

The effects of dried betel (*Piper betle* Linn) leaf extract and betel leaf meal on the production of quail egg

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Abstract. One of the purposes of the inclusion of antibiotics in the ration is to improve production efficiency. Betel leaves are medicinal herbs containing essential oil which can be used as natural antibiotics. This research aimed to examine the effect of giving betel leaf extract and betel leaf flour on quail egg production. A completely randomized design with 4 treatments and 4 replicates was used. Treatments consisted of basal ration (P0), the inclusion of betel leaf meal (BLM) in ration by 1% (P1), the inclusion of dried betel leaf extract (DBLE) in ration by 0.5% (P2) and 1% (P3). The results showed that the inclusion of betel leaf extract and flour did not affect egg production, feed intake, and egg mass. But it improved the feed conversion ratio.

1 Introduction

In the livestock industry, antibiotics in feed additives are used as a growth promoter, increasing efficiency in feed use and livestock production [1]. The use of antibiotics, drugs, or hormones that stimulate animal growth, which have the effect of not complying with the prescribed dosage recommendations, can cause residues in the livestock products produced, which can cause health problems in livestock. Adding antibiotics to animal feed is starting to cause serious problems, with residues or pathogenic bacteria found in livestock carcasses and other livestock products. Residues contained in consumed meat will increase bacterial resistance to antibiotics, so antibiotic replacement feed ingredients are needed [2].

Several studies have been carried out to replace the role of antibiotics as antibacterials, by using feed additives derived from medicinal plants (herbal medicine). Herbal rations are given to livestock, one of which is quail. Feed ingredients derived from medicinal plants can provide additional benefits and advantages and can be an alternative to replacing antibiotics. One of the traditional medicinal plants that can be used as an herbal feed ration and can replace antibiotics is green betel leaf (*Piper betle* Linn).

As an alternative feed ingredient, betel leaves can be used as a ration ingredient to increase metabolism in the body, stimulate the intestines to absorb important nutrients and vitamins for the poultry body, and be used as a strong antimicrobial and anti-fungal agent. In

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general, betel leaves contain as many essential oils as possible 4.2% which is antimicrobial because it can inhibit the growth of several types of bacteria such as *Escherichia coli* and *Salmonella* sp. [3]. However, according to Sudrajat et al. [4], medicinal plants given to animals will have better results if they are an extract solution. Carrasco et al. [5] stated that plant extracts can stimulate growth and efficient feed use. The research results of Sudrajat and Kardaya [2], showed that the boiled betel leaf solution has antibacterial activity, especially against *E. coli* bacteria, and has the potential to increase nitrogen retention and metabolic energy in broiler chicken rations. This research was conducted to test the effect of betel leaf flour and betel leaf extract on quail egg production.

2 Materials and methods

2.1 Birds and diets

This research used 128 *Coturnix coturnix japonica* quail with an average weight of 173.00 ± 17.98 grams/head, aged 7 weeks. The quail is in good health, has good body posture, is not deformed, has a light brown face with white under the jaw, has black or brown spots on the chest area, and has no lumps in the cloaca area. The experimental feed was prepared independently according to nutrient requirements (Table 1).

Table 1. Effect of feeding media composition on Black Soldier Fly larvae development

Feeds (%)	P1	P2	P3	P4
Corn Meal	60.4	60	59.4	58.85
CGM	7	6.8	6.6	7.8
Sorbean Meal	13.05	13.05	12.95	12.00
Fish Meal	8.8	8.5	8.5	8
Premix	1	1	1	1
CaCO ₃	5.6	6.5	7.2	8
CPO	1.5	1.5	1.7	1.7
DCP	2	2	2	2
Cr-O	0.15	0.15	0.15	0.15
BLE	0	0	0.5	1
BLF	0	1	0	0
Nutrient				
Metabolizable Energy (Kcal/kg)	2932	2952	2932	2935
Crude Protein (%)	20.4	20.4	20.4	20.4
Calcium (%)	2.72	2.72	2.72	2.72
Posfor (%)	0.6	0.6	0.6	0.6

Notes : Corn Gluten Meal (CGM), Dicalcium Phosphate (DCP), Calcium Carbonat (CaCO₃), Crude Palm Oil (CPO), Chromium Organik (Cr-O), Betel Leaf Extract (BLE), Betel leaf meal (BLM)

2.2 Experimental design and parameter

This research used a completely randomized design (CRD) consisting of four treatments and four replications, each containing 8 quail. The treatment for adding betel leaf extract to the ration in this study was: P0: Ration Without Betel Leaf Meal; P1: Ration Contains 1% Betel Leaf Flour; P2: Ration Contains 0.5% Betel Leaf Extract; P3: Ration Contains 1% Betel Leaf Extract.

Rations are given twice a day, namely in the morning and evening ad libitum. Drinking water was given ad libitum. There has been no treatment with medication or vitamins for quail since treatment began. The variables observed were feed consumption, egg production, egg mass, and feed conversion. Variable measurements are carried out every week. Data analysis was carried out using the ANOVA test. If it shows a significant effect ($P<0.05$) or very significant ($P>0.01$), then proceed with the Duncan test. Data analysis was assisted using the SPSS application.

3 Results and Discussion

The feed intake of quails that were given feed containing betel leaf extract and flour was not significantly different compared to quails that were not given betel leaves (control) (Table 2). This showed that the rations' palatability level was the same in all experimental diets. Feed palatability refers to the sensory characteristics of animal feed that influence an animal's willingness to consume it. According to Mcdonald et al. [6], palatability refers to the taste and texture of the feed and how the animal responds to it. A palatable feed is readily eaten by the animal. It may also refer to the aesthetic appeal of a feed, which might relate to the appearance or smell of the feed. Providing betel leaves in the feed showed that it did not affect the quail's sensory abilities so it did not affect the palatability of the feed. Apart from betel leaf extract, betel leaf flour can also be used as a feed additive in feed. The results of research by Herlina and Ibrahim [7] stated that the use of 0.2% betel leaf flour in commercial feed had a very significant effect on feed consumption but had no effect on body weight and feed conversion.

Table 2. Effect of feeding betel leaf on performances of quail-phase laying

Variables	P1	P2	P3	P4
Feed intake (g)	18.90±2.04	17.39±2.09	20.19±1.44	17.98±2.00
Egg production (%)	40.43±7.08	34.47±8.54	38.42±8.55	30.38±7.88
Mass production (g)	3.82±0.70	3.19±0.84	3.45±0.95	2.64±0.86
Feed conversion	4.32±0.91	3.67±0.91	4.37±1.30	3.31±0.59

Notes: The mean values of all variables show that they are not significantly different ($P > 0.05$)

According to the analysis of variance, feeding quail flour and betel leaf extract had no impact on the birds' ability to lay eggs. These findings are consistent with those of Sudrajat et al. [4] study, which found that the production and egg-mass production of quail eggs was not significantly affected by the administration of betel leaf solution to quail. Studies on the use of betel (*Piper betel* L.) leaf meal in chickens increased the population of non-pathogenic bacteria and reduced the population of pathogenic bacteria in intestines [8], and increased body weight gain [9]. This research is in line with research by Sudrajat et al. [4] on laying quail who were given betel leaf solution to drink, which did not affect egg production.

Providing betel leaf extract in feed improved feed conversion (Table 2). The average conversion rate for quail-given betel leaf extract was 3.31, better than that for quail without betel leaf extract, which was 4.32. In rations given betel leaf extract, there was an increase in ration efficiency by 23%. Plant extracts in meals may impact hens' functioning, intestinal health, and endogenous secretions [10]. This is due to the substance content contained in betel leaf extract can suppress the growth of microorganisms in the gastrointestinal tract [11].

4 Conclusion

The consumption and production of eggs were unaffected by feeding extract and flour of betel leaf. The ration conversion of laying quail can be improved by administering betel leaf extract in ration of laying quail.

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