Influence of Different Energy-Proteins on Performance and Blood Hematological on Three Types of Local Chicken

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***Abstract*---- *Indonesia is rich in germplasm, including local chickens. Three types of superior local chickens are Sentul-Warso Chicken, Chicken Kampung-Unggul, and Chicken Local-Jimy. Chickens are relatively diverse growth and nutrient needs are also variations, especially energy and protein content. The research has been conducted at Test Farm cage, Faculty of Animal Husbandry, University of Padjadjaran, Sumedang, and West Java-Indonesia. The objective of the study was to determine the energy-protein requirements of the ration, which resulted in the highest production performance and optimal hematologic blood values in three types of local chickens (Sentul-Warso Chicken, Chicken Kampung-Unggul, and Chicken Local-Jimy). Research using experimental method in laboratory. The experimental design was a Completely Randomized Design, consisting of five treatment rations with different energy and protein levels and each repeated four times. The treatment consisted of: R1 = EM 2750 kcal / kg and PK 15%; R2 = EM 2750 kcal / kg and PK 17%; R3 = EM 2750 kcal / kg and PK 19%; R4 = EM 2950 kcal / kg and PK 15%; and R5 = EM 2950 kcal / kg and PK 17%. The data were analyzed by means of variation and the differences between treatments were tested with Duncan Multiple Range Test. The result showed that ration with metabolic energy content 2,750 kcal / kg and 17% crude protein resulted in optimal production and hematological blood value in local chicken. The performance of Chicken-Jimy's production is higher than Sentul-Warso chicken and the lowest Kampung-Unggul chicken. The hematological value of chicken blood is in the normal range.*

Keywords--- energy, hematological, local chicken, performance, protein.

I. INTRODUCTION

The problems that arise in the development of livestock are generally related to the provision of quality feed, the guaranteed continuity of feed ingredients, and the quality of livestock (genetic aspects). While the results of previous research, about rations or feed ingredients may not be used as a reference in the preparation of broiler rations in Indonesia. However, at least the results of previous research can be used as a point of departure or reference of thought to conduct research in accordance with the conditions in Indonesia.

Indonesia's local broiler is a national genetic resource and contributes significantly to both food security and rural income [5]. The chicken has a social and cultural function for certain communities [12] and is part of Indonesian history [17]. In addition, local chicken as part of Animal Genetic Resources through its genetic diversity is an asset for future food needs [4, 6]. Local chickens have more genetic variation and adaptive properties than exotic chicken breeds. In addition, local chickens require relatively smaller inputs in the maintenance process.

Domestic broiler commodity demand from year to year continues to increase, although it has experienced a decrease caused by information eradication fluburung. But after that demand increased again until now. High demand, the reality can not be responded by local poultry breeders, although genetic resources and feed sources are available.

Chickens consume most rations are to meet the needs of protein and energy. The content of protein in the ration is very influential on the achievement of body weight. Protein content in the ration is required for tissue growth, tissue repair, and management of production and part of the enzyme structure so that protein is known as one of the principal constituents of body cells and tissues [3]. This suggests that proteins play an important role in achieving the desired final weight.

Provision of ration with a good nutrient quality and balanced course can affect the rate of growth and development of chickens. The resulting weight gain is a description of the quality of the ration given. The increase in body weight results from the consumption of good proteins. High protein quality will affect the protein intake into the meat so that amino acids are fulfilled in the body. The increase of body weight is caused directly by the availability of amino acid forming tissue so that consumption of protein ration is directly related to growth process.

Protein is a key element in the formation of blood erythrocytes [7]. Protein has been absorbed for body use in the form of amino acids, so that if during the process of formation of erythrocyte deficiency of amino acids it will lower blood erythrocytes levels. The erythrocyte membrane has a glucose carrier, which is one of the energy-producing nutrients. Energy needed erythrocytes such as for the maintenance of erythrocytes and membrane structure. Thus energy and protein are needed erythrocytes as a material for erythrocyte activity in the blood. Proteins are also needed for hemoglobin synthesis. Proteins, especially amino acids glycine and mineral Fe are the components of hemoglobin forming. [11].

Amino acids glycine is a nonessential amino acid that can be formed in the body. However, non-essential amino acids can not be formed when essential amino acid deficiencies can not be formed in the body. Thus essential amino acids must be available in the diet. Therefore the prepared feed is cultivated to contain sufficient essential amino acids in order that the synthesis of nonessential amino acids is not disturbed. This will be related to the synthesis of hemoglobin that can run smoothly if the constituent material is needed sufficiently during the process. Therefore, the amount of hemoglobin produced is proportional to the amount of constituent material for hemoglobin synthesis.

Blood can indicate the physiological condition of cattle because blood is a component that plays an important role in the physiological regulation of the body. One that affects the physiological condition of the livestock body is the ration. The ration that is not in accordance with the needs of livestock will lead to stress so that physiological changes that resulted in the hematological status decreased. This stress can be avoided one of them by giving the right energy-protein rations.

The right energy-protein content of the ration is expected to have a positive effect on the production performance and hematology of local chicken blood. The purpose and objective of the study was to establish the energy-protein requirements of the ration, which resulted in the highest production performance and optimal hematological blood values in three types of local chickens (Sentul-Warso Chicken, Chicken Kampung-Unggul, and Chicken Local-Jimy).

II. MATERIALS AND METHODS

Livestock Experiments

Livestock used in this research is DOC Sentul-Warso Chicken, Chicken Kampung-Unggul, and Chicken Local-Jimy, each of 100 tails. Before put in the cage, the chicken is first weighed the initial body weight (coefficient of variation weight 8.28%, 13.99%, and 13.65%). Chickens are given wingtag to facilitate the recording, and chickens are kept until the age of 10 weeks.

Trial Rations

The ingredients used for the preparation of the ration consist of corn, fine bran, soybean meal, fish meal, $CaCO_3$, fish meal, and bone meal. The rations used during the study were a mash-shaped ration, with nutrient content and metabolic energy rations presented in Table 1.

Table.1: Nutrient Content and Metabolizable Energy Research Ration

Nutrient and Energy	Treatment Rations				
	R1	R2	R3	R4	R5
Metabolizable Energy (kcal / kg)	2750	2750	2750	2950	2950
Crude protein (%)	15.00	17.00	19.00	15.00	17.00
Crude Fat (%)	6.66	6.54	6.19	7.,01	6.99
Crude Fiber (%)	4.89	4.75	4.62	4.09	3.97
Calcium (%)	1.05	1.25	1.34	1.01	1.24
Phosphorus (%)	0.58	0.67	0.72	0.55	0.67
Lysin (%)	0.97	1.18	1.35	0.94	1.16
Methionin (%)	0.35	0.40	0.44	0.35	0.40
Methionine + Cystine (%)	0.67	0.74	0.,80	0.64	0.72

Trial Cage

Chickens are randomly divided into 60 units of cages, each cage containing 5 tails. The enclosure used is a cage enclosure made of bamboo and ram wire. Cage Size 75 cm x 75 cm x 75 cm. Each cage is equipped with feeding and drinking water, and at the beginning maintenance is equipped with a lamp that serves as a heater.

Observed Variables

Performance of production, including:

1. Consumption of rations (grams / birds).
2. Increase in body weight (gram / birds)
3. Convertible rations (Index)
4. Weight carcass (gram / birds)
5. Income over feed and chick cost (Rupiah / birds)

Hemotological blood, including:

1. Blood Erythrocytes (million / mm^3)
2. Haemoglobin Blood (g / dL)
3. Blood Hematocrit (%)
4. Blood Protein (g / dL)
5. The fragility of Blood Cells (% hemolysis)

Experimental design

Research using experimental method in laboratory. The experimental design was a Completely Randomized Design, consisting of five treatment rations with different energy and protein levels and each repeated four times. The treatment consisted of: R1 = EM 2750 kcal / kg and PK 15%; R2 = EM 2750 kcal / kg and PK 17%; R3 = EM 2750 kcal / kg and PK 19%; R4 = EM 2950 kcal / kg and PK 15%; and R5 = EM 2950 kcal / kg and PK 17%.

Data analyses

Analysis of variance was applied to the data using statistical package programme of SPSS version 19. Significantly differed means were separated by a Duncan's multiple comparison test at 0.05, respectively.

III. RESULTS AND DISCUSSIONS

Effect of Energy-Protein Rations on Performance of Sentul-Warso Chicken Production

Measured production performances were feed consumption, weight gain, feed conversion, carcass weight, and Income over feed and chick cost (IOFCC) Sentul Warso Chicken, and the data are presented in Table 2.

Table.2: Effects of Ration Energy-Proteins on Consumption of Rations, Weight Gain, feed conversion ratio, Heavy Carcass, and Income over Feed and Chick Cost (IOFCC) of Sentul-Warso Chicken

Treatment	Consumption of Rations (g/b)	Weight Gain (g/b)	Feed Conversion Ratio (index)	Heavy Carcass (g/b)	IOFCC (Rp./kg)
R1	1652.08 NS	578.27NS	2.88NS	529.97NS	10,719
R2	1761.47 NS	596.38NS	2.98NS	569.73NS	12,647
R3	1479.13 NS	568.98NS	2.61NS	548.63NS	10,468
R4	1659.94 NS	534.24NS	3.12NS	535.22NS	11,881
R5	1550.40 NS	570.00NS	2.75NS	548.48NS	11,536

Description: R1 = CP 15%, and ME 2750 kcal / kg; R2 = CP 17%, and ME 2750 kcal / kg; R3 = CP 19%, and ME 2750 kcal / kg; R4 = CP 15%, and ME 2950 kcal / kg; R5 = CP 17%, and ME 2950 kcal / kg.
NS: Not significant

The average consumption of Sentul-Warso chicken ration was between 1479.13 g / b (R3) to 1761,47g / b (R2), weight gain between 534.24 g / b (R4) to 596.38 g / b (R2), the conversion of rations between 3.12 (R4) to 2.61 (R3), carcass weight between 529.97 g / b (R1) to 569.73 g / b (R2), and gains (IOFCC) between Rp. 10,468 / kg (R3) up to Rp. 12,647 / kg (R2). Based on the result of statistical analysis, the five treatment rations did not give significant effect (P> 0.05) to the production performance of Sentul-Warso chicken. The difference of metabolic energy of ration of 200 kcal / kg and protein content of ration by 4% did not affect the production performance of Sentul-Warso chicken. Sentul-Warso Chicken is relatively stable against changes in nutrient content in rations (protein and energy).

The performance of a livestock is determined by its genetic ability and adaptability to the environment. Each offspring has different abilities in growth. This may be due to differences in the genetic potential of each heredity and the ability to adapt to different environments in each individual [2]. The high body weight gain can be caused by the balance of nutrient content of the formula of rations used, where the nutrient content of energy and protein in the treatment of R2 has a better energy and protein level than other treatments. According to [24] that the balance between energy and protein and other food substances contained in the ration plays a significant role

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in the rate of growth. Furthermore, Siregar [1] added that the addition of body weight increase depends on a number of nutrients consumed by livestock.

Sentul-Warso Chicken is more responsive to changes in nutrient content in rations (protein and energy). Rations with a metabolic energy content of 2750 kcal / kg and 17% crude protein, support the production performance, and generate the highest profit (IOFCC).

Influence Energy-Protein Rations on Performance of Chicken Kampung-Unggul

Ration consumption, weight gain, feed conversion, carcass weight, and Income over feed and chick cost (IOFCC) Chicken Kampung-Unggul, and the data are presented in Table 3.

Average consumption of Chicken Kampung-Unggul ration between 1211.19 g / b (R4) to 1581.69 g / b (R2), weight gain between 443.65 g / b (R4) to 510.31 g / b (R2), feed conversion between 3.12 (R2) to 2.45 (R5), carcass weight between 413.26 g / b (R1) to 486.04 g / b (R2), and the gain (IOFCC) between Rp. 8,632 /Kg (R4) up to Rp. 11,096 / kg (R2).

Table.3: Effects of Ration Energy-Proteins on Consumption of Rations, Weight Gain, feed conversion ratio, Heavy Carcass, and Income over Feed and Chick Cost (IOFCC) of Chicken Kampung-Unggul

Treatment	Consumption of Rations (g/b)	Weight Gain (g/b)	feed conversion ratio (index)	Heavy Carcass (g/b)	IOFCC (Rp./kg)
R1	1402.16 ^{ab}	458.96^{NS}	3.07^{a}	413.26^{NS}	10,439
R2	1581.69 ^{a}	510.31^{NS}	3.12^{a}	486.04^{NS}	11,096
R3	1409.88 ^{ab}	453.02^{NS}	3.11^{a}	424.43^{NS}	9,583
R4	1211.19 ^{b}	443.65^{NS}	2.74^{ab}	419.05^{NS}	8,632
R5	1238.50 ^{b}	507.92^{NS}	2.45^{b}	458.22^{NS}	9,879

Description: R1 = CP 15%, and ME 2750 kcal / kg; R2 = CP 17%, and ME 2750 kcal / kg; R3 = CP 19%, and ME 2750 kcal / kg; R4 = CP 15%, and ME 2950 kcal / kg; R5 = CP 17%, and ME 2950 kcal / kg.

a, b: means with no common superscript differ significantly, SEM: standard error of means: $p<0.05$; NS: Not significant

Based on the result of statistical analysis, the consumption of ration and conversion of real cross section (P <0.05), but the weight did not show significant difference to the performance of Kampung-Unggul chicken production. The difference of the metabolic energy of ration is 200 kcal / kg and the protein content of ration is 4% to the consumption and conversion of Kampung-Ungg chicken ration. Chicken Kampung-Unggul relatively unstable to changes in nutrient content in rations (protein and energy).

Growth is an interaction between genetic and environmental factors. Contribution of genetic factors to growth is smaller than environmental factors, environmental factors are more dominant influence on growth. Therefore, the resulting results show the type of chicken to the production performance [15].

Income over Feed and Chick Cost is a barometer to see the cost of feed which is the biggest cost in the livestock business [8]. Factors that affect food income and chicken costs are final body weight, price / kg ration and selling price per kg of live weight. Chicken Kampung-Unggul is more sensitive to changes in nutrient content in the ration. Ration with metabolic energy content of 2750 kcal / kg and 17% crude protein, contributes to production performance, and highest profit yield (IOFCC), although the conversion value of the ration is relatively larger.

The Influence of Rice-Protein Energy on Local Chicken Production Performance-Jimy

Ration consumption, weight gain, feed conversion, carcass weight, and Income over feed and chick cost (IOFCC) Chicken Local-Jimy, and the data are presented in Table 4.

Table.4: Effects of Ration Energy-Proteins on Consumption of Rations, Weight Gain, feed conversion ratio, Heavy Carcass, and Income over Feed and Chick Cost (IOFCC) of Local Chicken-Jimy

Treatment	Consumption of Rations (g/b)	Weight Gain (g/b)	feed conversion ratio (index)	Heavy Carcass (g/b)	IOFCC (Rp./kg)
R1	1698.23 ^{NS}	590.13 ^{NS}	2.88 ^{bc}	520.54 ^{NS}	12,207
R2	1816.46 ^{NS}	631.19 ^{NS}	2.89 ^{bc}	551.72 ^{NS}	13,088

R3	1662.38 ^{NS}	629.38 ^{NS}	2.64 ^{c}	516.33 ^{NS}	13,036
R4	1887.56 ^{NS}	571.94 ^{NS}	3.30 ^{a}	509.99 ^{NS}	10,952
R5	1886.55 ^{NS}	617.31 ^{NS}	3.07 ^{ab}	527.89 ^{NS}	11,214

Description: R1 = CP 15%, and ME 2750 kcal / kg; R2 = CP 17%, and ME 2750 kcal / kg; R3 = CP 19%, and ME 2750 kcal / kg; R4 = CP 15%, and ME 2950 kcal / kg; R5 = CP 17%, and ME 2950 kcal / kg.

a, b: means with no common superscript differ significantly, SEM: standard error of means: $p<0.05$; NS: Not significant

Average local consumption of Chicken-Jimy chicken ration between 1662.38 g / e (R3) to 1887.56 g / e (R4), weight gain between 571.94 g / e (R4) to 631.19 g / e (R2), feed conversion between 3.30 (R4) to 2.64 (R3), carcass weight between 509.99 g / e (R4) to 551.72 g / e (R2), and the gain (IOFCC) between Rp. 10.952 / kg (R4) up to Rp. 13.088 / kg (R2). Based on the statistical analysis, the five ration treatments did not show a significant difference (P> 0.05) on the performance of Chicken-Local Jimy. The difference of metabolic energy ration of 200 kcal / kg and the protein content of ration by 4% did not affect the production performance of local chickens-Jimy. The Local Chicken-Jimy is relatively stable against changes in nutrient content in the diet (protein and energy).

Rations containing 2950 kcal / kg of metabolic energy and a crude protein of 15% (R4) resulted in the lowest productive performance in Local Chicken-Jimy. Income over Feed and Chick. Rations with a metabolic energy content of 2750 kcal / kg and 17% crude protein, support the production performance, and generate the highest profit (IOFCC).

Effect of Energy-Protein Rations on the Hematology of Sentul-Warso Chicken Blood

The hematologic blood measured was the amount of erythrocytes, blood hemoglobin, hematocrit values, blood proteins, and the fragility of the Sentol Warso Chicken cell, and the data presented in Table 5.

Table.5: Effect of Energy-Protein Rations on Number of Erythrocytes, Blood Hemoglobin, Hematocrit Value, Blood Protein, and Fragility of Sentul-Warso Chicken Blood Cells

Treatment	Erythrocytes (million / mm^3)	Haemoglobin (g/ dL)	Hematocrit (%)	Blood Protein (g/ dL)	The fragility of cells (% hemolysis)
R1	2.98 ^{NS}	6.59^{NS}	29.25 ^{NS}	4.50 ^{NS}	2.94 ^{NS}
R2	3.01 ^{NS}	6.78 ^{NS}	18.06 ^{NS}	4.92 ^{NS}	2.74 ^{NS}
R3	3.18 ^{NS}	7.17 ^{NS}	24.50 ^{NS}	5.40 ^{NS}	3.00 ^{NS}
R4	3.02 ^{NS}	6.25 ^{NS}	19.88 ^{NS}	4.72 ^{NS}	2.67 ^{NS}
R5	3.21 ^{NS}	7.01 ^{NS}	27.75 ^{NS}	4.46 ^{NS}	3.06 ^{NS}

Description: R1 = CP 15%, and ME 2750 kcal / kg; R2 = CP 17%, and ME 2750 kcal / kg; R3 = CP 19%, and ME 2750 kcal / kg; R4 = CP 15%, and ME 2950 kcal / kg; R5 = CP 17%, and ME 2950 kcal / kg.

NS: Not significant

The mean erythrocytes of Sentul-Warso chicken were between 2.98 million / mm^3 (R1) to 3.21 million / mm^3 (R5), blood hemoglobin levels of 6.25 g / dL (R4) to 7.17 g / dL (R3), blood hematocrit values between 18.06% (R2) to 29.25% (R1), blood protein content between 4.50 g / dL) (R1) to 5.40 g / dL (R3), R3) and the fragility of blood cells between 2.67% (R4) to 3.06% (R5). Based on the statistical analysis, the five ration treatments did not show a significant difference (P>0.05) to the hematologic blood of Sentul-Warso chicken. The difference of metabolic energy of ration of 200 kcal / kg and protein content of ration by 4% did not affect the hematological value of Sentul-Warso chicken blood. Sentul-Warso Chicken is relatively stable against changes in nutrient content in rations (protein and energy).

Protein is a major element in the formation of blood erythrocytes. Enzyme protease in the body is an extracellular enzyme that serves to hydrolyze proteins into amino acids the body needs. So nutrients in the form of proteins that have been digested then will be converted into amino acids absorbed by the body can be used one of them for the formation of erythrocytes. In addition to protein, energy as a result of carbohydrate, protein and fat metabolism is also needed during the process of erythrocyte formation. The amount of erythrocytes is influenced by the nation and animal species, sex, age, body condition, daily variation, physical activity, ambient temperature and stress conditions [23]. Erythrocytes basically have three functions, namely the transport of oxygen (O_2) to the body tissues, transport of carbon dioxide (CO_2) to the lungs and buffers of hydrogen ions (H^+) [13].

The formation of red blood cells from the reticuloendothelial system formed endothelial specialized in the birth of megaloblast. Megaloblast was born erythroblast and started formation of hemoglobin. Stem cells form a proerytroblast which is the mother of erirocytes. Toward the formation of hemoglobin, erythroblasts can be seen with alkaline staining, so people call it basofil erythroblasts. When hemoglobin has been formed a lot, the basophilic substance mixes with hemoglobin so that the eosin staining can begin to be absorbed and the cell is now called polychromafil eritroblast. In the course of the nucleus is smaller and called normoblast. Over time the nucleus diffuses and hemoglobin continues to be formed so that the cytoplasm no longer absorbs the basophile color and hemoglobin continues to form until it reaches about 34% and forms the reticulocyte. In the poultry core is maintained until the form of erythrocytes [17].

Effect of Energy-Protein Rations on Hematologic Blood Chicken-Superior Villages

The amount of erythrocytes, blood hemoglobin, hematocrit values, blood proteins, and fragility of Kampung-Unggul chicken blood cells, and are presented in Table 6.

Table.6: Effects of Energy-Protein Rations on Number of Erythrocytes, Blood Hemoglobin, Hematocrit Value, Blood Protein, and Fragility of Chicken Cells Kampung-Unggul

Treatment	Erythrocytes (million / mm^3)	Haemoglobin (g/ dL)	Hematocrit (%)	Blood Protein (g/ dL)	The fragility of cells (% hemolysis)
R1	3.01 NS	6.60 NS	29.45 NS	5.51 NS	4.13 NS
R2	3.05 NS	6.82 NS	25.61 NS	4.72 NS	3.68 NS
R3	3.30 NS	7.21 NS	24.00 NS	5.05 NS	4.09 NS
R4	3.04 NS	6.31 NS	28.88 NS	5.08 NS	4.30 NS
R5	3.18 NS	7.02 NS	27.75 NS	4.70 NS	3.60 NS

Description: R1 = CP 15%, and ME 2750 kcal / kg; R2 = CP 17%, and ME 2750 kcal / kg; R3 = CP 19%, and ME 2750 kcal / kg; R4 = CP 15%, and ME 2950 kcal / kg; R5 = CP 17%, and ME 2950 kcal / kg.

NS: Not significant

Average erythrocytes of Kampung-Unggul chicken between 3.01 million / mm^3 (R1) to 3.30 million / mm^3 (R3), blood hemoglobin levels between 6.31 g / dL (R4) to 7.21 g / dL (R3), blood hematocrit values between 24% (R3) to 29.45% (R1), blood protein content between 4.70 g / dL) (R5) to 5.51 g / dL (R1), and fragility blood cells between 3.60% (R5) to 4.30% (R4). Based on the statistical analysis, the five ration treatments did not show a significant difference ($P > 0.05$) to the hematological blood of Kampung-Unggul chicken. The difference of metabolic energy of ration of 200 kcal / kg and protein content of ration by 4% did not affect the hematological value of chicken blood of Kampung-Unggul.

Energy and protein have their respective portions of the erythrocyte composition as well as the erythrocyte formation process. Erythrocytes are surrounded by a plasmalemma. Plasmalemma is a cell membrane composed of approximately 40% lipid (phospholipids, cholesterol, glycolipids and so on), 50% protein and 10% carbohydrates. Inside, erythrocytes contain 33% of hemoglobin [16]. Components in the body are determined from the composition of rations consumed by livestock, this is in accordance with the opinion of [14] that the body of livestock is constructed from substances derived from food rations that are consumed.

Decreased hemoglobin levels can occur due to the disorder of erythrocyte formation (erythropoesis). Erythropoesis will increase in blood when iron reserves are reduced. According to [19] factors that affect the amount of erythrocytes in the circulation include the hormone erythropoietin which serves to stimulate the formation of erythrocytes (erythropoiesis) by triggering the production of proeritroblas from hemopoietic cells in the bone marrow. According to [10, 20] can also be caused by the disruption of amino acid synthesis, especially glycine so that hemoglobin synthesis is impaired. According to [11] that proteins, especially amino acids glycine and mineral Fe are the components of hemoglobin forming. So that the suspected decrease in hemoglobin levels can be caused due to disturbances during erythropoesis, and when the erythropoesis occurs there is a disruption of the work of the hormone erythropoietin during the process, it can also be caused by nutrients in the form of proteins that have been digested to be converted into amino acids to be absorbed by the body experiencing interference and this will have an effect on the synthesis of hemoglobin in which the amino acid is required for the formation process. According [21, 24] other factors affecting hemoglobin levels are the age of animals, species, environment, feed, presence or absence

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of erythrocyte defects, and blood handling during examination.

Effect of Energy-Protein Rations on Hematologic Local Chicken Blood-Jimy

The amount of erythrocytes, blood hemoglobin, hematocrit values, blood proteins, and the fragility of the local Chicken-Jimy blood cell, and the data are presented in Table 7.

Table.7: Influence of Rice-Protein Energy on Number of Erythrocytes, Blood Hemoglobin, Hematocrit Value, Blood Protein, and Local Chicken Blood Cell Cellity-Jimy

Treatment	Erythrocytes (million / mm^3)	Haemoglobin (g/ dL)	Hematocrit (%)	Blood Protein (g/ dL)	The fragility of cells (% hemolysis)
R1	3.01 ^{b}	7.60 ^{NS}	30.75 ^{NS}	4.,88 ^{NS}	2.22 ^{b}
R2	3.52 ^{a}	7.31 ^{NS}	34.06 ^{NS}	4.79 ^{NS}	2.10 ^{b}
R3	3.58 ^{a}	7.63 ^{NS}	34.63 ^{NS}	5.40 ^{NS}	2.75 ^{b}
R4	3.35 ^{ab}	6.89 ^{NS}	33.34 ^{NS}	4.87 ^{NS}	4.11 ^{a}
R5	2.98 ^{b}	6.38 ^{NS}	30.54 ^{NS}	4.80 ^{NS}	4.01 ^{a}

Description: R1 = CP 15%, and ME 2750 kcal / kg; R2 = CP 17%, and ME 2750 kcal / kg; R3 = CP 19%, and ME 2750 kcal / kg; R4 = CP 15%, and ME 2950 kcal / kg; R5 = CP 17%, and ME 2950 kcal / kg.

a, b: means with no common superscript differ significantly, SEM: standard error of means: $p<0.05$; NS: Not significant

The mean erythrocytes of local chickens-Jimy between 2.98 million / mm^3 (R5) to 3.58 million / mm^3 (R3), blood hemoglobin levels between 6.38 g / dL (R5) to 7.63 g / dL (R3), blood hematocrit values between 30.54% (R5) to 34.63% (R3), blood protein content between 4.88 g / dL (R1) to 5.40 g / dL (R3), and the fragility of blood cells between 2.10% (R2) to 4.11% (R4). Based on statistical analysis, the number of erythrocytes and the fragility of blood cells showed a significant difference ($P <0.05$), but hemoglobin, hematocrit values, and blood protein levels did not show any significant difference in the local chickens. The difference of metabolic energy of ration of 200 kcal / kg and the protein content of ration by 4% have an effect on the amount of erythrocytes and the fragility of blood cells in Chicken-Jimy Local.

The liver synthesizes and releases more than 90% plasma proteins [22]. According to [13] there are three major fractions of proteins in the blood, namely albumin, globulin and fibrinogen. Albumin, fibrinogen, and globulin (50-80% globulin) are synthesized in the liver, while the rest of the other globulins are formed in lymphoid tissue.

Total protein is a very important organic compound, one part of a very important total protein is the plasma protein. Plasma proteins consist of a very complex mixture of simple proteins and conjugate proteins such as glycoproteins and various forms of lipoprotein [9]. Several plasma protein functions are proposed by [8] as a function of transport, immune function, buffer function, and maintaining osmotic pressure. The importance of plasma proteins causes the total protein in the blood to be distributed evenly to the needs of the organs so that the total protein present in the blood increases with the increase in protein content in the ration.

Factors that may affect the total protein concentration are physiologically affected by age, growth, hormonal, gender, nutrition, environment and fluid loss [13]. The environment can cause stress on the cattle so that the cattle will lose their body fluids. Protein is also important to regulate the body's water balance. Plasma proteins such as albumin serve to maintain osmotic pressure in the blood. Therefore, the protein serves to help spread the body fluids evenly between the blood and body tissues.

There are several factors that can affect the physiological erythrocyte fragility, according to [23] that nutritional status, environmental temperature, and genetics can affect the erythrocyte fragility. Nutritional status affects the composition of erythrocyte membrane constituents, such as the views of [24] that the erythrocyte composer consists of components of phospholipids, glycolipids, cholesterol, and proteins (glycoproteins), which are highly dependent on nutritional status consumed by animals. Reported [19] that animals in warmer environments have lower erythrocyte fragility than animals living in wetlands. Furthermore [17] stated that the blood storage in refrigator and anticoagulant use of Ethylene Diamine Tetra Aceticacid (EDTA) can increase erythrocyte fragility.

IV. CONCLUSIONS

1. Ration with a metabolic energy content of 2,750 kcal / kg and 17% crude protein, resulting in optimal production and hematological blood values in broiler chickens.

2. The performance of Chicken-Local production of Jimy (consumption of ration = 1816.46 g / e; weight gain = 631.19 g / e; conversion of rations = 2.89; carcass weight = 551,72 g / e; and IOFCC = (Ration consumption = 1761,47 g / e) weight gain = 596,38 g / e; conversion of ration = 2,98; carcass weight = 569,73 g / e and IOFCC = Rp 12,647 / kg), and the lowest Kampung-Unggul chicken (consumption of ration = 1581.69 g / e; weight gain = 510.31 g / e; ration conversion = 3.12, carcass weight = 486.04 g / e; and IOFCC = Rp 11,096 / kg).
3. Hematological value of chicken blood Local-Jimy (blood erythrocytes = 3.52 million / mm^3, blood hemoglobin = 7.31 g / dL; hematocrit blood = 34.06%; blood protein = 4.79 g / dL; blood cells = 2.10% haemolysis), chicken Sentu-Warso (blood erythrocytes = 3.01 million / mm^3, blood hemoglobin = 76.78 g / dL; hematocrit blood = 18.06%; blood protein = 4.92 g / dL, and the fragility of blood cells = 2.74% hemolysis), and Chicken Kampung-Unggul (blood erythrocytes = 3.05 million / mm^3, blood hemoglobin = 6.82 g / dL; hematocrit blood = 25.61% blood = 4.72 g / dL, and the fragility of blood cells = 3.68% hemolysis) is in the normal range.

V. SUGGESTION

The preparation of ration formulas for local broilers is recommended using the metabolic energy content of 2750 kcal / kg with crude protein of 17%. Chicken Local-Jimy is more suitable to be developed in Indonesia to generate greater profit.

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