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# Effect of Feeding Hydrogen Peroxide Treated Defatted Rice Polishing on Performance of Broiler Chicks

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**Abstract:** The project was carried out to elucidate the effect of defatted rice polishing after treatment with $H_2O_2$ on the performance of broiler chicks. Six starter and six finisher experimental rations were prepared designated as A, B, C, D, E and F. The rations A, B and C containing 15, 20 and 25% defatted rice polishing (DFRP) were treated with $H_2O_2$, while D, E and F were not treated (control) containing similar levels of DFRP. These rations were provided to 240 day-old broilers divided into six groups. Non significant differences were observed in weight gain, feed consumption, feed efficiency and dressing percentage of birds fed various experimental rations. Inclusion of DFRP up to 25% levels had not adverse effect, but proved uneconomical due to addition of extra oil to compensate energy.

**Key Words:** Defatted rice polishing, feed consumption, feed conversion ratio

## Introduction

Defatted rice polishing (DFRP), a by-product of rice milling, is being used as a feed ingredient in Pakistan. Its potential as energy source cannot be exploited due to presence of certain anti-nutritional factors like, trypsin inhibitors, crude fibre and heme agglutinin. These anti-nutritional factors can be removed by different processes such as cooking or treating with weak acid or alkali (Majeed, 1997). The deoiled rice polishing treated with hydrogen peroxide and HCl improved the feed efficiency of the birds (Saeed, 1998). As very limited work has been carried out regarding effect of hydrogen peroxide treatment of defatted rice polishing, therefore, this project has been planned to study its effect on the performance of broiler chicks.

## Materials and Methods

**Experimental Birds:** Two hundred and forty day-old Hubbard broiler chicks were randomly divided into 6 experimental units with 4 replicates of 10 birds each. The birds were reared under standard managemental conditions in the Experimental Room of Department of Animal Nutrition, University of Veterinary and Animal Sciences, Lahore.

**Hydrogen Peroxide Treatment:** Defatted rice polishing purchased from local market, were treated with 6% $H_2O_2$ at the rate of 31.25 kg DFPR/50 L of $H_2O_2$.

**Preparation of Experimental Rations:** Six isocaloric and isonitrogenous broiler starter and broiler finisher experimental rations were prepared (Table 1 and 2). The rations A, B and C contained 15, 20 and 25% $H_2O_2$ treated defatted rice polishing, while rations D, E and F contained same levels of untreated defatted rice polishing. The average weight gain, feed consumption, feed conversion ratio (FCR), carcass percentage and economical grade were determined. The data was statistically analyzed using one-way analysis of variance (Steel & Torrie, 1982).

## Results and Discussions

The average weight gain, average feed consumption, FCR of experimental broilers during three stages of growth are presented in Table 3, 4 and 5 respectively. The birds received ration B showed superior performance in terms of average weight gain (2011 ± 62.6 g). However, non-significant difference was observed in weight gain in all

Table:1 Composition of and chemical starter ration

| Ingredients, % | Ration A 15%$H_2O_2$ DFRP | Ration B 25%$H_2O_2$ DFRP | Ration C 25%$H_2O_2$ DFRP | Ration D DFRP | Ration E DFRP | Ration F DFRP |
|---|---|---|---|---|---|---|
| Corn | 27.19 | 21.68 | 16.64 | 27.19 | 21.68 | 16.64 |
| DFRP | 15.00 | 20.00 | 25.00 | 15.00 | 20.00 | 25.00 |
| Rapeseed meal | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Rice Tips | 22.94 | 23.5 | 24.06 | 22.94 | 23.5 | 24.06 |
| Corn gluten 30% | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Soybean meal | 11.83 | 11.15 | 8.97 | 11.83 | 11.15 | 8.97 |
| Fish meal | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| DCP | 1.76 | 1.78 | 1.78 | 1.76 | 1.78 | 1.78 |
| Soybean oil | 1.79 | 3.40 | 5.00 | 1.79 | 3.40 | 5.00 |
| Molasses | 3.00 | 2.00 | - | 3.00 | 2.00 | - |
| Lysine | 0.0037 | 0.0037 | 0.0037 | 0.0037 | 0.0037 | 0.0037 |
| Methionine | 0.0012 | 0.0012 | 0.0011 | 0.0012 | 0.0012 | 0.0011 |
| Premix | 1.0 | 1.0 | 1.00 | 1.0 | 1.0 | 1.00 |
| M.E. | 2800 | 2800 | 2800 | 2800 | 2800 | 2800 |
| C.P. | 20 | 20 | 20 | 20 | 20 | 20 |

Table: 2 Composition of and chemical finisher ration

| Ingredients, % | Ration A 15%$H_2O_2$ DFRP | Ration B 25%$H_2O_2$ DFRP | Ration C 25%$H_2O_2$ DFRP | Ration D DFRP | Ration E DFRP | Ration F DFRP |
|---|---|---|---|---|---|---|
| DFRP | 15.00 | 20.00 | 25 | 15.00 | 20.00 | 25 |
| Rapeseed meal | 4.00 | 4.00 | 0.0054 | 4.00 | 4.00 | 0.0054 |
| Rice Tips | 52.13 | 47.16 | 45.04 | 52.13 | 47.16 | 45.04 |
| Corn gluten 30% | 3.00 | 3.00 | 5.00 | 3.00 | 3.00 | 5.00 |
| Soybean meal | 12.84 | 12.12 | 10.85 | 12.84 | 12.12 | 10.85 |
| Fish meal | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| DCP | 1.90 | 1.89 | 1.95 | 1.90 | 1.89 | 1.95 |
| Soybean oil | 2.56 | 4.26 | 5.00 | 2.56 | 4.26 | 5.00 |
| Molasses | 2.00 | 1.00 | - | 2.00 | 1.00 | - |
| Lysine | 0.0043 | 0.0043 | 0.0043 | 0.0043 | 0.0043 | 0.0043 |
| Methionine | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 |
| Premix | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| M.E. | 2800 | 2800 | 2800 | 2800 | 2800 | 2800 |
| C.P. | 19 | 19 | 19 | 19 | 19 | 19 |

Table 3: Average weight gain (gm) per bird during different phases of growth

| Rations | Mean ± Standard Error | | |
|---|---|---|---|
| | Starter Phase (0-4 weeks) | Finisher Phase (5-6 weeks) | Starter-cum-Finisher Phase (0-6 weeks) |
| A | 970.3 ± 23.7 | 1028.0 ± 59.7 | 1998.3 ± 59.0 |
| B | 916.0 ± 33.2 | 1095.0 ± 48.5 | 2011.0 ± 62.6 |
| C | 938.3 ± 8.9 | 1053.5 ± 19.4 | 1991.8 ± 16.4 |
| D | 950.5 ± 28.9 | 998.5 ± 81.5 | 1996.3 ± 40.9 |
| E | 917.3 ± 25.2 | 997.5 ± 54.2 | 1914.8 ± 42.8 |
| F | 884.8 ± 39.2 | 1043.5 ± 27.3 | 1928.3 ± 55.1 |

the birds during experimental period. The results of present project are in line with findings of Jeshwani *et al.* (1996); Sayre *et al.* (1988) who reported that defatted rice bran had no effect on weight gain. Masood *et al.* (1995) also concluded non-significant difference in body weight gain by feeding deoiled rice bran. On contrary, Saeed (1998); Saleemi (2000) reported improved growth response in broilers fed treated defatted rice polishing. These differences might be due to inclusion level of defatted rice polishing and the variety of bran,

Table 4: Average feed consumption (gm) per bird during different phases of growth

| Rations | Mean ± Standard Error | | |
|---|---|---|---|
| | Starter Phase (0-4 weeks) | Finisher Phase (5-6 weeks) | Starter-cum-Finisher Phase (0-6 weeks) |
| A | 1789.0 ± 44.3 | 2167.3 ± 60.6 | 3956.3 ± 68.6 |
| B | 1808.5 ± 10.6 | 2239.5 ± 61.0 | 4048.0 ± 64.6 |
| C | 1824.5 ± 21.9 | 2249.0 ± 14.5 | 4073.1 ± 31.1 |
| D | 1757.5 ± 42.1 | 2174.8 ± 36.8 | 4036.7 ± 116.2 |
| E | 1829.5 ± 55.9 | 2243.5 ± 46.6 | 4128.5 ± 131.3 |
| F | 1868.5 ± 17.1 | 2200.0 ± 63.6 | 4069.2 ± 64.3 |

Table 5: Feed conversion ratio per bird during different phases of growth

| Rations | Mean ± Standard Error | | |
|---|---|---|---|
| | Starter Phase (0-4 weeks) | Finisher Phase (5-6 weeks) | Starter-cum-Finisher Phase (0-6 weeks) |
| A | 1.84 ± 0.032 | 2.11 ± 0.075 | 1.97 ± 0.032 |
| B | 1.97 ± 0.069 | 2.04 ± 0.070 | 2.01 ± 0.039 |
| C | 1.94 ± 0.038 | 2.13 ± 0.026 | 2.04 ± 0.017 |
| D | 1.95 ± 0.070 | 2.08 ± 0.11 | 2.02 ± 0.87 |
| E | 1.99 ± 0.017 | 2.19 ± 0.074 | 2.15 ± 0.081 |
| F | 2.11 ± 0.089 | 2.11 ± 0.11 | 2.11 ± 0.080 |

Table 6: Dressing percentage of bird fed different experimental rations

| Rations | Average live weight (gm) | Average dressed weight (gm) | Dressing percentage |
|---|---|---|---|
| A | 2090 | 1350 | 64.5 |
| B | 2047.5 | 1300 | 63.4 |
| C | 2137.5 | 1326.25 | 62.04 |
| D | 2260 | 1446.25 | 64 |
| E | 2042.5 | 1297.5 | 63.5 |
| F | 2042.5 | 1290.3 | 63.1 |

and concentration of $H_2O_2$ used for treatment. Apparently higher feed was consumed by birds fed ration E (Table 4). However, non-significant difference was observed among various treatment groups during experimental period.

The best feed efficiency was noted in birds fed experimental ration A (Table 5). However, the difference was non-significant among the groups in birds fed different rations. These results are in accordance with the findings of Purushothaman *et al*. (1989); Tiemoko (1992); Jeshwani (1996) who observed non-significant differences in feed consumption and feed efficiency of birds fed treated defatted rice polishing. The contra dictionary results were also obtained by Majeed (1997); Ahmad (1991); Takemasa and Hijikuro (1991) who observed higher feed consumption and better feed efficiency. These difference might be due to variety of rice polishing used, its level and concentration of $H_2O_2$ used for treatment. It is also speculated that treatment of DFRP with higher concentration of $H_2O_2$ might produce better results.

The dressing percentage also followed the same trend and higher percentage was noted in birds feed ration A (Table 6). A non-significant difference was revealed among different treatment groups when data was subjected to statistical analysis. The present results are also supported by Purushothaman *et al*. (1989). The ration A was found to be economical in terms of cost per kg live weight, thus supporting the results of Tiemoko (1992) who reported reduced feed cost per kg weight by using rice polishing.

It was concluded that rice polishing can safely be used up to 25% level without any treatment, and had no adverse effect on performance.

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