ISSN 1682-8356
ansinet.org/ijps

INTERNATIONAL JOURNAL OF

POULTRY SCIENCE

ANSInet
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorijps@gmail.com

International Journal of Poultry Science 9 (8): 761-764, 2010
ISSN 1682-8356
© Asian Network for Scientific Information, 2010

Effect of Maxigrain Supplementation of Diets with or Without Rice Offal on the Performance of Broiler Chicks

S. Duru[1] and I.I. Dafwang[2]
[1]Department of Animal Science, [2]National Agricultural Extension and Research Liaison Service, Ahmadu Bello University, Zaria, Nigeria

Abstract: Three experiments were conducted concurrently to determine the effect of maxigrain supplementation of isocaloric diets with or without rice offal, the effect of maxigrain supplementation of diets containing rice offal at two levels of energy and the effect of maxigrain supplementation of diets in which the maize content was substituted with rice offal on a weight to weight basis. The experiments were conducted with 210 broilers from 2-5 weeks of age. Results showed that maxigrain supplementation did not have any effect on broiler performance when broilers were fed isocaloric and isonitrogenous diets with or without rice offal. Maxigrain supplementation improved the performance of broilers when added to low energy diets. The improvement in broiler performance was same at 0.1 and 0.2% maxigrain supplementation. The study confirmed earlier recommendations that rice offal can be fed at levels of up to 15% in broiler chick diets without adverse effect on growth performance and concluded that maxigrain enzyme supplementation may be beneficial only when added to diets containing lower than recommended energy and protein levels.

Key words: Poultry feed, maxigrain, rice offal, energy levels

INTRODUCTION

Rice offal is the byproduct of the one step milling process for paddy rice which produces only two products; the rice seeds ready for human use and the waste product which is made up of rice husk, rice bran, rice polishing and small quantities of broken grains. Rice offal constitutes 40% of paddy rice. In Nigeria the bulk of rice processing is handled by small scale rice milling machines which produce large quantities of rice offal which until recently were often burnt off to reduce waste pollution (Dafwang and Damang, 1996). The current production of paddy rice in Nigeria is estimated at 475.52 million Tonnes (NAERLS and NFRA, 2009), which has the potential of producing 190 million Tonnes of Rice offal. This product which is available in large quantities has hitherto been neglected for use in monogastric animal diets because of its high content of silica and fiber (Dafwang, 2006). However, Nigerian animal nutritionists have experimented widely with this product since 1987 (Oyeyiola, 1991; Tegbe, 1995; Dafwang and Damang, 1996; Oyawoye and Nelson, 1999; Maikano, 2005; Nduaka, 2005 amongst others). Their results indicate that that rice offal can be added at levels of 10-15% in broiler starter feeds, 15-22% for broiler finishers, 25% in layers' diets and 40% in growing pullet rations without adverse effect on growth or egg production performance. In spite of these findings, there have been concerns about whether ingredients used to make the rice offal containing diets isocaloric do not masked the effect of feeding such high levels of rice offal diets and the possible use of enzymes to increase the levels of use of rice offal in poultry diets. The use of enzymes to improve the digestibility of low quality feedstuffs which are often characterized by high fiber content have long been recognized (Marquardt *et al*., 1996; Danicke *et al*., 1999; Acamovic, 2001).

The purpose of these experiments was to confirm the optimum levels for rice offal inclusion in diets for finishing broilers and to evaluate the extent to which enzyme supplementation can increase the levels of use of rice offal in such diets.

MATERIALS AND METHODS

Experimental birds: Two hundred and ten (210) day-old broiler chicks were purchased from a commercial hatchery. They were reared on deep litter, in an open-sided wire mesh screened poultry house. Supplementary heat sources were supplied by using kerosene stoves, charcoal stoves and hurricane lanterns during brooding. The open-sides were screened with polyethylene sheets to conserve heat for the first one to three weeks of age. At two weeks old, the birds were allocated to seven dietary treatments in three of 10 birds each giving a total of 30 birds per treatment in a completely randomized design.

Experimental feeds: The seven dietary treatments comprised two isocaloric diets supplemented with 0.1 or 0.2% maxigrain with no rice offal, three low energy diets

Corresponding Author: I.I. Dafwang, National Agricultural Extension and Research Liaison Service, Ahmadu Bello University, Zaria, Nigeria

Table 1: Composition of regular rice offal based diets supplemented with maxigrain for 6-9 weeks old broilers

	Dietary treatments						
Ingredients	1	2	3	4	5	6	7
Maize	36.00	36.00	26.40	26.40	26.40	28.10	28.10
Maize offal	20.40	20.40	14.00	14.00	14.00	7.00	7.00
Groundnut cake	26.00	26.00	27.00	27.00	27.00	28.30	28.30
Full fat soybean	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Fish meal	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Rice offal	0.00	0.00	15.00	15.00	15.00	15.00	15.00
Limestone	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Bone meal	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Salt	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Vitamin	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Lysine	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Methionine	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Maxigrain	0.10	0.20	0.00	0.10	0.20	0.10	0.20
Palm oil	0.00	0.00	0.00	0.00	0.00	4.00	4.00
Premix*	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Calculated analysis							
Crude protein (%)	23.90	23.90	23.60	23.60	23.60	23.50	23.50
Energy (**Kcals**/kg)	2930.00	2930.00	2655.00	2655.00	2655.00	2878.00	2878.00
Calcium (%)	1.22	1.22	1.25	1.25	1.25	1.24	1.25
Available P (%)	0.65	0.65	0.66	0.66	0.66	0.65	0.65
Lysine (%)	1.26	1.26	1.25	1.25	1.25	1.25	1.25
Methionine (%)	0.92	0.92	0.90	0.90	0.90	0.90	0.90

*Biomix premix supplied the following per kg diet: vit. A, 10000 I.U; vit. D, 2000 I.I; vit. E, 25 mg; vit. K, 2 mg; Thiamine B1, 1.8 mg; Riboflavin B2, 5 mg; Pyridoxine B6, 3.5 mg; Niacin, 28 mg; vit. B12 0.015 mg; Pantothenic acid, 7.5 mg; Folic acid, 0.75 mg; Biotin, 0.06 mg; chlorine chloride, 300 mg; Manganese, 40 mg; Zinc, 30 mg; Iron, 20 mg; Copper, 3 mg; Iodine, 1 mg; Selenium, 0.2 mg; Cobalt, 0.2 mg

Table 2: Effect of maxigrain supplementation of isocaloric diets with or without rice offal performance of 2 -5 weeks old broiler chicks*

Die No.	Max. (%)	RO (%)	Initial Wt (g)	Body Wt (g)	Weight gain (g)	Feed Cons. (g)	Feed/ gain	Feed cost/ kg gain (₦)
1	0.1	0	209.7	866.7	657.0	1,779.0	2.71	148.04^{a}
2	0.2	0	209.7	840.0	633.7	1,797.7	2.84	154.95^{ab}
6	0.1	15	209.3	840.0	630.3	1,798.3	2.86	162.23^{b}
7	0.2	15	209.6	873.0	664.0	1,788.3	2.69	152.95^{ab}
SEM			0.1	6.7	6.7	7.8	0.03	1.90

*Means with different superscripts are significantly different ($p<0.05$)

in which rice offal replaced 15% maize on a weight to weight basis and were supplemented with maxigrain at 0, 0.1 and 0.2% while the last two diets contained 15% rice offal but were isocaloric with diets 1 and 2. All the diets were isonitrogenous. The composition of the diets and their calculated analysis are given in Table 1. Feed and water were given *ad libitum* but feed intake was computed weekly and the cumulative figures at 5 weeks were subjected to analysis.

Data analysis: The computed cumulative body weight, weight gain, feed consumption, feed/gain ration and feed cost/kg gain and carcass parameters were subjected to analysis of variance using the SPSS version 15 statistical package. Differences between means were assessed using the Duncan Multiple Range Test in the SPSS package.

RESULTS AND DISCUSSION

The effect of maxigrain supplementation of isocaloric diets with or without RO on the performance of broilers is given in Table 2. The results show that maxigrain supplementation had no effect on growth performance and feed efficiency. The significant differences in feed cost/kg gain between the 0.1% maxigrain supplemented RO containing diet indicates the possibility that maxigrain supplementation of isocaloric diets may increase the cost of production. However, since maxigrain supplementation at 0.2% did not increase production cost, the higher cost at 0.1% can be attributed to chance.

That the inclusion of up to 15% rice offal in isocaloric broiler starter diets had no adverse effect on broiler performance is a confirmation of earlier recommendations that broiler chicks can tolerate up to 15% inclusion in their diets (Maikano, 2005). Earlier

Table 3: Effect of maxigrain supplementation of low versus high energy rice offal containing diets on performance of 2-5 weeks old broiler chicks*

Diet No.	Energy	Max. (%)	Initial Wt (g)	Body Wt (g)	Weight gain (g)	Feed Cons. (g)	Feed/ gain	Feed cost/ kg gain (₦)
4	Low	0.1	209.3	803.3^{c}	594.0^{c}	1,802.0	3.04^{c}	148.58^{a}
5	Low	0.2	209.3	800.0^{c}	590.7^{c}	1,789.7	3.03^{c}	148.42^{a}
6	High	0.1	209.7	840.0^{b}	630.3^{b}	1,802.7	2.86^{b}	162.23^{b}
7	High	0.2	209.3	873.3^{a}	664.0^{a}	1,788.3	2.69^{a}	152.95^{a}
SEM			0.2	9.8	9.8	149.5	0.05	1.90

*Means with different superscripts are significantly different (p<0.05)

Table 4: Effect of maxigrain supplementation of low energy rice offal contaning diets on performance of 2-5 weeks old broiler chicks*

Diet No.	Max. (%)	Initial Wt(g)	Body Wt (g)	Wt gain	Feed Cons (g)	Feed/ gain	Feed cost/ kg gain
3	0.0	209.7	763.3	553.70	1854.8^{b}	3.36^{b}	161.79^{b}
4	0.1	209.3	803.3	594.00	1802.0^{a}	3.04^{a}	148.58^{a}
5	0.2	209.3	800.0	590.70	1789.7^{a}	3.03^{a}	148.42^{a}
SEM		0.3	9.0	9.10	5.9		

*Means with different superscripts are significantly different (p<0.05)

studies by Dafwang and Damang (1996) had recommended a limit of 15% in finisher feeds and 10% for broiler starters. The effect of maxigrain supplementation of low versus high energy diets is given in Table 3. The results identified the superior benefits of higher energy diets over that of the lower energy diets. Although maxigrain supplementation improved the performance of low energy diets as was shown in experiment 2, the average increase in growth performance on the low energy diets (896.3 g/bird) could not match the average performance of the two high energy diets (998.2 g/bird).

The results of the third experiment showed that maxigrain supplementation significantly improved performance when rice offal is substituted for maize on a weight to weight basis which gives rise to lower energy diets (Table 4). The results obtained confirms that the beneficial effects of maxigrain supplementation is obtainable only with the use of feeds that do not meet the recommended energy or protein levels for optimum growth. Although performance on the 0.2% maxigrain supplementation tended to be better than 0.1%, differences were not significant. This confirms the maxigrain's manufacturer's recommendation that the level of inclusion need not exceed 0.1%. The conclusion that can be drawn from these three experiments is that,

1. Broiler chicks can be fed up to 15% rice offal in diets formulated to supply optimum levels of energy and protein without adverse effect on growth performance.
2. Maxigrain enzyme supplementation improved growth performance only when used in sub-standard diets with less than recommended levels of energy. It had no effect on diets with optimum levels of energy and protein.

The confirmation that up to 15% rice offal can be included in diets for broiler chicks broilers is very significant as this will lead to significant savings in the quantities of maize which is in greater need for human food. The 15% level of rice offal inclusion was equivalent to a replacement of 25% of the maize in the control diet. This level of maize replacement can be up to 50% if cheaper sources of high energy feedstuffs are available as was demonstrated by Aduku *et al.* (1996).

REFERENCES

Acamovic, T., 2001. Commercial application of enzymes technology for poultry production. World's Poult. Sci. J., 57: 225-235.

Aduku, A.O., I. Nuhu, I.I. Dafwang and S.A. Offiong, 1996. Cottonseed Oil Sludge (CSOS) utilization and a comparative evaluation of CSOS with palm oil in broiler diets. Trop. Agric., 73: 206-210.

Dafwang, I.I. and P. Damang, 1996. Rice offal in finishing diets for broilers. J. Anim. Prod. Res., 15 and 16: 131-139.

Dafwang, I.I., 2006. Meat, milk and eggs from farm wastes: Explorations in animal nutrition research and extension. An inaugural lecture. A publication of the University organized lectures committee, Vice chancellor's office, ABU, Zaria, pp: 73.

Danicke, S., O. Simon and H. Jericho, 1999. Effect of supplementation of Xylanase on performance and nutrient digestibility. Archiv. Fur. Gert., 63: 252-259.

Maikano, A., 2005. Effects of graded levels of rice offal in broiler diets. M.Sc. Thesis, Animal Science Department, Ahmadu Bello University Zaria, Nigeria.

Marquardt, R.R., A. Brenes, Z. Zhang and D. Boras, 1996. Use of enzymes to improve nutrient availability in poultry feedstuffs. Anim. Feed Sci. Technol., 60: 321-330.

NAERLS and NFRA, 2009. Agricultural Performance Survey Report of Nigeria; 2009 wet season. NAERLS, ABU, Z aria and NFRA, Abuja.

Nduaka, K.U., 2005. Effects of replacing maize offal with rice offal with enzyme supplementation on broiler performance. M.Sc. Thesis submitted to Animal Science Department, Ahmadu Bello University Zaria, Nigeria.

Oyawoye, E.O. and F.S. Nelson, 1999. Utilization of rice offal by laying hens. Proc. of 4th Ann. Conf. of Animal Science Association of Nigeria held at UTA Conf. Centre, Oyo Road, Ibadan, September 14-16.

Oyeyiola, L.B., 1991. Utilization of rice offal by-egg type chickens. M.Sc. Thesis, Anim. Sci. Dept. Ahmadu Bello Univ. Zaria, Nigeria.