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Additional Effect of Apple Sugar Leaf Extract (Annona Squamosa L) Through Drinking Water on Feed Digestiveness and Performance of Roles, Layer Tife

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Abstract

This study aimed to determine the effect of sugar apple leaf extract (Annona squamosa l) on production performance, carcass and digestibility of roles layer tife. The experimental design used was a completely randomized design (CRD) with 5 treatments and 4 replications, where each replication used 3 male laying hens aged 2 weeks so a total of 60 chickens were used. The treatment was the administration of sugar apple leaf extract through drinking water, namely 0%, 1%, 2%, 3% and 4% for treatment E0, E1, E2, E3 and E4 respectively. The variables observed were nutrient digestibility and performance. The results showed that the administration of sugar apple leaf extract through drinking water had no effect on ration consumption, Feed Conversion Ratio (FCR) and initial weight, but could increase body weight gain, final weight, dry matter digestibility, protein digestibility and energy digestibility. Based on the results of the study, it can be concluded that the administration of sugar apple leaf extract at a level of 2-4% can increase nutrient digestibility and the performance of laying hens.

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1 Introduction

Roles layer tife are a by-product of breeding and hatching laying hens. Roles layer tife can produce meat. So far, laying hens have only focused on raising female-layer chickens. The production of Day Old Chick (DOC) from laying hens of the male sex has not been widely used as a meat producer. Roosters grow faster when cultivated than female chickens (Zhang et al., 2015; Liu et al., 2015). The advantages of this chicken are that the DOC price is relatively cheap, the growth is quite fast, the meat is thin but dense, there is little fat and the taste of the meat is not much different from native chicken (Nova et al., 2020).

The use of antibiotics as growth factors or Antibiotic Growth Promoters (AGPs), given through feed in small amounts or sub-therapeutic levels and the long term (Bulu et al., 2020). However, the use of AGPs can interfere with human health as consumers, due to the presence of antibiotic residues in foodstuffs and the emergence of zoonotic bacterial strains that are resistant to antibiotics. This is detrimental because it reduces the effectiveness of antibiotic therapy used in the treatment of various infections in humans as consumers (Dahiya et al., 2006).

Indonesia is known as one of the countries that have biodiversity which is widely used in traditional medicine. Currently, although traditional medicines are widely used by the community as self-medication, health workers/doctors are generally still hesitant to prescribe or use these drugs (Handayani, 2001). One of Indonesia's biological wealth is the sugar apple leaf (Annona squamosa L).

Sugar apple leaves contain alkaloids aporphine, carvone, linalool, limonene, squamosin and quercetin. Acetogenins, another characteristic group of compounds isolated from Annona Squamosa have been suggested to act as potential anti-neoplastic agents and are also the main insecticidal constituents of sugar apple extract (Hendriks & Zeeman, 2009; Kim & Holtzapple, 2006; Singh et al., 2010). Sugar apple leaf extract has shown promise for pest control against various insect pests. Laboratory and field tests show that extracts from sugar apple leaves are effective against plant pests such as caterpillars. Crude oil from Annona Squamosa seeds at a concentration of 2.5 percent significantly reduced leaf damage caused by larvae and adult beetles (Irwan, 2007).

2 Materials and Methods

Place and time of research

The research was carried out on a ranch owned by a farmer in the village of Dajan Peken, Tabanan District, Tabanan Regency, Bali. The duration of the study was 2 months from preparation to data collection. Laboratory research for sample analysis was carried out at the Nutrition and Animal Feed Laboratory and phytochemical analysis at the Analytical Laboratory of Udayana University.

Research design

The design used in this study was a completely randomized design (CRD) with five (5) treatments and four (4) replications, each experimental unit consisted of 3 roles layer tife, so the number of chickens used was 60 with initial weight. 114.75 g - 140.15 g. The treatments used in this study were: chicken without sugar apple leaf extract administration through drinking water (E0), administration of sugar apple leaf extract 1% (E1), administration of sugar apple leaf extract 2% (E2), administration of 3% sugar apple leaf extract (E3), giving 4% sugar apple leaf extract (E4).

Cage

The cage used in this study was a 20-box battery cage system with the size of each box (Length x Width x Height) 60 cm x 50 cm x 40 cm. The cage material used was BRC wire. Each box is equipped with a place to eat and a place for drinking water made of paralon pipes and bamboo. Dirt mat from used cardboard to accommodate making it easier to clean. Cleaning is done once a week.

Making sugar apple leaf extract

The production of sugar apple leaf extract (Annona squamosa L) begins with the process of collecting sugar apple leaves. The sugar apple leaves used are old leaves picked from 5 strands of the oldest leaf on each branch, and then the leaves are washed using clean water. The sugar apple leaves obtained were weighed 1 kg, then added 1 litre of clean water was, and then blended. Water extract from sugar apple leaf with a ratio of 1:1 was put into a bottle and kept closed for use as the next treatment (Bunse et al., 2011; Ospina et al., 2010). The treatment of sugar apple leaf extract 1% (E1) was given 99 ml of drinking water and 1ml of sugar apple leaf extract, then for treatment E2, E3, and E4 followed the pattern of E1 behavior.

Variable

The variables observed in this study were as follows: (1) nutrient digestibility and (2) the performance of roles layer tife.

Data analysis

The data obtained were analyzed using a variance. If between treatments there were significantly different results ($P < 0.05$), the analysis was continued with Duncan's multiple distance test (Steel & Torrie, 1993).

3 Results and Discussions

The results of the research on the digestibility and production performance of roles layer tife given sugar apple leaf extract are as follows:

Nutrient digestibility

Table 1
Nutrient digestibility of roles layer tife

Variable	Treatment					SEM
	E0	E1	E2	E3	E4	
Dry matter digestibility (%)	73,12^{d}	75,15^{cd}	75,46^{c}	82,96^{a}	80,64^{b}	0,69
Protein Digestibility (%)	66,83^{d}	71,71^{c}	72,98^{c}	83,33^{a}	79,96^{b}	0,84
Energy digestibility (%)	78,09^{c}	80,55^{b}	80,46^{b}	90,58^{a}	89,63^{a}	0,64

Information:

1) Provision of drinking water without the addition of sugar apple leaf extract as a control (E0), provision of drinking water with the addition of 1% sugar apple leaf extract (E1), provision of drinking water with the addition of 2% sugar apple leaf extract (E2), administration of drinking water with the addition of 3 % sugar apple leaf extract (E3), and drinking water with the addition of 4% sugar apple leaf extract (E4).

2) SEM: "Standard Error of The Treatment Means"
3) Values with different letters in the same row show a significant difference (P<0.05)

The dry matter digestibility value in the E0 treatment was 73.12% (Table 1). Dry matter digestibility of roles layer tife that received E1 treatment had a dry matter digestibility value of 0.03% which was not significantly different (P>0.05) higher than E0 treatment. Treatments E2, E3 and E4 had dry matter digestibility values of 0.34%, 7.84% and 5.52% significantly different (P<0.05) higher than treatment E0. This is because sugar apple leaf extract contains chemicals such as flavonoids as an antibacterial which can optimize the process of absorption of nutrients in the digestive tract of chickens so that nutrient digestibility increases (Leão et al., 2021; Safa et al., 2016; Łukaszewicz et al., 2008). According to Widodo (2005), one of the roles of flavonoids in the body of livestock is to help the process of digestion and absorption of food nutrients. Its mechanism of action is to kill harmful microorganisms in the digestive tract, thereby breaking down microorganisms and their crusts attached to the intestines. This condition causes the intestinal wall to become thinner, and the absorption of nutrients increases (Jacob et al., 2013).

Protein digestibility in this study showed that the results of treatments E1, E2, E3 and E4 were significantly different (P<0.05) higher than treatment E0. The protein digestibility in Table 1 shows that the digestibility of the E0 treatment was 66.83% lower than the E1, E2, E3 and E4 treatments, namely 4.88%, 6.15%, 16.5% and 13.13%. This is because tannins act as protein denatures while flavonoids are compounds that are easily soluble in water for antimicrobial and antiviral work. Its mechanism of action in inhibiting bacteria is carried out by denaturing proteins and damaging bacterial cell membranes by dissolving fats contained in cell walls so that proteins in the digestive tract can be absorbed properly (Sklan & Hurtwitz, 1980).

The effect of treatment on energy digestibility is shown in Table 1, energy digestibility showed significantly different results (P<0.05). The energy digestibility value of treatment E0 was 78.09% significantly different (P<0.05) lower than treatment E1 at 2.46%, E2 at 2.37%, E3 at 12.49% and E4 at 11.54%. This is because the content of chemical compounds in sugar apple leaves can inhibit the growth rate of pathogenic bacteria so that energy absorption increases. This energy digestibility figure is still in the range of chicken energy digestibility in the tropics, which is in the range of 60-85% (Blair et al., 1990). According to Anggorodi (1994), individual cattle of the same species have slight differences in their ability to digest any given feed.

Performance of roles layer tife

Table 2
Performance and carcass of roles layer tife

Variable	Treatment[1)]					SEM[2)]
	E0	E1	E2	E3	E4	
InitialWeight(g)	133,98[a3)]	128,87 [a]	129,86[a]	129,55[a]	131,14[a]	2,75
Final Weight(g)	642,48[b]	672,25[b]	693,47[ab]	751,93[a]	652,77[b]	24,7
Ration Consumption (g/hr)	21,66[a]	23,16[a]	23,63[a]	23,45[a]	19,88[a]	1,52
Weight Gain (g/hr)	9,06[b]	9,69[ab]	10,05[ab]	10,74[a]	9,30[ab]	0,86
FCR	2,39[a]	2,39[a]	2,35[a]	2,18[a]	2,14[a]	0,07

1) Provision of drinking water without the addition of sugar apple leaf extract as a control (E0), provision of drinking water with the addition of 1% sugar apple leaf extract (E1), provision of drinking water with the addition of 2% sugar apple leaf extract (E2), administration of drinking water with the addition of 3 % sugar apple leaf extract (E3), and drinking water with the addition of 4% sugar apple leaf extract (E4).
2) SEM: "Standard Error of The Treatment Means"
3) Values with different letters in the same row show a significant difference (P<0.05)

The initial weight of male roles layer tife given sugar apple leaf extract treatment E0 was 133.98 g (Table 2); treatments E1, E2, E3 and E4 were 3.81%, 3.07%, 3.31% and 2.12% not significantly different (P>0.05) lower

than treatment E0. This shows that the chickens used at the beginning of the study had a homogeneous body weight.

The average treatment value of E1 was 4.63%, E2 was 7.39% and E4 was 1.60% higher than E0 but statistically not significantly different (P>0.05). The E3 treatment was 17.03% higher than the E0 treatment which was statistically significantly different (P<0.05). Ariesta et al. (2015), stated that the nutrient content that is more absorbed by the chicken body will provide a higher final body weight because it will increase tissue development in increasing livestock body weight.

The results showed that the average consumption of the E0 treatment ratio was 21.66 g/e/day (Table 2). The consumption of rations for roles layer tife given drinking water with the addition of 1%, 2%, 3% and 4% sugar apple leaf extract (E1, E2, E3 and E4) were 6.92%, 9.10%, 8, respectively. 26% and 1.60% higher than treatment E0 but not statistically significantly different (P>0.05). This was because the nutritional content of the rations of roles layer tife was the same in each treatment given sugar apple leaf extract and not given as a control. This is in line with the opinion of Bidura et al. (2020), that the administration of herbal extracts (katuk leaves and garlic) as much as 5 cc/100 cc of drinking water did not significantly affect the consumption of rations. Authority (2016), also reported that the administration of plant herbal extracts (garlic) through drinking water at a concentration of 2.5-5% had no significant effect on ration consumption.

The increase in body weight in Table 2 shows that the administration of sugar apple leaf extract showed E0 treatment of 9.06 g. The mean of E1 treatment was 6.95%, E2 was 10.93% and E4 treatment was 2.64% higher than E0 treatment but statistically not significantly different (P>0.05). The E3 treatment was 18.54% higher than the E0 treatment which was statistically significantly different (P<0.05). Wahju (2015), states that weight gain is largely determined by the high and low consumption of nutrient supplies in livestock. Consumption of nutrients such as protein and energy is the main in increasing weight gain. Protein is a complex form of the smallest collection of units, namely amino acids that are utilized by the body. Amino acids will be utilized after protein metabolism occurs from feed (Iskandar, 2012).

The average value of the Feed Conversion Ratio (FCR) of roles layer tife given sugar apple leaf extract at treatment E0 was 2.39 (Table 2). Roles layer tife that were given treatment E1, E2, E3 and E4 were 0%, 1.67%, 8.78% and 10.46%, respectively, not significantly different (P>0.05) with treatment E0. This is because the rations given in the study have the same nutritional content and the same age, sex and rearing of chickens. This is in line with the opinion of Lacy & Vest (2000), who states that the factors that influence the conversion of rations are the physical form of the ration, body weight, nutritional content of the ration, the environment in which it is reared, strain and gender. Wahyu (2015), states that the FCR value can be used to measure the efficiency of the use of rations, following North's (1992), statement that the small ration conversion rate means the use of rations is more efficient because the consumption of rations is used for chicken growth.

4 Conclusion

Based on the results of the study, it can be concluded that the administration of sugar apple leaf extract (Annona squamosa L.) through drinking water can increase nutrient digestibility and production performance of roles layer tife.

Suggestion

Based on the results of the study, it can be suggested that farmers can use 3% sugar apple leaf extract through drinking water as a natural antibiotic to increase nutrient digestibility and production performance of roles layer tife.

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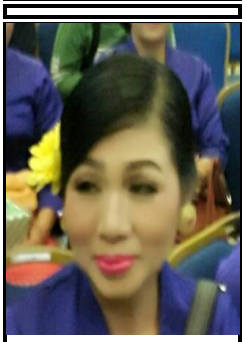

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