCIENCES

Effects of using commercial GLOBACID® acidifier supplementation on growth performance and some haematological parameters in Japanese quail (*Coturnix japonica*)

Hossein Fazilat*, Farshid Kheiri and Mostafa Faghani

Department of Animal Science, Faculty of Agriculture, Shahrekord Branch, Islamic Azad University, Shahrekord, Iran

Abstract

This study was planned to investigate the effect of using commercial GLOBACID® on performance and some haematological parameters in Japanese quail. A total of 180 one day old quail chicks with an average weight of 17.44 g were divided into five treatment s and were further subdivided into 3 replicates. The birds were either treated with no GLOBACID® (control) or treated with 0.5 kg/ton (S1), 1 kg/ton (S2) and 1.5 kg/ton (S3) and 2 kg/ton (S4) GLOBACID®. The live body weight gains and feed consumption of birds were measured individually. Feed conversion efficiency was calculated weekly. At the end of the trial, 4 birds from each replicate were slaughtered and some blood samples were taken for haematological parameters. The performance data showed no significant effect between the control and treated groups expect carcass yield which increased significantly in S_2 and S_4. Triglyceride decreased significantly in S_1 and S_2. It was concluded that using commercial GLOBACID® had some beneficial effects in Japanese quail.

Keywords: GLOBACID®; performance; hematological parameters; Japanese quail

To cite this article: Fazilat, H., F. Kheiri and M. Faghani, 2014. Effects of using commercial GLOBACID® acidifier supplementation on growth performance and some haematological parameters in Japanese quail (Coturnix japonica). Res. Opin. Anim. Vet. Sci., 4(11): 622-625.

Introduction

During the past 50 years, aviculture industry has made great strides in several areas including nutrition to maximize the efficiency of growth performance and meat yield (Dhawale, 2005). In the recent years, there is an increasing trend in using organic acid and mixtures, as alternatives to antibiotic growth promoters due to their inhibiting activity on the growth and development of pathogens in animal feed and gastrointestinal tract (Langhout, 2000; Jovank et al., 2008). Acidification of diets with weak organic acids have been reported to decrease colonization of pathogen and production of toxic metabolites, improved digestibility of protein, calcium, phosphorous, magnesium, zinc and served as substrate in the intermediary metabolism (Veeramani et al., 2003; Isabel and Santos, 2009).

Feed acidifiers are fed to the animals in order to lower the pH of the gut and microbial cytoplasm thereby inhibiting the growth of pathogenic intestinal microflora (Gunal et al., 2006; Ghazalah et al., 2011). This inhibition reduces the microflora competing for the host nutrients and results in better growth and performance of the chicken. They also act as mold inhibitors (Isabel and Santos, 2009).

Acidification of feed or water consumption by animals, using organic acids, represent a frequent practice to control digestive micro-flora, improving feed utilization, production performance and maintaining the health state of animals (Dhama et al., 2014). Some important organic acids are formic acid, propionic acid, lactic acid, citric acid, fumaric acid and sorbic acid (Pinchasov and Elmaliah, 1994; Patterson and Burkholder, 2003). The acidifiers can modify the

***Corresponding author:** Hossein Fazilat. Department of Animal Science, Faculty of Agriculture, Shahrekord Branch, Islamic Azad University, Shahrekord, Iran. Po Box: 166.
E-mail: Davoodfazilat@gmail.com

pH of both the feed and the animal's digestive tract and can disrupt the normal cell function and protein synthesis of various gut microorganisms. In addition, it has been suggested that lower pH improves nutrient absorption (Rezanezhad Dizaji et al., 2012). Acidifiers, particularly, the short chain fatty acids, acetate, propionate and butyrate have contributed greatly to the profitability in poultry and also provide people with nutritious poultry products (Patten and Waldroup, 1998). Moreover, acidifiers improved growth performance through establishment of low gastrointestinal pH condition by supporting endogenous digestive enzymes and reducing undesired gut micro organisms (Richards et al., 2005). Acidifiers constitute an important component of modern feeding strategies without antibiotics. Organic acids are known to have strong antibacterial effects and they have been used in the protection of feed from microbial and fungal destruction (Hedayati et al., 2013). GLOBACID® is an acidic formula is based on lowering the buffer capacity, supplemented with acids that retard the growth of pathogenic bacteria. The performance response in quail feeding various levels of GLOBACID® supplement has not been investigated. This research has been conducted to study the effect of commercial GLOBACID® supplementation on growth performance and some serum biochemical parameters in Japanese quail.

Materials and Methods

This experiment was carried out at the Aviculture Farm of Najafabad, Isfahan, Iran. A total of 180 one day old quail chicks with an average weight of 17.44 g were divided into five treatment groups and were further subdivided into 3 replicates. The GLOBACID® (Global Nutrition International Zac de Paron 5 Rue des Compagnons d'Emmaüs BP 70166 35301 Fougères Cedex, France) was purchased from poultry commercial market. The basal diet was prepared on the basis of corn and soybean meal as recommended by National Research council (NRC, 1994). The treatments were divided as basal diet with no GLOBACID® kept as control, and for the others 0.5 kg/ton (S1), 1 kg/ton (S2), 1.5 kg/ton (S3) and 2 kg/ton (S4) of GLOBACID® were used respectively. The composition of basal diet was: corn 57.09%, soybean meal 34.80%, fish meal 4%, vegetable oil 1.6%, lysine hydrochloride 1.3%, dicalcium phosphate 0.32%, carbonate calcium 1.15%, salt 0.3%, vitamin premix 0.25%, mineral premix 0.25%, DL-Methionine 0.4% and sand 0.20%. Diets and fresh water were provided *ad libitum* during this experiment. The live body weight gains and feed consumption of quails were measured individually, feed conversion efficiency were calculated weekly. At the end of experimental period, 4 birds form each replicates (totally 60 birds) were slaughtered for determination of dressing percentage free from giblets and some organs were weighed separately as percentage of carcass weight.

Evaluation of some blood parameters

After 6 h of fasting, blood samples were taken from the brachial vein from four birds per replicate and stored at refrigerator at 4°C. Individual serum samples were analyzed for total cholesterol, triglyceride, albumen, globulin, copper (Cu) and zinc (Zn) by an automatic biochemical analyzer following the instructions of the corresponding reagent kits (Pars Azmoon Co., Teheran, Iran).

Data analysis

The GLM procedure of SAS software (SAS, 2001) was used for data analysis of variance as completely randomized design. The significant difference among the mean were calculated by Duncan's multiple range tests at 0.05 levels.

Results

The performance data has been shown in Table 1& 2. The results showed no significant effect among the control and treated groups expect carcass yield which increased significantly in S_2 and S_4. The result of biochemical parameters is shown in Table 3. Triglyceride decreased significantly in S_1 and S_2.

Discussion

The current study demonstrated the positive dietary effect of GLOBACID® on performance of Japanese quail. Acidification of drinking water has positive effects on the performance and health of birds (Chapman et al., 1988). Rezanezhad Dizaji et al. (2012) showed that FCR decreased significantly ($P<0.05$) in

Table 1: The effect of added experimental diets on quail's performance

Treatments	FI(g/d)	BW(g/d)	FCR	FI(g)	Pre-slaughter weigh(g)
Control	23.36	5.82	4.01	984.2	224.0
S_1	24.33	5.65	4.29	1018.5	238.1
S_2	24.07	6.12	3.92	1008.4	240.8
S_3	23.19	6.02	3.87	971.5	231.1
S_4	23.05	6.19	3.70	958.6	228.3
MSE	0.96	0.27	0.20	0.76	17.84
P Value	1.43	0.62	0.43	0.38	0.85

Table 2: The effect of used experimental diets on carcass traits percentage of quails

Treatments	Liver (%)	Gizzard (%)	Intestine (%)	Breast (%)	Drumstick (%)	Carcass yield (%)
Control	3	2.35	5.23	30.94	22.90	81.13[ab]
S_1	3.05	2.25	5.19	30.94	22.81	78.81[b]
S_2	2.32	2.51	4.64	31.51	23.23	83.23[a]
S_3	2.85	2.49	4.84	31.98	22.74	83.07[ab]
S_4	2.65	2.58	5.03	32.15	23.36	84.82[a]
MSE	0.41	0.38	0.57	1.42	1.04	2.48
P Value	0.11	0.61	0.57	0.63	0.89	0.01

Means within a column with no common letter are significantly different (P<0.05)

Table 3: The effect of added experimental diets on some blood parameters

Treatments	Triglyceride (mg/dl)	Cholesterol (mg/dl)	Albumen (mg/dl)	Globulin (mg/dl)	Cu (mg/dl)	Zn (mg/dl)
Control	163.75[a]	265.58	1.35	2.28	47.50	254.58
S_1	123.92[b]	226.77	1.30	2.20	47.83	229.83
S_2	123.67[b]	233.83	1.30	2.25	53.91	223.42
S_3	153.17[ab]	218.75	1.30	2.20	51.08	277.83
S_4	133.08[ab]	224.67	1.35	2.23	53.58	247.33
MSE	21.76	37.95	0.10	0.35	13.68	45.27
P Value	0.05	0.66	0.87	0.99	0.91	0.46

Means within a column with no common letter are significantly different (P<0.05)

synbiotics and acidified groups compared to the control. In agreement with our findings, Bonos et al. (2010) reported no effect on body weight of Japanese quail by addition of acidifiers to the diets. Henry et al. (1987) showed that the organic acids may affect the integrity of microbial cell membrane or cell macromolecules or interfere with the nutrient transport and energy metabolism causing the bactericidal effect. In agreement to our findings, Akinleye et al. (2008) indicated that feeding broilers with probiotics, organic acids and prebiotics did not result in significant weight gain. Hedayati et al. (2013) reported that acidification of gut stimulates enzyme activity and optimizes digestion and the absorption of nutrients and minerals. Improvement in live body weight, body weight gain and feed conversion ratio by organic acid supplementation has also been reported by Abdel-Fattah et al. (2008). Ogunwole et al. (2012) showed that weights of gizzard, heart, liver, kidney, abdominal fat and spleen were not significantly different when birds were supplemented with acidifier which is in agreement to our findings. Similarly, Rezanezhad Dizaji et al. (2012) reported that with use of acidifiers did not improve the weight of proventriculus, Gizzard, liver and Bursa between groups. Chimote et al. (2009) reported improvement in live body weight of quails that used acidifier compared to control groups. Sultan (2014) showed better dressing yield by using acidifiers in Japanese quails which is in agreement to our result. The differences in cholesterol, albumen and globulin concentration did not reach statistical significance but it tended to decrease in serum of broilers fed diet containing GLOBACID®. The most significant effect of the acidifier was observed on triglyceride which decreased significantly in treated groups. Hashemi et al. (2014) showed that use of acidifiers could reduce the cholesterol and triglycerides in male broilers. Brzóska et al. (2013) found no significant difference between the control and experimental chickens in glucose, total protein, triglycerides, total cholesterol and high density lipoprotein.

Conclusion

Findings of the present study indicated that using GLOBACID® in the diet of quails had beneficial effects on performance and some haematological parameters.

Acknowledgments

The authors sincerely acknowledge the technical help provided by the Dr. Yaser Rahimian.

References

Abdel Fattah, S.A., El Sanhoury, M.H., El Mednay, N.M. and AbdelAzeem, F. 2008. Thyroid activity, some blood constituents, organs morphology and performance of broiler chicks fed supplemental organic acids. *International Journal of Poultry Science,* 7: 215-222.

Afsharmanesh, M. and Pourreza J. 2005. Effects of calcium, citric acid, ascorbic acid, vitamin D on the efficacy of microbial phytase in broiler starters fed wheat-based diets: Performance, bone mineralization and ilea digestibility. *International Journal of Poultry Science,* 4: 418-424.

Akinleye, S.B., Iyayi E.A. and Afolabi K.O. 2008. The performance, haematology and carcass traits of broilers as affected by diets supplemented with or

without Biomin a natural growth promoter. *World Journal of Agriculture Science*, 4: 467-470.

Bonos, E.M., Christaki E.V. and Florou-Paneri, P.C. 2010. Effect of dietary supplementation of mannan oligosaccharides and acidifier calcium propionate on the performance and carcass quality of Japanese quail (Coturnix japonica). *International Journal of Poultry Science,* 9: 264-272.

Brzóska, F., Śliwiński, B. and Michalik-Rutkowska O. 2013. Effect of dietary acidifier on growth, mortality, post-slaughter parameters and meat composition of broiler chickens. *Annals of Animal Science*, 13: 85-96.

Chapman, D.J. 1988. Probiotics, acidifiers and yeast culture: a place for natural additives in pig and poultry production. Proc. of Alltech's Fourth Annual Symp, Nicholasville, USA.

Chimote, M.J., Barmase1 B.S., Raut A.S., Dhok A.P. and Kuralka S.V. 2009. Efficacy of feeding yeast and acidifier on performance of Japanese quails. *Veterinary World*, 2: 185-186.

Dhama, K., Tiwari, R., Khan, R.U., Chakraborty, S., Gopi, G., Karthik, K., Saminahthan, M., Desingu, P.A. and Sunakara, L.T. 2014. Growth promoters and novel feed additives improving poultry production and health, bioactive principles and beneficial applications: the trends and advances- a review. *International Journal of Pharmacology*, 10: 129-159.

Dhawale, A. 2005. Better eggshell quality with a gut acidifier. *Poultry International*, 44: 18-21.

Hashemi, S.R., Zulkifli, I., Davoodi, H., Hair, M., Bejo, and Loh, T.C. 2014. Intestinal histomorphology changes and serum biochemistry responses of broiler chickens fed herbal plant (Euphorbia hirta) and mix of acidifier. *Iranian Journal of Applied Animal Science,* 4: 95-103.

Hedayati, M., Manafi, M., Yari, M. and Vafaei, P. 2013. Effects of supplementing diets with an acidifier on performance parameters and visceral organ weights of broilers. *European Journal of Zoological Research,* 2: 49-55.

Henry, P.R., Am merman, C.B., Campbell, D.R. and Miles, R.D. 1987. Effect of antibiotics on tissue trace mineral concentration and intestinal tract weight of broiler chicks. *Poultry Science*, 66: 1014-1018.

Ghazalah, A.A., Atta, A.M., Elkoub, K., Moustafa, M.E.L. and Shata, F.H. 2011. Effect of dietary supplementation of organic acids on performance, nutrients digestibility and health of broiler chicks. *International Journal of Poultry Science,* 10: 176-184.

Gunal, M., Yayli, G., Kaya, O., Karahan, N. and Sulak, O. 2006. The effects of antibiotic growth promoter, Probiotic or organic acid supplementation on performance, intestinal microflora and tissue of broilers. *International Journal of Poultry Science,* 5: 149-155.

Isabel, B. and Santos, Y. 2009. Effects of dietary organic acids and essential oils on growth performance and carcass characteristics of broiler chickens. *Journal of Applied Poultry Research,* 18: 472-476.

Jovank, L., Markov, S., Olivera, D. and Sredanovic Slavica, S. 2008. Herbs and organic acids as an alternative for antibiotic growth promoters. *Archiva Zootechnica,* 11: 5-11.

Langhout, P. 2000. New additives for broiler chickens. Alternatives to antibiotics. Feed Mix. Special. pp: 24-27.

National Research Council, 1994. Nutrients Requirements of Poultry. 9th Rev. Edition, National Academy Press, Washington, D.C.

Ogunwole, O.A. Abu, O.A. and Adepoju, I.A. 2011. Performance and carcass characteristics of broiler finishers fed acidifier based diets. *Pakistan Journal of Nutrition,* 10: 631-636.

Pinchasov, Y. and Elmaliah, S. 1994. Broiler chick responses to anorectic agents: 1. Dietary acetic and propionic acids and the digestive system. *Pharmacology Biochemistry and Behavior,* 48: 371-376.

Patten, L.D. and Waldroup, P.W. 1988. Use of organic acids in broiler diets. *Poultry Science,* 67: 1178-1182.

Patterson J.A. and Burkholder K.M. 2003.Application of prebiotics and probiotics in poultry production. *Poultry Science,* 82: 627-631.

Rezanezhad Dizaji, B., Hejazi, S. and Zakeri, A. 2012. Effects of dietary supplementations of prebiotics, probiotics, synbiotics and acidifiers on growth performance and organs weights of broiler chicken. *European Journal of Experimental Biology,* 2: 2125-2129.

SAS Institute, SAS/STAT User's Guide for Personal Computer.2001.Release 6.12 SAS Institute, Inc., Cary, N.C., USA.

Sultan, A., Ullah I., Khan, R.U., Zahoor ul Hassan and Khan, S. 2014. Impact of chlorine dioxide as water acidifying agent on the performance, ileal microflora and intestinal histology in quails. *Archive Tiezucht*, (in press).

Veeramani, P., S.T. Selvan and Viswanathan, K. 2003. Viswanathan.2004.Effect of acidic and alkaline drinking water on body weight gain and feed efficiency in commercial broiler. *International Journal of poultry Science,* 38: 42-44.