

## **Effect of using high levels of soybean meal on performance and carcass characteristics of broiler chicks.**

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### **Abstract**

An experiment was conducted to study the effect of using high levels of soybean meal in broiler starter diets on growth performance and carcass characteristics at 7 weeks of age. A number of 72 day-old broiler chicks were individually allocated among four treatment groups. The different experimental starter diets (from 1-21 days of age) were formulated to be iso-nutritive and contained 23% crude protein and 3100 kcal ME/Kg feed. The inclusion rates of soybean meal were 30, 35, 40 or 45%. All treatment groups were fed the same grower and finisher diets.

At the end of the starter period (21 days of age), weight gain, feed intake, feed conversion and performance index values of chicks fed diets containing different levels of soybean meal were approximately similar. At the end of growing period (37 days of age) and the end of experiment (49 days of age), the values of performance parameters and carcass characteristics of birds fed the different treatments had no significant differences.

### **Introduction**

Raw soybean can not be used successfully in poultry feed or human food, because it contains many antinutritional factors. Fortunately, the heat treatment employed during processing is usually adequate to destroy trypsin inhibitor and other toxins such as lectins. Trypsin inhibitor and lectins are the major antinutrients in raw soybeans due to their high concentration and the severity of the growth-depressing effects they cause in animals (Linear, 1994). A high quality (highly digestible) SBM requires low residual activities of trypsin inhibitor and urease. Although the desolventizing-toasting process reduces antinutrients in raw beans to low levels, processed meals still contain residual antinutritional factors levels (Maenz *et al.*, 1999). The SBM may be included at levels of 25 to 50% in poultry diets (Fasina *et al.*, 2004). They mentioned that at such high dietary inclusion levels, the antinutritional content of the diet could be enough to cause antinutrients effects. Although the traditional corn – soybean meal broiler starter diets are considered highly digestible, they may contain a variety of complex proteins that may not be easily digested by the young chick due to the lack of the necessary intake enzymes at early stage of life (Uni *et al.*, 1999). Thus, the objective of this study was to evaluate effect of the including high levels of SBM in broiler diets during the starter period (0 – 21 days of age) on growth performance and carcass characteristics at 7 weeks of age.

### **Materials And Methods**

A number of 72 unsexed one-day old broiler chicks (Arbor Acres) were randomly distributed into four equal treatments each of 18 birds representing the four respective experimental diets. Chicks were brooded and reared individually in separate wire cages in an open system house under similar hygienic and environmental conditions and vaccinated against common disease.

During the experimental period, which lasted from 1 day old to 49 days of age, chicks were fed the experimental starter diets up to 21 days of age, then switched to a grower diet containing 20% CP and 3200 Kcal ME/Kg from 22 to 37 days of age. A finisher diet containing 18.5 CP and 3200 Kcal ME/Kg feed was fed to all the birds during the finishing period (38 – 49 days of age). Four experimental starter diets were formulated in which the first one (T<sub>1</sub>) was corn soybean meal diet containing 30% SBM and served as a control. In the

other starter diets, the levels of SBM were 35, 40 or 45% for T<sub>2</sub>, T<sub>3</sub> or T<sub>4</sub>, respectively. All starter diets were adjusted to be iso-nitrogenous of about 23% CP and iso-caloric of about 3100 Kcal ME/Kg feed. At the end of the experimental period six random samples of experimental birds were taken from each treatment and slaughtered to determine the carcass characteristics.

## Results And Discussion

Determination of the urease activity (UA) in SBM as indicator to their contents of antinutritional factors revealed value of 0.037 pH units. These results show that SBM, used in this experiment, is in a good quality, since the circumstances during desolventizing-toasting process are ideal to destroy most of the antinutritional factors which involved in raw soybean seeds. Main and Garlich (1995) concluded that SBM with UA between 0.02 and 0.2 pH could be used in broiler diets without any adverse effect on growth performance. In addition, Fasina *et al.* (2003) reported that UA can be used to monitor lectin levels during SBM processing because both proteins (TI and lectin) exhibit similar sensitivities to heat treatment. The UA of 0.031 to 0.088 units of pH change are indicative of adequately processed meals that contain very low lectin levels.

The results at the end of the starter period (21 days of age) revealed no significant differences among dietary treatments in growth performance (Table1). These results are in agreement with the results of EL-Deek *et al.* (2002) who found no negative effect of SBM level (21.7, 32.5 or 43.4%) on live body weight, feed intake and feed conversion ratio. Similar results were reported by Fasine *et al.* (2004) when they compared corn starch-casein diet and corn-soy diet containing 52% SBM with starting turkey poults which grow equally well.

Inspection of data listed in Table (1) revealed that, at 37 and 49 days of age, the experimental treatments with high SBM levels in starter period had no significant effect on all performance parameters compared with control group. Arafa *et al.* (2001) compared the effect of feeding diets containing all-vegetable protein versus mixture of vegetable and animal protein sources on the performance and carcass characteristics of broiler chicks. They found that live body weight, feed consumption and feed conversion ratio of chicks fed on vegetable protein diets such as soybean meal (containing 38.65% SBM), corn gluten meal and/or sunflower seed meal were not significantly different from those of the control fish meal diet.

Statistical analysis revealed no significant effect of the experimental treatments on percentages of dressing, liver, gizzard, heart, abdominal fat, kidney and total edible parts (Table 2). These results are in agreement with those reported by El-Deek *et al.* (2002) who found no significant difference in carcass characteristics due to SBM levels in the diets. On the other hand, Arafa *et al.* (2001) found that carcass characteristics were not significantly affected by feeding chicks either on animal or vegetable protein sources.

It could be concluded that, under this experimental conditions, using high level of good quality SBM up to 45% of starter diet had no negative impact on growth performance and carcass characteristics of broiler chicks.

## References

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**Table (1): The effect of soybean meal levels on the performance of broiler chicks.**

Items	Treatments (soybean meal levels)				
	30%	35%	40%	45%	Significance
<i>At 21 days of age:</i>					
Live body weight (gm/bird)	626	626.8	622.2	622	N.S
Feed consumption (gm/bird)	903	898	900	897	N.S
Feed conversion ratio	1.442	1.433	1.446	1.443	N.S
Performance index (PI)	43.41	43.74	43.03	43.10	N.S
<i>At 37 days of age:</i>					
Live body weight (gm/bird)	1692.9	1697.6	1689.8	1716.9	N.S
Feed consumption (gm/bird)	3269	3272	3259	3315	N.S
Feed conversion ratio	1.931	1.928	1.929	1.931	N.S
Performance index (PI)	87.67	88.05	87.60	88.91	N.S
<i>At 49 days of age:</i>					
Live body weight (gm/bird)	2677.1	2665.9	2648.7	2667.2	N.S
Feed consumption (gm/bird)	5486	5446	5419	5454	N.S
Feed conversion ratio	2.049	2.043	2.046	2.045	N.S
Performance index (PI)	130.65	130.49	129.46	130.43	N.S

**Table (2): Relative carcass characteristics of broiler chicks at 7 weeks of age as affected by experimental diets.**

Items	Treatments (soybean meal levels)				Significance
	30%	35%	40%	45%	
Carcass %	79.40	79.76	79.22	79.15	N.S
Abdominal Fat %	2.42	2.40	2.49	2.45	N.S
Giblets %	3.58	3.57	3.60	3.59	N.S
Total edible parts %	82.98	83.33	82.82	82.74	N.S
Breast muscles %	18.23	18.13	18.19	18.11	N.S
Thighs muscles %	15.78	15.60	15.53	15.74	N.S
Breast+Thighs muscles %	34.01	33.73	33.72	33.85	N.S