

Faloak (*Sterculia quadrifida*) Bark Solution as A Feed Additive on The Internal Organs of Broiler Chickens

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ABSTRACT

The aim of this research was to evaluate the effect of using faloak bark solution in drinking water on the percentage of internal organs of broiler chickens. This research used a completely randomized design consisting of 4 treatments and 5 replications, with 5 chickens in each replication. The treatment given was T0 = without adding faloak bark solution to drinking water, T1 = 1 ml faloak bark solution/l drinking water, T2 = 1.5 ml faloak bark solution/l drinking water, T3 = 2 ml faloak bark solution/l drinking water. Research variables included the relative weight of bursa fabricius, spleen, and kidney. The results of statistical analysis showed that administration of faloak bark solution in drinking water had no significant effect [$P > 0.05$] on internal organs [bursa fabricius, thymus, spleen, and kidneys]. Based on the research results, it can be concluded that giving faloak bark solution up to a dose of 2 ml/drinking water has not been able to improve the immune response of chickens and affect the kidney percentage of broiler chickens.

Keywords: faloak; broiler chickens; internal organs; feed supplement

INTRODUCTION

The Faloak plant is a type of tree endemic to Timor Island, Rote, East Nusa Tenggara Province [NTT], Indonesia. According to Setyowati et al [2008], Faloak [*Sterculia quadrifida*] is believed to be one of 20,900 endemic species or around 55% of the total 38,000 species in Indonesia. Faloak bark has a hard physical characteristic, the outer surface is uneven with dark brown longitudinal grooves. Susanto [2019] reported that Faloak bark contain some bioactive compound, such as phenol, flavonoid, and terpenoid, and also high antibacterial activity on the bacteria *B. subtilis* [90.51 µg/mL], *E. coli* [80.12 µg/mL], *S. aureus* [77.87 µg/mL], and *S. thypi* [61.23 µg/mL]. Faloak also has the highest antioxidant activity and total phenolic content [34.16 ± 0.76 mg/mL]. Faramayuda et al [2022] added that the total flavonoid content of faloak leaf extract was 5.31 ± 0.29 % w/w, and the total phenol content of faloak extract was 1.79 ± 0.03 % w/w.

According to Albuquerque et al, [2020], the presence of flavonoids and phenolic content can prevent several serious diseases, such as cancer, Alzheimer's, and diabetes if they are consumed daily in a normal dose. Furthermore, Shabella [2013] added that the pharmacological activity of flavonoids is anti-inflammatory, analgesic, and antioxidant. For generations in NTT Indonesia, the bark of Faloak has been boiled and used as an antimicrobial, treating typhus, treating liver disorders, anti-malarial, and other medical treatments.

From the description above, it appears that the bioactive content of faloak bark has great potential as a natural feed additive to maintain chicken health. The weight of internal organs is an indicator of the chicken's health or immune response.

Hewajuli and Dhamayanti [2015] stated that the immune organs in broiler chickens play a role in the body's immune system against incoming foreign objects or antigens. Hanum et al, [2017] added that Bursa Fabricius and thymus are body organs that play a role in the immune system in birds, while lymph plays a role in the breakdown of old erythrocytes and the secretion of antibodies. Therefore, the objective of the study was to evaluate the effect of using faloak bark solution in drinking water on the relative weight of internal organs of broiler chickens

MATERIALS AND METHODS

Chickens Feeds

From 1 to 35d the chicks were fed on commercial feed. Feed and clean drinking water were provided ad libitum in the form of pellets. The nutritional content of the feed is listed in Table 1.

TABLE 1: Nutritional content of starter and finisher feed.

Ingredients	Starter feed	Finisher feed
Energy [kal/kg]	3100	3100
Protein [%]	21	19
Fat [%]	3-7	3-8
Calcium [%]	0,9-1,1	0,9-1,1
Phosphor [%]	0,6-0,9	0,6-0,9

Chicken cage

The cage used in this research was an open system cage measuring 8x4 meters, then 20 plots were made from the cage, each cage measuring 50x60 cm. Each cage is equipped with lights, a feeder and a drinker.

Research methods

A total of 100 one-day-old broiler chicks strain CP-707 were used in this experiment. The chickens were randomly allocated to 4 treatments with 5 pens per treatment and 5 birds per pen. The treatment was: 1] T0: Drinking water without administering faloak bark solution, 2] T1: 1 ml Faloak bark solution/l drinking water, 3] T2: 1.5 ml Faloak bark solution/l drinking water, and 4] T3: 2 ml Faloak bark solution/l drinking water

Variables measured

The variables measured as indicators of the effect of the treatment given in this study were the relative weight of internal organs [bursa fabricius, thymus, spleen and kidneys].

RESULTS AND DISCUSSION

The effect of administering faloak bark solution through drinking water on the internal organs of broiler chickens can be seen in Table 2.

TABLE 2: Average relative weight of internal organs of broiler chickens given Faloak bark solution.

Variables	Treatment				P
	T0	T1	T2	T3	
Bursa Fabricius (%)	0,095	0,092	0,105	0,120	0,329
Thymus (%)	0,232	0,225	0,192	0,198	0,325
Spleen (%)	0,153	0,124	0,132	0,156	0,477
Kidney (%)	0,512	0,493	0,527	0,458	0,133

Effect of treatment on the relative weight of bursa fabricius

The percentage of bursa of fabricius in this study [0.092-0.120%] is still within the normal range. According to Aprilia [2018], the normal size of the relative weight of the bursa of Fabricius in broiler chickens is 0.07%-0.11%. The results of the analysis of variance showed that the treatment did not have a significant effect [P>0.05] on the weight of the bursa Fabricius of broiler chickens. This could be due to the bioactive compounds in faloak bark such as flavonoids, saponins, tannins and phenolic compounds were not sufficient to support the development of the Bursa of Fabricius. Another reason for the weight of the bursa of Fabricius was not affected in this study, because the research chickens were in good health. so it did not affect the Bursa of Fabricius. This is supported by research by Fajrih *et al.* [2014] that the relative size of the bursa of Fabricius is influenced by the stress response to the environment.

Effect of treatment on the relative weight of thymus

The average percentage of thymus produced in this study ranged from 0.198 - 0.232%. The range of results of this research is still considered normal in accordance with Aprilia's research [2018] on the normal size of thymus weight in broiler chickens was 0.18-0.25%. Based on the results of the analysis of variance, it showed that the administration of faloak bark solution had no significant effect [P>0.05] on the percentage of thymus. During the whole experiment broiler chickens were in good health and did not experience stress, so the bioactive compounds in faloak bark were not able to increase lymphocyte cells which can carry out an immune response against attacks by pathogenic bacteria. This is supported by Niu *et al.* [2009] stated that the weight of the thymus organ will decrease in line with the condition of the livestock and also the environment that is exposed to heat stress.

Effect of treatment on the relative weight of spleen

The average percentage of spleen in this study ranged from 0.124 to 0.156%, still within the normal range. According to Aprilia *et al.* [2018], the relative weight of broiler chicken spleen is 0.11 - 0.15%. Based on the analysis of variance, administration of faloak bark solution had no significant effect [P>0.05] on the percentage of the spleen. This is probably because bioactive compounds contained in faloak bark have not been able to influence lymph activity which plays a role in the body's defense system of broiler chickens. According to Jamilah *et al.* [2013] feed or nutrition greatly influences the development of lymphoid organs. One of the factors that influence the increase in spleen weight is heat stress or the stressed condition of the chicken. According to Zulfa [2019], the increase in spleen weight occurs when it is exposed to heat stress and foreign body infections. According to Merryana *et al.*, [2007], enlargement of the spleen occurs when broiler chickens are infected with bacteria because the lymph acts as an immune system that produces lymphocytes.

Effect of treatment on the relative weight of kidney

The average percentage of kidneys produced in this study ranged from 0.458-0.527%. The percentage of kidneys from this study is still in the normal range, which according to Hermana *et al.* [2008] stated that the normal kidney weight of broiler chickens ranges from 0.43-0.84% of body weight. Based on the analysis of variance, administration of faloak bark solution had no significant effect [P>0.05] on the percentage of kidneys. This means that the faloak bark solution does not make the kidneys work harder in secreting the results of the metabolism of food substances because the harder the kidneys work, the more the chicken's kidneys will enlarge. Khosravina *et al.*, [2013] stated that the relative weight of the kidneys is influenced by the function of the kidney organ and the feed additive used.

CONCLUSION

Based on the results of the research, it can be concluded that administering faloak bark solution up to a dose of 2 ml/drinking water has not been able to improve the internal organs of chickens and provide the same effect on the kidney percentage of broiler chickens.

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