

## تأثير اضافة البروتين على النمو وكرات الدم البيضاء وبروتين الدم في الدواجن ذات النمو المتأخر

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### ملخص

تم اختيار ١٥ كتكوت ( ٨ أسابيع ) من بين ٧٠ من الكتاكيت سبق أن تغذت لمدة ٧ أسابيع على عليقة بها كمية غير كافية من البروتين ( ١٤٪ ) على أساس المادة الجافة ) . وقسمت هذه المجموعة الى ثلاث مجموعات غذيت على عليقة تحتوى على بروتين بنسبة ١٧ ، ١٩ ، ٢١٪ على التوالى .

وقد أظهرت المجموعة الثالثة نتائج عالية ونسبة التصاق ووجد أنه تقل بوضوح نسبة كرات الدم البيضاء كلما زادت نسبة البروتين .

ولم يظهر أية فروق بين المجاميع بالنسبة للنمو أو بروتين الدم .

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## EFFECT OF PROTEIN ON GROWTH, DIFFERENTIAL LEUCOCYTIC COUNT AND SERUM PROTEIN FRACTIONS IN STUNTED CHICKENS

(With 4 tables)

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### SUMMARY

15 stunted chickens (8 weeks old) were chosen out of 70 which were fed for 7 weeks on dry mash containing suboptimal level of protein (14% on dry matter basis). The stunted chickens were divided into 3 groups and fed on ration containing about 17.5, 19.0 & 21.5% crude protein respectively.

They were examined for their rate of growth, dressing percentages, differential leucocytic count, and the serum protein fractions.

The third group showed the more heavier carcass yield. There was a marked decrease in neutrophils accompanied by lymphocytosis and monocytosis as the protein content of the ration increased. The body weight development and serum protein fractions showed no significant differences.

### INTRODUCTION

In the standards of the committee of the National Research Council, not less than 20% total protein is advised in the ration for chicks up to 8 weeks of age, and 16 per cent from 8 to 18 weeks of age, MORRISON (1959). ACKERSON *et al.* (1953) showed that a lot of chickens fed diet containing 30% proteins showed a greater gain in growth than those fed 25%. In an experiment on chicks by NORRIS and HEUSER (1930) in which rations containing different percentages of protein were prepared by varying the amount of meat scrap included. Levels varying from approximately 13 to 21% were compared. The requirement was found to be higher than 18.58%.

for the first 8 weeks, whereas a level of 15 to 16% was adequate thereafter. AUCKLAND *et al.* (1969) fed turkeys to 6 weeks of age on suboptimal levels of protein and then fed adequate amounts. The turkeys showed compensatory growth, and mean body weight was 25% below controls at 6 weeks and only 3% below at 14 weeks.

The picture of blood reflects the different changes in the animal health which may occur due to any change in the regimes of feeding KODRIAVTISOV *et al.* (1969). In normal physiological conditions of chickens the form and constituents of blood especially formed elements is more or less constant, ZIETSOV (1971) KOZNITSOV and PARATSOV (1968) said that addition of proteinous compounds in the ration of animals stimulates leucocytosis. It is now accepted that under condition of stresses or any change in the type of food given to the chickens or animals may depress the number of circulating eosinophils, OSCAR (1961). It was found that changes in the protein metabolism will lead to changes in the plasma proteins and their fractions, BALEN and SHALAEVA, (1967), BERENSHTAIN, (1966), ESAEV, (1968). KOZNITSOV and PARATSOV (1968) said that addition of proteinous compounds in the ration of animals stimulates leucocytosis. It is now accepted that under condition of stresses or any change in the type of food given to the chickens or animals may depress the number of circulating eosinophils, OSCAR (1961). It was found that changes in the protein metabolism will lead to changes in the plasma proteins and their fractions, BALEN and SHALAEVA, (1967), BERENSHTAIN, (1966), ESAEV, (1968).

The aim of this work is to test the effect of increasing levels of protein in the ration of stunted chickens, previously fed on rations with suboptimal level of protein up to 8 weeks of age.

#### MATERIALS AND METHODS

15 stunted chickens (8 weeks old) had been selected from 70 growing chicks which were fed up to 8 weeks age on a dry ration low in protein (14% protein on dry matter basis). The stunted chickens were divided into 3 groups offered rations contain in per cent : crushed white corn, 33,25,13 ; coarse wheat bran, 20,20,20 ; fish meal, 5,7,7 ; horse beans, 40, 46, 60 ; calcium carbonate, 1.5, 1.5, 1.5 ; common salt, 0.5, 0.5, 0.5 ; in the three groups respectively. 4g of vitamin AD<sub>3</sub> and 2g yeast were added per Kg of each of the three rations. The rations contain approximately the same amount of TDN (74%) while it contains about 17.5, 19.0 & 21.5% protein (on dry matter basis) in the three groups respectively.

The chickens were weighed weekly during the experimental period which lasted for 8 weeks. At the end of this period, chickens of the three groups were slaughtered and blood films were taken, stained by Panoptic method of papenheim (LEVINSON and MACFATE, 1961), and 400 white cells were differentiated by the four-field meander method (COLES, 1967). The electrophoretic pattern of three serum samples from each group were determined. TURBA and ENERKEL, (1950).

## RESULTS

It is evident from table (1) that there was no significant difference between the three groups regarding growth. Regarding the carcase yields, group 3 showed the higher percentage. Examination of serum protein fractions by electrophoretic separation was undertaken. Table No. 3 reveals no significant changes between groups even in gamma globulins, but it was noted that alpha globulins in the third group were slightly decreased than the other two groups but this is of no significance.

Differential leucocytic count, as it is evident from table 4, showed significant differences between the groups regarding all the types of white cells except basophils and eosinophils. Group 1 showed neutrophilia while group 2 & 3 showed lymphocytosis accompanied by monocytosis.

TABLE 1. The body weight development in the stunted chickens offered rations with different levels of protein

weeks	Group 1 9	Group 2 9	Group 3 9
0	259.4	283.2	292.2
1	294.4	313.2	310.4
2	377.2	394.8	408.6
3	462.4	477.2	506.8
4	561.4	576.4	587.4
5	656.4	648.8	682.6
6	678.4	685.4	719.8
7	779.6	730.2	831.6
8	824.8	752.0	802.0

Statistical analysis of the data using F test showed no significant difference between the three groups as the F value was less than 1.0.

TABLE 2. The carcase yields in relation to the living weight in each of the three groups

Yields	Group 1	Group 2	Group 3
* Yield (1)	50.65	49.48	57.23
* Yield (2)	65.18	63.98	66.08

\* Yield (1) = weight of meat & bones and visible fat i.e. dressed carcase.  
Yield (2) = Yield (1) plus head & neck, liver, heart and gizzard.

TABLE 3. Percent of serum protein fractions in blood serum

Groups	No.	Albumin	Alpha globulins	Beta globulins	Gamma globulins
I	1	46,5	20,7	20,7	59,2
	2	36,5	18,9	13,5	31,0
	3	37,9	16,3	13,9	31,9
	Mean	40,3	18,6	16,0	40,7
II	1	42,2	17,1	13,5	28,4
	2	38,3	16,1	21,1	24,2
	3	33,8	19,2	16,9	30,2
	Mean	38,1	17,5	17,2	27,6
III	1	32,8	13,2	18,4	35,9
	2	30,4	10,0	26,3	33,2
	3	25,1	11,3	29,6	33,9
	Mean	29,4	11,5	24,8	34,3
F values		1.25	13.16	16.21	1.42

F value at  $P < 0.05$  and d.f. 2,6 = 19.36.

TABLE 4. Differential leucocytic count (showing the percent of each type of leucocytes in blood)

Groups	No.	Basophils	Eosinophils	Band cells	Segmented neutrophils	Lymphocytes	Monocytes
I	1	2	6	3	30	55	4
	2	—	2	4	31	61	2
	3	2	10	4	32	45	7
	4	—	11	6	29	52	2
	5	1	8	3	22	63	3
	Mean	1.0	7.4	4.0	28.8	55.2	3.6
II	1	2	11	1	21	61	4
	2	1	4	3	26	58	8
	3	—	7	4	30	62	6
	4	—	5	2	18	70	5
	5	—	5	5	20	64	6
	Mean	0.6	6.4	3.0	23.0	63.0	5.8
III	1	—	3	1	8	81	7
	2	—	2	1	9	78	10
	3	1	5	1	13	69	11
	4	—	2	4	16	70	8
	5	1	3	1	10	80	5
	Mean	0.4	3.0	1.6	11.2	75.6	8.2
F value		0.67	3.61	*4.36	**23.94	**14.8	*6.68

F value at P 0,05 and d.f. 2,12 = 3.88.

\*\* Highly significant at 5% level of probability.

\* Significant at 5% level of probability.

## DISCUSSION

The protein percentages in the diet of chickens raise many questions and points of interest especially when it is tested in a way to improve the growth of stunted chickens fed for a certain period on suboptimal amount of protein. But as it is already clear from the results there were no significant differences between the three groups, regarding the rate of growth even when the protein content of the ration is raised to 21.5%. This contradicts AUCKLAND *et al.* (1969), while the dressing percentage showed higher value in groups 3.

Regarding the blood proteins there was no significant changes in the percentages of serum protein fractions. This may be attributed to the fact that the given percentage of protein (14%) in the first 8 weeks of its age is not so low to cause certain responses in blood serum.

The changes obtained in the haematological picture is a normal response occurring in the haemopoetic system which usually reflects any changes in the diet and regime of feeding as stated by KODRIAVTSOV *et al.* (1969). On the light of this experiment the obtained lymphocytosis & monocytosis in group 2&3 may be due to increased percentage of protein as stated by KOZ-NITSOV and PARATSOV (1968).

From the obtained results we can conclude that feeding stunted chicken rations with protein content up to 21.5% (on dry matter basis) is of no significant effect on the rate of growth, serum protein fractions, while it may have a beneficial effect on dressing percentages. Also increasing levels of protein in the rations causes marked changes in the blood leucocytic percentages.

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