Australian Journal of Basic and Applied Sciences, 5(7): 45-48, 2011
ISSN 1991-8178

# Effect of Feeding Broiler Chicks on Graded Levels of Soaked Prosopis Seeds

Ausol, Zein Elabdin and Mukhtar, A.hmed Mukhtar

Department of Animal Production-College of Agricultural Studies, Sudan University of Science and Technology

**Abstract:** Eighty four 7days old (Ross 308) broiler chicks were used to study the effect of addition of soaked Prosopis seed on the performance and carcass characteristics. Four experimental diets containing 0, 25%, 50% and 75%soaked Prosopis seed (SPS), replacing sesame cake and sorghum partially. The experimental was in a completely randomized design (CRD) with four treatments, each replicated three times with 7 chicks per each. Parameters evaluated were average body weight, average body weight gain, average feed intake, average feed conversing ratio (FCR), carcass characteristics as well as apparent nutrient digestibility. Results obtained showed that chicks fed on diets contained (25, 50%of SPS) consumed more feed flowed by those on (25% SPS) and group (75%) consumed the lowest feed. Where feed intake during the period of experimental was significantly ($P<0.05$) increase with the increasing of SPS up to 50% induction in diets. For live body weight gains chicks in group B (25%SPS) recorded significant ($P<0.05$) heaviest value in both parameters compared to other groups. For feed conversion ratio (FCR), also chicks in group B (25%SPS) recorded the best value compared to other groups. The economical study showed that SPS could be included in broiler diets up to 50% without characteristics ($P<0.05$) effects due to the level of inclusion of SPS in broiler diets. It was evident from the economical study that SPS could be included up to 50% in broiler diets without any adverse.

**Key words:** Prosopis seed, carcass characteristics, apparent nutrient digestibility.

## INTRODUCTION

Feed is the major item of cost in poultry production mainly in Sudan due to competition between human and livestock in feedstuffs or scarce in production and the rapid production growth in poultry industry (Mukhtar, 2007). Hence, the recent research trend has directed to identify and evaluate the underutilized legume seeds as alternative protein source for livestock animals (Janardhanan *et al*., 2003).Mesquite (Prosopis juliflora), which is widely distributed in Sudan, is among underutilized pulses.

Mesquite seed contained high level of protein, starch. Desirable amino acids, fatty acid and mineral composition with good nutritional properties (Annonga *et al*., 2004). However, the disadvantage of mesquite is its high content of anti-nutritive factors such as tannins, haemagglutinins, prosopine and toxic amino acids which are capable of inducing adverse effect on simple stomached animals when consumed without adequate processing (Cheeke and Shull, 1985).Fortunately, by soaking or heating, the anti-nutritional properties are avoided. Scientific data on direct or processed use of prosopis seeds and its nutritive value is lacking.

The objective of this research is to evaluate the effect of using soaked prosopis seeds as alternative plant protein source replacing sesame cake on the performance and carcass characteristics of broiler chicks.

## MATERIAL AND METHODS

The experiment was carried out at the department of Animal Production, College of Agriculture Studies, Sudan University of Science and Technology, from 78th April and ending on 12th May 2010, in an ambient temperature ranging between 25-35c.

Pods of Mesquite (Prosopis juliflora) were harvested from many parts of Khartoum State, sun-dried, cleaned and broken in an electric mill. The seeds were separated manually, and then soaked in tab water for 24 hours, then again sun-dried to less than 10% moisture content. The seeds were ground through a modified feed mill to fine particles and used for the experimental diets.

A sample of the ground seed was subjected to proximate analysis according to AOAC (1990).

**Corresponding Author:** Ausol, Zein Elabdin, Department of Animal Production-College of Agricultural Studies, Sudan University of Science and Technology

***Experimental Birds:***

Eighty four, 7-days old unsexed (308 Ross) broiler chicks, were selected after week of adaptation period. Chicks were divided into 4 groups of 21 chicks each and randomly a singed to the 4 treatment groups in incompletely randomized design. Each group was further subdivided into 3 replicates of 7 chicks' per each in away of equal weight. Feed and water were provided freely. All recommended vaccines and prevention medication were administered accordingly.

***Experimental Diets:***

Based on the results of the proximate analysis of the Prosopis seeds flour (PSF) 4 diets were formulated containing (PSF) replacing sesame meal as plant protein source at 0,25,50and 75%. The composition and the calculated analysis of experimental diets were shown in Table (1). The variations in energy concentration were adjusted with the aid of vegetable oil where was required.

***Parameters:***

Live body weight and feed intake were recorded weekly. Feed conversion ratio (FCR) and body weight gain (BWG) were calculated weekly and the mortality was recorded daily.

***Carcass Preparation:***

At the end of the experiment 3 birds, that their weights close to group average, were selected from each group, weighed individually after an overnight fasting except from water then slaughtered. Juglor blood samples, from each bird were collected into clean dry bottles. Clotted serum was separated for chemical analysis. Chicks were scaled and eviscerated chilled at 4c for 24 hours, for carcass characteristics and meat yield. Hot carcass, heart, gizzard, abdominal fat and liver were weighed. The carcasses were sawed into tow halves, and then divided into the commercial cuts (breast, drumstick and thigh). Each cut was weighed individually, then deboned top determine the weight of meat and bone of each cut. The meat was frozen for chemical analysis and panel taste.

**Table 1:** Percent inclusion rate (by weight) of dietary ingredients used in the experiment

| Treatments Ingredients | Control | 25%SPS | 0%SPS | 75%SPS |
|---|---|---|---|---|
| Dura | 65.75 | 62.5 | 58.0 | 56.0 |
| Groundnut cake | 13.0 | 15.0 | 19.32 | 21.7 |
| Sesame cake | 15.0 | 11.75 | 7.5 | 3.75 |
| Supper conc.* | 5.0 | 5.0 | 7.5 | 11.75 |
| SPS | - | 3.75 | 0.375 | 0.36 |
| Salt | 0.25 | 0.25 | 0.25 | 0.25 |
| Oyster shell | 1.0 | 0.6 | 0.6 | 0.63 |
| DL-Meth. 98% | - | 0.06 | .07 | 0.09 |
| L- Lysine99% | - | 0.49 | 0.23 | 0.05 |
| vitamins | 0.2 | 0.2 | 0.2 | 0.2 |
| Vegetable oil | - | 0.9 | 1.33 | 1.13 |
| Total | 100 | 100 | 100 | 100 |
| | Calculated and chemical composition (%) of diets used | | | |
| ME kcal/kg | 3133.11 | 3139.56 | 3130 | 3104.7 |
| Crude protein% | 22.0 | 22.0 | 22.0 | 22.0 |
| Crude fiber | 4.12 | 4.2 | 4.45 | 4.67 |
| Ash | 4.7 | 4.7 | 4.38 | 4.21 |
| Ether extract | 4.58 | 4.49 | 4.42 | 4.36 |
| Methionine | 0.5 | 0.5 | 0.5 | 0.5 |
| Lysine | 1.15 | 1.85 | 1.85 | 1.86 |
| calcium | 1.18 | 1.0 | 1.0 | 1.0 |
| phosphorus | 0.65 | 0.63 | 0.63 | 0.63 |

*Supper concentrate (LNB): CP 40%..: "ME 2000kcal/kg, Ca=8- Lysine=12% -Methionine=3% -Phos. total=8%Vit 12500iu -VitD3 2500iu- Vit E 25mg/kg- Vit C 4000 mg/kg- VitB1 20 mg/kg- VitB2 100 mg/kg- - VitB12 300 mcg/kg -Vit .k3 60 mg/kg -Iron 800 mg/kg-Folic acid 30 mg/kg- Choline 10000 mcg/kg- VitB640 mg/kg -Biotine Mcg/kg

**Ca =21%

***Panel Taste:***

Frozen meat was slightly seasoned, wrapped individually in aluminum foil and roasted at 190c for 70 minutes with average internal temperature of 88c and served warm. Ten well trained taste panels were used to score colour, flavour, tenderness and juiciness of meat (Cross *et al.*1978).Samples were served warm to each judge.

***Statistical Analysis:***

The data obtained were subjected to analysis of variance, and the comparison of means was determined by using Duncan's multiple range tests (Duncan's 1955).

## RESULTS AND DISCUSSION

The performance of broiler chicks fed on soaked prosopis seed (Table2) showed that feed intake was increased significantly (P<0.05) with the increase of SPS in the diet till 50%, this may be due to increase level of fiber, which meant that the chicks had to eat more to meet their requirements for energy, protein and other dietary components. This result in agreement with that of Savory and Gentle (1976); Abdel Samie *et al*.(1983) and with the results of Annonyu and Ter Meulen(2001) on pullet fed processed and raw prosopis seeds, and Yusuf *et al*.(2008) on broiler chicks fed decorticated fermented prosopis seed meal.

Chicks fed on diet contained 25% SPS recorded significantly (P<0.05) high live body weight, weight gain and the best value in feed conversion ratio compared to other groups. These results in line with the findings of Abeke *et al*.(2007) who found that processing(cooking)had significant improvement on performance . The increase in the performance of chicks might be due to processing reduce the anti-nutritional factor of seeds (Wu and Inglett,1974).The better FCR might be due to sooking,which has been reported to improve nutrient digestibility as well as anti-nutrients and toxins (Hamad and Field,1978).

For body components, percentages of commercial cuts and percentages of tissues content of selected cuts, results showed no significant(P>0.05) differences, with slight numerical increase in these parameters with the increase in the SPS in the diets(Table3).The same trend was showed for the total lean chemical composition. The average subjective meat quality scores also did not showed significant (P>0.05) difference among tested groups (Table 4). Blood serum of chicks fed on diet contained50%SPS recorded high values in white blood cells (WBC) content, total protein (TP) and uric acid compared to the other tested groups (Table5).

The estimates of apparent nutrient utilization are shown in (Table5).It revealed that the inclusion of SPS in broiler diets significantly (P<0.05) affected dry matter, crude protein, ether extract, ash and nitrogen free extract (NFE) digestibility by the chicks.

Based on the results obtained, it could be concluded that the soaked Prosopis seed flour can replace sesame meal up to 50% in broiler diets without any serious effect on the performance of the chicks.

**Table 2:** Average performance of chicks fed on diets containing soaked Prosopis seeds.

| Treatment Item | 0% SPS (A) | 25%SPS (B) | 50% SPS (C) | 75% SPS (D) | SE |
|---|---|---|---|---|---|
| Initial weight g/bird | 196.43 | 194.05 | 192.38 | 193.1 | 2.6 |
| Final body weight g/bird | 1980.24a | 2428.49 b | 2207.74 c | 1584.41 | 54.8 |
| Feed intake g/bird | 3098.81 a | 2995.25 a c | 3654.09 b | 2831.51 a c | 102.58 |
| Body weight gain g/bird | 1760.48 a b | 2234.52 a | 2015.36 a | 1498.64 a | 87.68 |
| Feed conversion ratio | 1.77 a | 1.34b | 1.81 a | 1.91 a | 0.07 |
| Mortality % | 0.0 | 1.19 | 1.2 | 1.19 | - |

**Table 3:** Effect of feeding broiler chicks on diets containing soaked Prosopis seeds on the hot Carcass weights, yield of commercial cuts percentages and non- carcass components

| Treatment Item | 0% SPS | 25%SPS | 50% SPS | 75% SPS |
|---|---|---|---|---|
| Hot eviscerated carcass wt. Kg/bird | 1.930 | 2.040 | 1.800 | 1.560 |
| Breast * | 25.1 | 25.3 | 25.5 | 24.0 |
| Drumstick * | 7.3 | 6.7 | 6.9 | 6.4 |
| Thigh * | 5.1 | 6.0 | 5.2 | 4.7 |
| Heart** | 0.57 | 0.56 | 0.6+6 | 0.71 |
| Gizzard** | 1.97 | 1.4 | 1.64 | 2.06 |
| Liver** | 2.04 | 1.83 | 2.03 | 2.34 |
| Abdominal fat** | 17.02 | 20.26 | 14.13 | 25.47 |

*as (%) of hot carcass

** as (%) of final body weight

**Table 4:** Effect of feeding broiler chicks on diets containing soaked Prosopis seeds on Chemical composition and physical characteristics of meat

| Treatment Item | 0% SPS | 25%SPS | 50% SPS | 75% SPS |
|---|---|---|---|---|
| Dry matter | 37.25 | 35.7 | 33.5 | 33.15 |
| Moisture | 62.75 | 64.8 | 66.5 | 66.85 |
| Ash | 1.1 | 1.2 | 1.3 | 1.35 |
| Crude protein | 16.7 | 17.2 | 17.6 | 17.8 |

**Table 4:** Continue

| | | | | |
|---|---|---|---|---|
| Ether extract | 2.75 | 2.85 | 2.95 | 3.05 |
| NFE | 42.2 | 43.1 | 44.7 | 44.65 |
| Tenderness | 5.5 | 6.5 | 5.4 | 6.4 |
| Flavour | 6.02 | 6.8 | 6.1 | 6.3 |
| Colour | 6.0 | 6.8 | 6.7 | 6.7 |
| Juiciness | 6.0 | 7.1 | 6.5 | 6.3 |

**Table 5:** Effect of feeding broiler chicks fed on Soaked Prosopis seeds plasma Constituents and Fecal chemical composition.

| | | | | |
|---|---|---|---|---|
| Hemoglobin | 11.6 | 10.3 | 11.1 | 9.4 |
| WBC | 66.7 | 66.0 | 70.0 | 62.3 |
| Total protein g/dI | 3.5 | 3.5 | 4.8 | 3.5 |
| Uric acid g/dI | 1.6 | 0.8 | 1.6 | 0.8 |
| Dry matter | 94.3 | 95.3 | 94.8 | 94.9 |
| Crude protein | 6.3 | 6.1 | 5.4 | 5.1 |
| Ash | 14.8 | 11.6 | 12.1 | 12.4 |
| Ether extract | 2.8 | 2.4 | 2.3 | 2.4 |
| Crude crude | 13.8 | 12.7 | 12.1 | 12.1 |
| NFE | 37.7 | 32.7 | 31.8 | 33.0 |

## REFERENCES

Abdelsamie, R.E., N.P. Ranaweeraand W.E. Nano, 1983. The influence of fiber content and physical texture on the performance of broiler in tropics.Br.poult.Sci., 24: 383-390.

Abeke, F.O., A.A.S. Olddel, I.I. ekoni, I.A. Dwfwang, O.O. Adeyinka and A. Abeke., 2007. Effect of duration of cooking of lablab purpureuss Beans on the performance organ weights and hematological parameters of Shika .Brown pullet chicks. Journal of Biological Science, 7(3): 562-565.

Annongu, A.A. and U. Ter Meulen, 2001. Chemical and nutritional evaluation of dietary processed and unprocessed Prosopis Africana seed meal with pullet chicks Arch qefiugelk, 65: 28-32.

Annongu, A.A., J.K. Joseph and F. Liebert, 2004. Effect of anaerobic fermentation and Lyle treated Prosopis Africana seed meal on the nutritional and hematological responses of Harco chicks. Raw Material Res., 1: 33-41.

A.O.A.C. 5. Association of Official Analytical Chemist. 1990. Official methods of analysis (vol.2, 5th ed.)Virginal. Associations on asonoran Desert bajada: geographical correlates and evolutionary source pods. Vegetation., 74: 107-112.

Cheeke, P.R. and R. Shull, 1985. Natural toxicants in feeds and poisonous plant.Avi.CO Inc.Westport Connecticut, pp: 332-351.

Cross, H.R., R. Moen and M.S. Slafield, 1978.Training and testing of judges for sensory evaluation of meat quality. Food Technology, 32: 48-52.

Duncan, D.B., 1955. Multiple range and multiple F-tests. Biometrics. 11:1-42.

Hamad, K. and R.A. Fields, 1978. Effects of fermentation on soluble protein. An. Meal Sci.Assoc., pp: 4-16.

Janardhanan K., V. Vadivel and M. Pagalenthi, 2003. Biodiversity in Indian under- exploited/ tribal pulses. In: Improvement strategies for Leguminosae Biotechnology (editors: PK .Jaiwal and RP Singh), pp: 353-405.

Mukhtar, A.M., 2007. The effect of feeding Rosella (Hibiscus sabdarifa) seed on broiler performance. Research of Animal Veterinary Sciences. 2:12-23.

Savory, C.J. and M.J. Gentle, 1976. Changes in feed intake regulation in poultry.

Wu, W. and K. Inglett, 1974. Nutritionally available niacin in corn. Isolation and biological activity. J.Agric. Feed Chem., 6: 100-104.

Yusif, N.D., D. Ogah, M. D.I. Hassan, M.M.Musa and U.D. Doma, 2008. Effect of decorticated fermented Prosopis seed meal(Prosopis Africana) on growth performance of broiler chicken.Inter. J.of Poult.Sci., 7(11): 1054-1057.