

THE EFFECT OF EARLY FEED RESTRICTION ON THE COMPENSATORY GROWTH IN BROILER CHICKENS

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ABSTACT

An experiment was conducted to examine the effect of early feed restriction on the compensatory growth in broiler chickens. One hundred and fifty broilers were distributed to six treatment groups, with 30 broilers for each group. Each treatment group was represented by five replication of five broiler each. Broiler were fed ad libitum through out the experiment as the control, and other five group were fed restriction R1 (20% feed restricted of ad libitum), R2 (25% feed restricted of ad libitum), R3(30% feed restricted of ad libitum), R4 (35% feed restricted of ad libitum), R5 (40% feed restricted of ad libitum). Broiler were fed ad libitum conventional broiler diets from 1 to 7 and 15 to 42 days of age. Feed restriction was applied to broiler from 8 to 14 day of age so as to reduce their weight. The present result showed that broilers showed compensatory growth when they were restrict-refed. There is not decreased in finally body weight in broiler chickens which have restricted feed and have a similar feed conversion at all treatments.

Keywords : *Restricted Feeding, Growth, Broiler Chickens*

INTRODUCTION

Poultry businesses in Indonesia at this time continues progress very rapidly, it can be seen from the number of livestock population of broiler chickens in Indonesia. As can be seen in data released by the Department of Animal Husbandry of West Java Province, an increase of 16 percent from 2007, amounting 58.084.470 to 69.562.266 head in 2008. The increase was due to broiler farm felt quite profitable. Government support in the form of livestock regulations contained in the government rules number 15 of 1977 which set the rules and regulations set up poultry farms. Government participate and provide make good impact on the progress of broiler chicken farm it self so it would increase the passion broiler breeder chickens in Indonesia. In addition, public

awareness of the nutritional needs of especially those derived from animal protein also indirectly supports the increase in population of these broiler chickens.

On the other hand, the increase of population is not always followed by an increase in welfare of farmers, because it is still dependent of imported feed ingredients, so the feed ration price will be high and not balanced with the selling price of products on the market. Classical problems such as these an obstacle for broiler breeders themselves because results in lower profits. We need a solution to deliver optimal results and efficient for the farmer, such as by improving efficiency in managing maintenance.

One way method for giving diets to chickens is usually giving ad libitum diets (always available) to grow rapidly. This method causes the diet rations of broiler chickens will consume 10-20 percent more than it needs, which in will increase the cost incurred for diet rations. In addition, excess feed consumption caused diet ration energy consumed is not always converted into flesh but will be stockpiled in the form of the final product is achieved body broilers with high fattening. This fatty will begin to occur at the beginning of growth and if this fatty has been formed in the early days, it will give unfavorable effects of the fatty greater when harvested.

One effort that can be done to improve production efficiency in broiler chickens is by limiting the amount of diet rations given in the early phase of growth between the ages of 8-14 days (age 1-7 days and after 14 days were given ad libitum ration). This restriction aims to inhibit the growth hypertrophy happened on broiler chickens aged 7-14 days that resulted in slowing growth or enlargement of the cell network. This restriction will not change the total number of cells (hyperplasia) but only inhibits cell enlargement (hypertrophy) so that when given diet rations ad libitum again, the growth of both hyperplasia and hypertrophy network will return to normal (Hood and Allen, 1977; Jones and Farrell, 1992).

The diet of 70 percent of total ad libitum feed intake of broiler chickens were obtained with the same final body weight in chickens given feed ad libitum, reduced mortality and a more efficient in feed conversion (Wijten., et al, 2008).

Reduced feed rations by 30 percent during the age of 8-14 days of ad libitum broilers led slows growth, this is due to the available protein in the diet reduced so that the growth hypertrophy (enlarged cells) is inhibited, but after the restriction period stops then will be compensated by chicken with consume more feed were given normal diet (ad libitum) again, so the chicken will eventually reach the same body weight of chickens fed ad libitum rations.

MATERIALS AND METHODS

This research was conducted in Laboratory Poultry Husbandry Faculty, Padjadjaran University. The method used is an experiment with Completely Randomized Design (CRD). The material used is one day broiler chickens with Cobb strain, vita chick, therapy, ND-B1, IBD vaccine. The tools used include plots cage (1 x 1 m), feeder, drinking water, sprayer, scales, heating lamps, needles, syringes of blood storage.

150 chicks were divided into 6 treatment groups. R0 = the diet ad libitum, R1 = The diet ration of 80% of ad libitum, R2 = The diet ration of 75% of ad libitum, R3 = The diet ration of 70% of ad libitum, R4 = The diet ration of 65% of ad libitum, and R5 = The diet ration of 60% of ad libitum).

The parameters observed were the final body weight, blood hematology, and FCR. Data were analyzed with ANOVA. If there is a difference of treatment followed by a test of Duncan's Multiple Range Test (Gasper,2006).

RESULTS AND DISCUSSION

Final Body Weight

Table 1. The average body weight of the End of Each Treatment Research

Repeat d	Treatment					
	R0	R1	R2	R3	R4	R5
gram.....					
					
1	2915,0	2685,0	2812,0	2865,0	2752,0	2844,0
2	3095,0	2785,0	2816,0	2700,0	2847,5,0	2892,0
3	2780,0	2700,0	2754,0	2820,0	2880,0	2686,0
4	2965,0	2897,5	2699,0	2612,0	2762,5	2555,0

5	2468,0	2708,0	2648,0	2746,0	2936,0	2708,0
Total	14223,0	13775,5	13729,0	13743,0	14178,0	13685,0
Average	2844,6	2755,1	2745,8	2748,6	2835,6	2737,0

Based on the variance analysis showed that the rations in the early growth restriction did not significantly affect the final body weight ($P < 0.05$). These results indicate that the chicken had left to pursue growth in the reduction diet ration (at age 8-14 days). This can be explained because the chicken can compensate for the lagging growth in the next phase by consuming more feed, so the chickens get more protein for growth. This is consistent with the results of Wijtten., (2008) that restricting the diet at the age of 7-14 days to get the same final body weight with ad libitum feeding. These result same with described by Leeson and Zubair (1996), when the chickens are treated ration restriction, it will cause disruption of growth, but when the chickens get back normal intake of nutrients the growth will come back normal again.

This phenomenon can be explained because the chicken consuming protein and energy of diet rations less than their needs. Treatment R0 consume 12,74 grams of protein/day, whereas treatment of R1, R2, R3, R4 and R5 consume 10,19; 9,55; 8,91; 8,28; and 7,64 grams of protein. The amount is not sufficient for weight gain in chickens. Lack of this protein causes chicken experience delays in network growth. Protein consumed just enough for basic living needs and growth of hair.

During feed restriction, body weight gain of broiler chickens in the second week decreased by 9,09 to 27,67% when compared with the R0 treatment (ad libitum ration). However on the fourth week, weight gain greater than weight gain R0 treatment (ad libitum), this can be seen in the curve of weight gain. At the five week, each treatment consumes almost the same protein that is equal to 31,78 grams of protein, but what sets it apart is the use of these proteins. R0 consume protein to meet the needs of his hunger while others consume ration treatment to fulfill the requirement of protein for tissue growth is inhibited during treatment restriction. This is consistent with described by Leeson and Zubair (1996), that the chickens are given preferential treatment in the early ration restriction will try to

restore its growth on the diet phase back to normal. This means that the phase compensation actually be used to pursue growth in a previously disadvantaged.

Hematology Blood

Table 2. The average value of Hematology Blood from Each Treatment Research On Day-14

Treatment	Parameters					
	Erythrocytes (per ml)		Hb (g/%)		Hematocrit (%)	
	Days-7	Days-14	Days-7	Days-14	Days-7	Days-14
R0	1,337 x10 ⁵	1,531 x10 ⁵	6,00	6,65	19,43	26,15
R1	1,130 x10 ⁵	1,638 x10 ⁵	4,75	7,00	19,83	27,15
R2	1,370 x10 ⁵	1,569 x10 ⁵	5,67	6,05	24,00	25,60
R3	1,277 x10 ⁵	1,348 x10 ⁵	5,99	6,45	20,17	23,95
R4	1,017 x10 ⁵	1,490 x10 ⁵	4,67	7,85	20,13	29,65
R5	1,183 x10 ⁵	1,362 x10 ⁵	5,33	7,05	22,50	27,50

Based on statistical analysis showed that diet restriction had no significant effect ($p < 0.05$) in the amount of blood erythrocytes. Described by Koch (1973) and Sturkie (1986) the number of red blood cells (erythrocytes) in the immature birds are more variable and it ranged between 3-4 million or an average of 3.5 million per ml of blood. So the number of blood cells in this study are still well below the normal amount of R0 to R5. Nevertheless, in Table 2. seen a decline in the number of blood erythrocytes in the treatment diet restrictions when compared to R0 treatment (ad libitum feed ration). This is due to diet restriction treatment that has been done which caused the decrease in erythrocyte formation process. As a result of the reduced number of red blood cells then caused decrease supply of oxygen (O₂) from the lungs to the tissues and carbon dioxide (CO₂) from tissues to the lungs carrier metabolism waste products, so that the formation of ATP is reduced.

This means that the number of red blood cells and hemoglobin in the normal range will be followed by an increase in growth (body weight). When the number of red blood cells and hemoglobin low it will have an impact on low body weight. This result is in accordance with the mechanism of "compensatory growth" that described by Leeson and Zubair (1996), which states ration

restriction will cause poor growth, in this case hyperplasia relation to the growth of blood cells.

So do with blood hematocrit. Siswani (2006), report that blood hematocrit values of maximum growth is at a certain value. This means that when the blood hematocrit value is low, there will be an impact of low growth, but on the contrary if the hematocrit value is high then the growth will also be low. This is because if the high hematocrit value then causes the blood viscosity will increase, so that transport nutrients through the blood becomes low.

Feed Conversion

Table 3. Average Conversion Ratios of Each Treatment Research In Week-six

Time (weeks)	Treatment					
	R0	R1	R2	R3	R4	R5
1	1,47	1,64	1,78	1,53	1,59	1,69
2	1,60	1,44	1,32	1,38	1,42	1,33
3	1,42	1,40	1,37	1,37	1,19	1,27
4	1,47	1,48	1,47	1,42	1,36	1,49
5	1,69	1,86	1,59	1,87	1,77	1,81
6	2,24	2,40	2,49	2,57	2,30	2,53

Based on the results of variance analyzes showed that diet restriction had no significant effect ($P < 0.05$) to feed conversion values. These results are in accordance with the results obtained Wijtten., (2008) and Yagoub and Babiker (2008) which describes the influence of diet restriction treatment did not significantly affect the value of feed conversion. This can be explained, when the time of giving back to normal rations, the chickens will consume more feed. This is because chickens need more nutrition to restore or pursue growth retardation that has occurred during the diet restriction. This is consistent with the opinion Yagoub and Babiker (2008) that the chickens will consume more feed to meet the needs of the protein. This makes no difference in feed conversion value at the end of the study.

CONCLUSION

Based on the results and discussion of this research, it can be taken to a conclusion as follows:

1. Restricted feeding on early growth (8-14 days) can reduce the weight of chickens in the second week but did not lead to lower final body weight in broiler chickens reared for 42 days.
2. 30 percent restriction (70 percent of diet ad libitum) is the best level in the system restriction feeding on broiler chickens reared 42 days.

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