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Analysis of the Economic Value of Providing Binahong Leaves (*Anredera Cordifolia*) as a Substitute for Antibiotic Growth Promoter in Broiler Raising

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ABSTRACT

Broiler rearing requires optimal productivity which will have implications for higher income. However, broiler rearing requires innovation in maintaining their health.This study aims to determine the utilization of binahong leaves as a substitute for AGP which has an impact on the economic value of a broiler livestock rearing process. Study design used a completely randomized design (CRD) with 5 treatments and 4 replications, namely P0: no antibiotics and no infection, P1 = No antibiotics + 0.4 ml infection, P2 = commercial antibiotics + 0.4 ml infection, P3 = 7.5 gr binahong leaves / kg feed + 0.4 ml infection, and P4 = 15 gr binahong leaves / kg feed + 0.4 ml infection. The parameters observed were feed cost, feed price per body weight, economic value of feed, and income over feed cost. The results of the study were the provision of binahong leaf flour did not give a significant difference in the parameters of feed cost, and the economic value of feed. However, in the parameters of feed price per body weight and income over feed cost, the provision of binahong leaf flour had a significant effect. In conclusion utilization binahong leaves has an impact on the economic value of a broiler livestock rearing process.

Keyword: Alternative feed, Binahong leaf, Broiler chicken, Economic value

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1. Introduction

The broiler business has challenges that must be addressed immediately to increase the quantity and quality of meat produced. The broiler business is still very dependent on commercial feed and *feed additives*. The use of antibiotics as *feed additives* aims to stimulate growth by stimulating the formation of vitamin B complex by microbes [1]. Antibiotics growth promoters (AGP) that are often used by farmers and currently circulating are semi-synthetic products [2]. Semi-synthetic products in animal feed are often indicated not to be derived from pure cultures of microbes, but in the form of chemically synthesized antimicrobials so that their use for a long time will cause resistance effects on target pathogenic bacteria. Broiler chicken maintenance requires optimal productivity, this implies the creation of higher income due to high production but with economical feed costs. Based on this background, researchers are interested in conducting research in the socio-economic field with the title Analysis of the Economic Value of Giving Binahong Leaves (*Anredera Cordifolia*) as a Substitute for Antibiotic Growth Promoter.

2. Materials and Methods

2.1. Place and Time

This research was conducted at the Livestock Biology Laboratory, Faculty of Agriculture, University of North Sumatra. This research will be conducted from October to November 2023.

2.2. Materials and Equipment

Tools
The tools used in this study are colony cages equipped with feed and drink containers per cage, digital scales of capacity 1 kg, 25W incandescent lamps, stationery, cameras and logbooks.
Material
The materials used in this study include: One-day-old Cobb strain broiler chickens (DOC).

2.3. Research Methods

This study used a completely randomized design (CRD) experimental design with 5 treatments and 4 replicates. With the following treatments:
P0 : Positive Control (No Infection),
P1 : Negative Control (No Antibiotic + 0.4 ml infection)
P2 : Negative Control (Commercial antibiotic + 0.4 ml infection)
P3 : Negative Control (7.5 g Binahong Flour /kg Ration + 0.4 ml infection)
P4 : Negative control (15 g Binahong flour /kg ration + 0.4 ml infection).

Table 1. Composition of Bravo 511 and Bravo 512 Rations

Nutrients	Bravo 511	Bravo 512
ME (Kcal/Kg)	2900 - 3000	3000 - 3100
Water Content (%)	13,0	13,0
Crude Protein (%)	21,0 - 23,0	19,0 - 21,0
Ash (%)	7,0	7,0
Crude Fat (%)	5,0	5,0
Crude Fiber (%)	5,0	5,0
Calcium (%)	0,9	0,9
Phospor (%)	0,6	0,6
Aflatoxin (ppb)	50	50

Source: (Charoen Phokpand, 2022)

2.4. Research Parameters

2.4.1. Feed cost

Feed cost are all costs used in the maintenance process during the study. The feed uses commercial feed so that the resulting feed cost is the cost of feed using commercial feed. [3] The formula for calculating feed costs is as follows.

Feed cost = Amount of feed consumed (gr) x Price of feed (gr)

2.4.2. Carcass Weight (g/head)

Carcass weight is a method for comparing research results after the head, base of neck, legs, blood, fur, and inner cavity contents are removed, as assessed in the 2009 SNI (Indonesian National Standard) standard [4].

2.4.3. Feed price per body weight

The price of feed per body weight is the value needed to produce broiler weight gain. [5] The formula for calculating the price of feed per body weight is as follows.

$$\text{Feed Price per Body Weight (IDR)} = \frac{\text{Total Ration Consumption Price (IDR)}}{\text{Weight Gain (g)}}$$

2.4.4. Income over feed cost ratio (IOFC)

[6] Calculating *Income Over Feed Cost* (IOFC) using the following formula:

IOFC = Selling Price (IDR) - Feed Price (IDR)

2.4.5. Economic value of feed

[7] calculates the economic value of feed using the following formula:

Economic value = Feed Conversion x Price per head of feed

2.5. Data Analysis

To determine the effect of treatment on the measured variables, the data obtained were tested with variance analysis (ANOVA) with the help of SPSS software. If the treatment showed a significant effect, it was followed by multiple area tests (Duncan) to determine differences between treatments.

3. Results and Discussion

3.1. Cut Weight

Feed costs are the entire amount spent in purchasing feed. This research uses Bravo feed (Charoen Pokphand) . Data presentation will be grouped by treatment. Feed costs can be seen in Table 2 below.

Table 2. Feed cost (IDR/Period/head)

Treatment	U1	U2	U3	U4	Total	Mean±SD
P0	27421.2	27860	27293.4	26087	108662.4	27165.6^{tn} ±758.71
P1	26445.6	26815	27711	27144	108115.2	27028.8^{tn} ±536.86
P2	26400.6	27468	26983.8	28651	109503	27375.75^{tn} ±955.39
P3	25488	25943	26699.4	27751	105881.4	26470.35^{tn} ±988.97
P4	25934.4	25519	28341	24813	104607	26151.75^{tn} ±1531.14

Notes: The same superscript indicates no significant difference (P>0.05).

Based on Table 2, it can be seen the amount of feed prices in this study. The price of feed does not have a significant difference this is because alpha is greater than 0.05. The smallest average feed price occurred in P4 amounting to IDR.26,151.75 /period/head. This was influenced by P1 not using AGP, and given *Salmonella Sp. The* average price of the largest feed was P2 at IDR.27,375.75/period/head. The results of the acquisition of feed prices are obtained based on feed consumption. [8] the average feed consumption of broiler chickens given additional binahong leaves as a substitute for AGP as follows. also P0 (90.34 ± 2.41), P1 (84.33 ± 2.81), P2 (90.02 ± 1.55), P3 (88.22 ± 3.08), P4 (87.14 ± 4.84) (gr/head/day).

The average feed price in the treatment of binahong leaves as AGP (P3, P4) was lower than the feed price in the treatment of commercial AGP (P2). This difference was caused by different feed consumption. Binahong leaves contain saponin compounds that cause a bitter taste. This is in accordance with the opinion of Firdiansyah [9] that high saponin compounds in binahong leaves have a taste that tends to be bitter so that to reduce the bitterness, chickens will drink quite a lot of water and will consume less feed.

The feed used in the study was Bravo commercial feed at a price of IDR.9000/Kg, the conversion of feed price per gram was IDR.9/gram. If the feed cost is calculated with a period of 35 days, the average feed cost is as in Table 2. The price of feed in this study is higher than the results of research on the provision of herbal medicine to broiler chickens based on. [10] the highest feed price was P3 at IDR. 19,783, while the lowest P2 was 19,388. The difference in the results of this study is due to differences in the time period of broiler rearing and differences in feed prices.

3.2. Feed price per body weight

Feed price per body weight is the value needed to produce broiler weight gain. The calculation of feed price is obtained from the price of feed divided by body weight gain. The price of feed per body weight can be seen in Table 3.

Based on Table 3, it can be seen the price of feed per body weight during the study. The provision of binahong leaves at 15gram/Kg of ration has the lowest price of feed per body weight which is IDR12.28/gram. This means that if there is an increase in body weight by 1 gram, the feed cost incurred is IDR.12.28. The highest feed price per body weight was obtained in P1 at IDR.13.80/gram body weight. The provision of binahong flour as a substitute for AGP had a significant effect (P<0.05). The price of feed per body weight was obtained based on the body weight gain of broilers and ration consumption in the study. The calculation of feed cost per gain was done because feed costs ranged from 60-80% of the total cost of production. [11] which states that the cost of feed plays an important role because it is the largest cost of the

total cost of business in animal husbandry. Therefore, the use of good quality and relatively cheap feed is a necessity to achieve a certain level of efficiency.

Table 3. Feed price per body weight (IDR/head/period)

Treatment	U1	U2	U3	U4	Mean±SD
P0	13.58	13.66	13.37	13.87	13.62±0.21^{b}
P1	14.34	12.97	13.21	14.70	13.80±0.84^{b}
P2	13.91	12.92	13.62	14.30	13.69±0.58^{b}
P3	13.68	13.84	14.02	13.29	13.71±0.31^{b}
P4	12.01	11.88	13.42	11.79	12.28±0.77^{a}

Notes: Different superscripts indicate significant differences (P<0.05).

The application of herbal plants in the livestock industry has a positive impact. This can be seen through research [12] which states that the total revenue, income and R/C ratio of broiler cultivation using turmeric herbs are significantly different (P < 0.05) between conventional maintenance and maintenance using turmeric herbs. Maintenance of broiler chickens using turmeric herbs significantly (P<0.05) increased the income of broiler farmers. Giving binahong leaves contains active flavonoid compounds. [13] shows that the provision of flavonoids in sufficient quantities will be protective in increasing body weight gain, but if given in excess of the limit of administration it will cause hepatoxite (poison in the liver). The average value of feed price per body weight is different from the average feed price. At the price of feed P1 is a group without the provision of AGP is the treatment that has the lowest feed price compared to other treatments. While at the price of feed per body weight P1 obtained the highest value. This is caused by a lot of feed consumption but does not produce a balanced body weight so this makes the value of the two parameters different. [14] giving binahong leaf flour as a substitute for AGP has the following consecutive body weight gain. P0 (57.00 gr/head/day), P1 (53.09 gr/head/day), P2 (57.19 gr/head/day), P3 (57.97 gr/head/day), and P4 (60.61 gr/head/day).

3.3. Economic value of feed

The economic value of feed is the value obtained from the ratio of average feed consumption per head to average body weight gain per head multiplied by the price of feed per head. Simply put, the economic value of feed is the multiplication of FCR by the price of feed. The economic value of feed can be seen in the Table 4 below.

Based on Table 4, it can be seen the economic value of feed per head in the study of the addition of binahong leaves as a substitute for AGP. Based on the results of *one-way* anova testing, there were significant differences in all treatments given (P < 0.05). Economic value means feed efficiency multiplied by feed price. The smaller the economic value, the better the efficiency of feed use. The best economic value in this study was obtained by P4 (addition of 15gr binahong leaves/Kg feed + *salmonella sp*. infection) with a value of IDR. 35,766.83/head, followed by the economic value of P3 (addition of 10gr binahong leaves/Kg feed + *salmonella sp.* infection) of IDR. 40,302.62.

Table 4. Economic value of feed (IDR/head/period)

Treatment	U1	U2	U3	U4	Mean±SD
P0	41388.54	42289.23	40531.79	40217.50	41106.76±930.77^{b}
P1	42127.16	38628.48	40660.58	44333.53	41437.44±2405.33^{b}
P2	40794.10	39446.80	40839.39	45534.86	41653.79±2666.82^{b}
P3	38736.73	39902.06	41595.65	40976.06	40302.62±1256.70^{b}
P4	34611.23	33681.89	42272.55	32501.63	35766.83±4422.23^{a}

Notes: Different superscripts indicate significant differences (P<0.05).

The highest economic value was found in P2 (feed given commercial AGP given *salmonella sp*. infection) amounting to IDR.41653.79/head. The economic yield of feed was obtained based on the feed conversion value obtained during the study. The smaller the feed conversion value, the more efficient the feed and the more economical the feed value.

Research on the provision of binahong leaves as a substitute for AGP has a lower economic value than the economic value of feed in research on the provision of herbal medicine. [15] stated that the highest economic value was P3 amounting to IDR. 19,783, while the lowest P2 was IDR. 19,388. Economic value is

the opposite of feed conversion, the higher the economic value, the better the livestock in converting feed into meat.

4. Conclusion

4.1. Conclusion

The feeding of binahong (*Anredera Cordifolia* (*Ten.*) *Steenis*) leaf meal mixed with commercial feed did not give significant differences in the parameters of feed cost, and *income over feed cost*. However, in the parameters of feed economic value and feed price per body weight, binahong leaf meal had a significant effect.

4.2. Suggestion

Farmers are advised to use a mixture of binahong leaf meal with chicken feed. The results showed that the use of binahong leaf meal as a substitute for AGP can reduce feed costs in broiler farming.

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