The Effectiveness Of Red Power Injection On The Hematological Profile Of Layer Chicken (*Gallus domesticus*)

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ABSTRACT

Layer chickens are one of the most popular types of mass-produced laying hens in Indonesia. One way to keep laying hens healthy is to fulfill their micronutrient and vitamin needs. Giving vitamins such as Red power injection is very good for broilers, layers and fighters. Red power injection contains extra liver which contains vitamin B12, folic acid, and iron which are useful for maintaining chicken health. In this study, researchers wanted to test the effectiveness of Red power injection supplements in increasing blood in laying hens (*Gallus domesticus*). The study used an experimental research method using two treatments for one day. Four laying hens (*Gallus domesticus*) that have been provided are divided into two treatment groups with a dose of group one 0.8 ml / head and a dose of group two 1.2 ml / head. The variable observed was the increase of Hematology Profile (Erythrocytes, Leukocytes, and Hemoglobin). The results showed an increase in the Hematology Profile tested. The increase in the Hematology Profile is due to the effect of nutrition on chickens has been fulfilled, Red power injection is a supplement containing liver extract which helps the formation of Hematology Profile in Laying Hens (*Gallus domesticus*).

Keywords: red power injection, hematology profile, laying hens

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INTRODUCTION

Laying chickens are a type of mass-produced laying chicken that is very popular in Indonesia. Eggs themselves contain nutrients that support animal protein nutrition and are widely consumed by the public and the food industry to meet their needs. Considering the growing population and high demand for eggs, keeping laying hens is a promising prospect as it not only improves the quality of production but can also fulfill missing market needs. The number of laying hens increases every year because more eggs are needed for consumption and distribution.

Laying chickens are one of the livestock commodities that contribute animal protein which is capable of producing highly nutritious products. The level of nutritional value of the production of laying hens refers to the quality of the eggs, both external and internal quality (Rao, Q *et al.* 2012). Laying breeds of chickens start their first production at the age of ± 18 weeks until the age of 90 weeks. A laying hen is capable of producing eggs ranging from 250-280 eggs/year. the average egg weight is 50-60 g per egg (Anwar, *et al.* 2018). Analysis of income in the laying hen farming business needs to be carried out because so far farmers have paid little attention to aspects of the financing that has been spent and the income received, so that in turn not much is known about the level of income obtained. This income analysis is

needed to determine the magnitude of production costs and their effect on the income received by breeders (Halim et., al 2007).

Alternative management systems such as free range rearing systems differ significantly from conventional battery cages in layout, facilities, labor costs, crowding, and risk of parasite infection. Suprijatna (2008), laying hens are kept conventionally (intensive) where the activities of the chickens are kept limited to the cage and all their needs are regulated and provided by the breeder, while free range maintenance is based on animal welfare (animal welfare) is a system of keeping chickens by letting them live. freely and humanely lethal.

The productivity of raising laying hens can be influenced by the health of the chicken flock, therefore the health of the chicken flock must be maintained so that the chicken flock is not attacked by disease. The use of antibiotics in the livestock industry is used as a treatment for livestock so that the animals do not die. However, long-term and continuous use of antibiotics can cause antibiotic resistance and cause negative effects, especially if consumed by humans. The use of antibiotics in the livestock industry must be minimized to prevent more serious antibiotic resistance by using other ingredients that can maintain animal health.

One way to maintain the health of laying hens is to meet their micronutrient and vitamin needs. Giving vitamins such as Red Power injection is very good for broilers, layers and fighting chickens. Red power injection contains extra liver which contains vitamin B12, folic acid and iron. In animals, extra liver is effective in increasing the number of liver cells. Vitamin B12 is needed to stimulate appetite and help use carbohydrates in the body and plays a very important role in the nervous system. Vitamin B2 has a major role in the oxidation of fats, carbohydrates and amino acids. Vitamin B6 functions as a coenzyme in the metabolism of amino acids, proteins, carbohydrates and lipids in addition to neurotransmitter synthesis. Vitamin B12 is important for DNA synthesis, erythropoiesis, maintenance of the nervous system, and metabolism of proteins, fats, and carbohydrates, D-panthenol, vit B3 etc.

Based on the description above, the blood hematological profile in laying hens (*Gallus domesticus*) can increase blood levels by administering Red power injection. The aim of this research was to see the effectiveness of Red power injection in increasing blood in laying hens (*Gallus domesticus*).

METHODS

Study Design

The research design used in this research is experimental research. This experimental research used 2 treatments. Red power injection is given by injection at different doses. Chicken blood was taken at the end of treatment on day 11. P1: Giving Red power injection at 0.8 ml / head. P2: Giving Red power injection with 1.2 ml / head.

Samples

The chicken samples used have been provided by PJMK and have been confirmed to be healthy. Four chickens were divided into 2 treatment groups. Red power injection samples were obtained from online stores.

Location and study period

Research in testing the effectiveness of Red power injection was carried out at the Clinical Pathology Laboratory, Faculty of Veterinary Medicine, Airlangga University and the maintenance of chicken experimental animals during the research took place in the Experimental Animal Room, Faculty of Veterinary Medicine,

Airlangga University. This research was carried out on November 9 – November 19 2023.

Chicken Blood Collection Technique

Chicken blood can be collected through the brachial vein in the right and left wings using a 1 or 2 cc needle and syringe.

Erythrocyte and Leukocyte Counting Techniques

The method used is the Natt and Herrick method where the appearance of chicken erythrocyte cells tends to be pale compared to leukocyte cells which are dark purplish blue in color and appear granular intracellularly. Erythrocyte cells will have nuclei that are painted dark blue and purplish. The counting is carried out in a counting room where leukocyte cells are counted in 9 basic areas (4 large areas which are composed of 4 small areas and 5 areas in the central part of the counting room) and erythrocyte cells in 5 areas which are composed of 16 small areas (central part of the counting room) .

Hemoglobin Level Examination Technique

The method used is the cyanmethemoglobine method or photoelectric method. This method has the principle that the blood is diluted with Drabkins solution containing potassium ferricyanide and potassium cyanide. Hemoglobin will change to methemoglobin which then becomes cyanmethemoglobin. The solution will be measured at 540 nm (green filter) using a spectrophotometer.

Data analysis

Data collection uses pre-checking, intervention and post-checking so that it is hoped that there will be differences in the development or increase in the hematological profile.

RESULT AND DISCUSSION

In the results of the research above, higher hemoglobin levels in chicken blood are likely caused by differences in animal physiology (age and activity), environment (temperature and humidity) and feed composition (Swenson 1993; Wahyuni *et al.*, 2012). Apart from that, it can also be caused by the condition of the cage being open all day causing the chickens to get enough oxygen so that hemoglobin levels increase. According to Weiss and Wardrop (2010) hemoglobin levels are influenced by oxygen levels and the number of erythrocytes so that there is a tendency that if the number of erythrocytes is low, the hemoglobin level will be low and if the oxygen in the blood is high, the body is stimulated to increase the production of erythrocytes and hemoglobin. The increase in hemoglobin yield before and after treatment is most likely caused by the presence of Vitamin B-Complex, where the active main metabolite of vitamin B6, namely pyridoxal-5-phosphate, is released into the circulation and 60% of it is bound to plasma proteins. . Some of the pyridoxal phosphate in the liver will be hydrolyzed to become pyridoxal and will be released into the blood circulation to bind to albumin and enter erythrocytes to help the metabolism of hemoglobin. The remaining free pyridoxal phosphate in the liver will be oxidized to 4-pyridoxic acid to be excreted in the urine (Henderson, 1979).

Based on the test results, the number of erythrocytes in chickens that had been given Red power injection increased. Where before the injection was carried out, the number of erythrocytes in the chicken was 45.6 x 103, whereas after the injection it increased to 52 x 103 and 54.8 x 103. This increase in the number of erythrocytes was experienced by the two

Table 1. Results of Hematocrit Examination in Chickens That Have Been Injected with Red Power

Treatment Group	Before	After	
		Dose 0,8	Dose1,2
Hemoglobin	10 g/dl	15 g/dl	22 g/dl
Erythrocytes	45,6 x 10^3	52 x 10^3	54,8 x 10^3
Leukocytes	22,4 x 10^3	24 x 10^3	27,6 x 10^3
Hematocrit	28%	25%	25%

chickens that were injected with doses of 0.8 and 1.2. This is in accordance with the results of the statement by Piliang and Djojosoebagio (2006) that the factor that can influence the formation of erythrocytes is nutritional adequacy. The nutrition contained in Red power injection is liver extract which contains iron which functions to increase the production of red blood cells and vitamin B. - complex.

The increase and decrease in leukocytes in the blood is the body's response mechanism to invading pathogens. High leukocyte production cannot be assumed to mean that the animal is sick. An increase in the number of leukocytes reflects a humoral and cellular response in fighting pathogenic agents that cause disease in the body. Moyes and Schute (2008) and Soeharsono *et al.* (2010) stated that the physical health of livestock can be measured by the number of leukocytes produced, where an increase in the number of leukocytes indicates an increase in the body's defense ability. Meanwhile, a decrease in the number of leukocytes can also be assumed to mean that there is no infection or disturbance of pathogenic bacteria attacking the body. Calculation of the number of leukocytes was carried out using the counting room method, differentiation of leukocytes was carried out by observing smear preparations with a microscope. The results of calculating the number of leukocytes before the Red Power Injector injection were 22.4 x 103 while after being injected with the Red Power Injection the number of leukocytes increased to 24 x 103 and 27.6 x 103. This increase in the number of leukocytes is due to Red Power injection which contains liver extract and vitamin B-Complex. Where the combination of B vitamins contained in the B-complex vitamin plays a role in increasing the livestock's immune response by increasing the production of white blood cells so that it can help the disease healing process.

Hematocrit is the percentage of red blood cells in the blood, which is calculated by including both the number and size of these cells and expressed as a percentage of the blood volume (Jumalang, 2015). Hematocrit is closely related to hemoglobin and erythrocytes. Hematocrit is also a parameter in the blood's ability to carry oxygen. The results of the research show that the average hematocrit value of male free-range chickens for each treatment can be seen in Table 1. Before treatment, the yield was 28%, the 0.8 dose treatment was 25% and the 1.2 dose treatment was 25%. Based on the table presented, the average hematocrit value is in the range of 25-28%. The average hematocrit value obtained for male village chickens was still within the normal range even though there was a decrease after treatment. According to Dharmawan

(2002), normal hematocrit values in chickens range from 22.0-35% with an average of 30.0%. The results of the study showed that the hematocrit level was not in line with the number of erythrocyte levels obtained. This is also supported by the opinion of Soeharsono *et al.* (2010) that the number of erythrocytes does not always affect the hematocrit value. Changes in hematocrit levels will affect blood viscosity. According to Guyton and Hall (2006), the greater the hematocrit percentage, the more friction will occur in the blood circulation, causing blood viscosity to increase along with the increasing hematocrit value. An increase or decrease in the hematocrit value in the blood will have an impact on blood viscosity. The greater the hematocrit percentage, the more blood viscosity will increase. This condition is caused by contraction of the spleen or dehydration. Spleen contraction itself is stimulated by the release of the hormone epinephrine which occurs when the animal experiences fear, pain or exercise.

CONCLUSION

This increase in the number of erythrocytes was experienced by the two chickens that were injected with doses of 0.8 and 1.2. This is in accordance with the results of Piliang and Djojosoebagio's (2006) statement that the factor that can influence the formation of erythrocytes is nutritional adequacy. The nutrients contained in redpower are liver extract which contains iron which functions to increase the production of red blood cells and vitamin B-complex. . Besides that, environmental temperature plays an important role in the number of red blood cells in poultry. An increase in body temperature results in an increase in metabolic processes. Red blood cell production is also influenced by the hormone erythropoietin which functions to stimulate the production of proerythroblasts from hematopoietic cells into the bone marrow. The results of the study showed that the hematocrit level was not in line with the number of erythrocyte levels obtained. This is also supported by the opinion of Soeharsono *et al.* (2010) that the number of erythrocytes does not always affect the hematocrit value. Changes in hematocrit levels will affect blood viscosity. An increase or decrease in the hematocrit value in the blood will have an impact on blood viscosity. The greater the hematocrit percentage, the more blood viscosity will increase. This condition is caused by contraction of the spleen or dehydration. Spleen contraction itself is stimulated by the release of the hormone epinephrine which occurs when the animal experiences fear, pain or exercise.

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