

# The effect of natural zeolite and bakery waste on performance and serum parameters of broiler chickens

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**Introduction** Use of bakery waste in animal nutrition is a way to reduce feed cost and environmental pollution. Large quantities of bakery waste are produced in Iran. It is possible to replace wheat with bakery waste in poultry rations. Bakery waste has a considerable moisture and carbohydrate and might be polluted with mold and mycotoxins. The presence of mycotoxins in ration may lead to increase mortality and decrease performance of broiler chickens. To reduce the possible adverse effects of mycotoxin, zeolite (clinoptilolite) has used in poultry diets successfully (Oguz and Kurtoglu 2000). It acts as an adsorbent and reduces bioavailability of mycotoxin in gastrointestinal tract. The objective of this experiment was to use bakery wastes in broiler chicken rations and to study its effect on performance and role of zeolite in decreasing possible adverse effects of bakery wastes.

**Materials and methods.** 360,1-d-old, Ross male broiler chickens were randomly assigned to a completely randomized design experiment with 3×3 factorial arrangements with 4 replicates, 3 levels of bakery wastes (0, 10, 20%) at the expense of wheat and 3 levels of natural zeolite (0, 1, 2%) were used to evaluate the individual and combined effects of these factors. Isocaloric and isonitrogenous diets were formulated based on NRC 1994. The birds had 24-h access to feed, water and light. Bakery waste samples were analyzed for crude protein (CP), ether extract (EE), crude fiber (CF), nitrogen free extract (NFE), ash and sodium. Metabolizable energy was calculated from this equation:  $ME_n = 34.49CP + 76.1EE + 37.67NFE$  (NRC 1994). Performance data were recorded weekly. At 21, 42 and 49 d of the experiment one bird in each replicate was killed and its relative organ weights were measured. At 21 and 42 d, simultaneous with slaughter, blood sample from one bird in each replicate was collected and its serum was separated. Serum total protein, alanine aminotransferase, aspartate aminotransferase and lactate dehydrogenase activity were measured. Data were analyzed by using the GLM procedure of SAS (1996).

**Results** Mean feed intake and body weight (BW) gain data for the experiment are given in Tables 1 and 2, respectively. BW gains were significantly decreased when 20% bakery waste was added to the diet during 0-49 period ( $P < 0.05$ ). Zeolite didn't significantly change BW gain. The addition of 2% zeolite reduced feed intake in starter period ( $P < 0.05$ ). In spite of the reduction of feed intake, BW gain was not affected by 2% zeolite. 20% bakery waste decreased feed intake during finisher period ( $P < 0.05$ ). Addition of bakery waste or zeolite didn't alter feed conversion ratio. Zeolite didn't change any relative organ weights. Mortality was not affected by any dietary treatments. Bakery waste significantly increased relative bursa of fabricius weights ( $P < 0.05$ ). Addition of bakery waste didn't change serum total protein and serum lactate dehydrogenase, alanine aminotransferase and aspartate aminotransferase activity. There was no interaction between zeolite and bakery waste in all traits.

**Table 1** Mean bird feed intake in the experiment (g)

Day Factor	0-21	21-42	42-49	0-49
%Zeolite				
0	800.5 <sup>a</sup>	2597.1	1295.8	4693.4
1	821.6 <sup>a</sup>	2661.7	1372.6	4856.0
2	780.0 <sup>b</sup>	2607.3	1349.6	4736.9
P value	0.035	0.678	0.158	0.326
± SEM	10.657	55.270	28.018	77.780
%Bakery waste				
0	795.7	2599.2	1394.8 <sup>a</sup>	4789.6
10	793.2	2666.8	1342.7 <sup>a</sup>	4802.8
20	813.2	2600.1	1280.6 <sup>b</sup>	4693.9
P value	0.365	0.616	0.027	0.565
± SEM	10.657	55.270	28.018	77.78

**Table 2** Mean bird BW gain in the experiment (g)

Day Factor	0-21	21-42	42-49	0-49
%Zeolite				
0	445.0	1197.7	498.7	2141.4
1	447.3	1182.0	492.7	2122.0
2	438.7	1175.0	533.7	2147.4
P value	0.685	0.709	0.443	0.880
± SEM	7.204	19.760	24.182	37.039
%Bakery waste				
0	446.7	1214.5	539.6	2200.8 <sup>a</sup>
10	436.2	1184.2	501.8	2122.2 <sup>a</sup>
20	448.1	1156.0	483.6	2087.8 <sup>b</sup>
P value	0.453	0.132	0.266	0.106
± SEM	7.204	19.760	24.182	37.039

**Conclusions** According to the data replacement of 20% bakery waste reduced BW gain but inclusion of 10% didn't have any undesirable effect. The findings of this research suggest that 10% wheat can be replaced with bakery waste in the broiler chicken rations without any adverse effect on performance under the condition of this experiment.

## References

National Research Council, 1994. *Nutrients Requirements of Poultry*. National Academy Press, Washington, DC.  
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