Nutrient Digestibility of Laying Quail at Different Sexes Treated With Papaya Leaves In Ration

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Abstract. Quails were high-productivity poultry, the use of feed containing certain enzymes such as papaya leaves thought to increase the nutrient digestibility of quails, besides that gender is also thought to affect nutrient digestibility. This study used 60 laying age quail (± 16 weeks age) consisting of 30 males and 30 females. corn, rice bran, layer concentrate and papaya leaf flour used as ration composition. This study used a completely randomized design of six treatments and five replication, the treatment consisted of the level of papaya leaves (PL) in rations distributed to different sexes, the treatments were P1 (0% PL: female quail), P2 (0% PL: male quail ), P3 (3% PL: female quail), P4 (3% PL: male quail) P5 (6% PL: female quail) and P6 (6% PL: male quail). Data obtained were analyzed by ANOVA and further tested using the Duncan multiple range tests, the variables observed were dry matter digestibility, organic matter digestibility, and protein digestibility. The results showed that papaya leaf flour at level 3% did not affect (P > 0.05) on digestibility (dry matter digestibility, organic matter digestibility, protein digestibility) compared to control but the use of papaya leaf flour at the level of 6% can significantly reduce nutrient digestibility (P <0.05). The sex of quails does not give the influence (P> 0.05) on nutrient digestibility. This study concluded that the use of PL in rations at levels above 3% can reduce nutrient digestibility.

Keywords: papaya leaf flour, quail age layer, nutrient digestibility.

1. Introduction
Quail is recognized as a diversified poultry species for commercial meat and egg production, quail has a short reproduction cycle and high productivity. Quail is very popular because it has high productivity and does not require a large area of land in its maintenance. Quail can produce meat and eggs so that it is classified as dual-purpose poultry, high productivity of quail must be followed by a supply of high-quality and continuous feed.

In many areas, different types of feeds are used depending on availability and local conditions. Some of these feeds are not cited in the scientific literature but are used locally. Also, seasonal availability and high cost of conventional feed ingredients are major problems often faced by poultry farmers. Fluctuating and relatively expensive commercial feed prices are also one of the factors that affect quail farmers’ income [1]. The use of feed alternative substitute for commercial feed is one of the solutions that have been carried out by farmers, alternative feeds must have good nutritional content, easily obtained and high availability. Alternative feeds also have a more economical price than commercial feed.
Papaya leaf is one of the feed ingredients that have the potential as an alternative feed for quail, papaya leaf has a high nutritional content, is easily obtained and its use does not compete with human needs. Papaya leaves also contain papain enzymes that are classified as proteolytic enzymes to increase the digestibility of nutrients, especially proteins in the digestive tract. Papaya leaves contain papain (5.3%), a natural enzyme that helps in the digestion of proteins [2] in the digestive tract, and vitamin C (286 mg/100 g), as well as vitamin E (30 mg/100 mg). They also contain high levels of base metals (potassium, sodium, calcium, and magnesium), and appreciable levels of iron [3]. Leaf meal supplementation has been included in the diets of poultry as a means of reducing the high cost of conventional protein sources and to improve profit margin [4].

2. Material and Methods
2.1 Quail preparation
60 laying quails (14 weeks) consisting of 30 male quails and 30 female quails, were placed into a digestive cage with a size of 30x 20x 30 cm, each cage plot consisted of two quails.

2.2 Ration
The feed ingredients used were yellow corn, rice bran, layer concentrate, and papaya leaf flour. Papaya leaves used are green papaya leaves, papaya leaves were dried in the sun for two days and then ground to produce papaya leaf flour.

The composition and nutrient content of the treatment ration is shown in Table 1.

| Feed Composition       | Perlakuan |                |                |
|------------------------|-----------|----------------|----------------|
|                        | P1, P2    | P3, P4         | P5, P6         |
| Yellow corn            | 45        | 45             | 42             |
| Rice bran              | 17        | 15             | 16             |
| Papaya leaf            | 0         | 3              | 6              |
| Laying concentrate     | 38        | 37             | 36             |
|                        | 100       | 100            | 100            |
| nutrient content of the treatment |               |                |
| ME(Kcal/kg)            | 3096      | 3047           | 3032           |
| CP (%)                 | 18.9      | 18.95          | 18.65          |
| FP (%)                 | 5.28      | 5.14           | 5.0            |
| CF (%)                 | 5.95      | 6.6            | 6.82           |

2.3 Nutrien digestibility analysis and variables observed
The variables observed were dry matter digestibility, organic matter digestibility, and crude protein digestibility. The method used to measure digestibility was modified from the total collection Sibald method adjusted for quails.

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\text{Apparent digestibility coefficient} = \frac{\text{Nutrients in feeds} - \text{Nutrients in feces}}{\text{Nutrients in feeds}} \times 100
\]

Before data collection, the first step is to adapt the feed for 1 week. Feed adaptation is intended to familiarize quails with experimental feed. After the adaptation period is complete, the data collection process is carried out for 2 weeks.

2.4 Statistical analysis
This study used a completely randomized design of six treatments and five replications. The treatment was the level of use of papaya leaves in the ration and different sexes. The treatments in this study are:

P1 (0% PL: female),
P2 (0% PL: male),
P3 (3% PL: female),
P4 (3% PL: male),
P5 (6% PL: female)
P6 (6% PL: male)

Data were analyzed using One Way ANOVA procedure of SPSS 16.00. All comparisons among means were performed using Duncan’s Multiple Range Test (DMRT) [5].

3. Result and discussion

| Nutrient digestibility       | Treatment |
|------------------------------|-----------|
|                              | P1        | P2        | P3        | P4        | P5        | P6        |
| Dry matter digestibility     | 74.66±2.76 | 73.58±3.32 | 76.20±3.35 | 75.48±0.76 | 68.79±1.52 | 71.18±1.15 |
| Organic matter digestibility | 78.07±2.26 | 77.24±2.62 | 78.99±2.46 | 78.38±0.77 | 73.03±2.30 | 74.25±0.99 |
| Crude protein digestibility  | 85.08±1.39 | 83.39±1.56 | 85.76±1.32 | 85.48±2.82 | 79.08±2.00 | 78.32±0.41 |

Different superscript on the same row indicate significant differences (P <0.05)

The use of papaya leaves in quail ration gives a significant effect on the laying quail dry matter digestibility, while different sexes do not give effect. The use of 6% papaya leaves reduces the dry matter digestibility while 3% of papaya leaves have no difference compared to controls. Decreased dry matter digestibility in the administration of 6% papaya leaves is thought to occur due to an increase in crude fiber ration, [6] reported that an increase in crude fiber ration might reduce the digestibility of other feeds. Atmaja reports that substitution of papaya leaves on commercial feed reduces the distribution of abdominal fat which is likely due to the high crude fiber content of papaya leaves, which has an impact on the digestibility of other feed ingredients.

Dry matter digestibility in this study was higher than reported by ([7]; [8]) that the digestibility of quail layer layers was 47.49-60.27%, and according to [9] that the dry matter quail layer digestibility ranges from 72-73%.

Increasing papaya leaves in rations up to 6% also decreases protein digestibility and organic matter digestibility. Papaya is a type of plant that produces enzymes kimopapain, papain and lipase that can help break the complex nutrient binding bonds, thus increasing digestibility and efficient utilization nutrient ration [10], [11] reported that giving papaya leaves in rations as a substitute for soybeans can improve nutrient digestibility.

The digestibility of crude protein in this study was higher than the results of the research reported by [7] which ranged from 55.24 to 69.21% and reported by [8] which was 40.44% - 49.49%. The decrease in crude fiber is thought to be due to an increase in crude fiber in rations containing papaya leaves. [9] that an increase in crude fiber ration significantly decreased the digestibility of nutrients, other treatments.

[12] found that high crude fiber caused an increasing digestion rate in the gastrointestinal tract and therefore reduces digestion time and nutrient absorption by the gastrointestinal membrane. [13] also reported that increasing total fiber in the diet significantly affected nutrient retention (dry matter, organic matter, and nitrogen).

4. Conclusion
The use of papaya leaves in the ration has not been able to increase the digestibility of quail nutrients in the quail, the use of papaya leaves above 3% reduce the digestibility of ration nutrients.
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