EFFECT of VITAMIN E (*Alpha tocoferol)* on PERFORMANCE MALE ETAWA GOAT GRADE

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ABSTRACT

The purpose of this study were to determine the effect of vitamin E on dry matter intake, digestibility of dry matter, and weight gain of Etawa goat grade. This study used 16 PE male goats with average weight 28 – 35 kg/head. The design used was a randomized complate block design (RCBD) with 4 groups and 4 treatments. The treatments were consisted R0: control feed (35% cassava, 25% copra oil, 15% tofu waste, 15% corn meal, and 10% cassava leaves), R1: R0 + vitamin E of 100 mg, R2: R0 + vitamin E of 200 mg, and R3: R0 + vitamin E of 300 mg. The data were tested by analysis of variance (ANOVA), the followed by the least significant different (LSD) test to determine the best level of use vitamin E. The results showed that: (1) supplementation of vitamin E in the diet with levels of 300 mg had significant effect ($P < 0.05$) on digestibility dry matter, but not significant effect ($P > 0.05$) to the dry matter intake and weight goat; (2) supplementation of vitamin E at a level of 300 mg (R3) produces the highest digestibility values than the other treatments (R0, R1, and R2).

Keywords: Etawa goat grade, Vitamin E, and Weight gain

INTRODUCTION

Peranakan Ettawa (PE) Goat is small ruminants animal protein sources has enough potential to be developed as a producer of meat and milk. These goat can adapt to the climatic conditions in Indonesia and is easily maintained. Indonesia's population growth continues to increase led to increased need for animal protein, which prompted the need for innovation - a new innovation in order to increase the production of meat so that the meat in Indonesia needs can be met.

In goat livestock farming intensively managed or semi-intensive, is one component of feed inputs that determine the success of the business financially. Management strategies and feeding require further analysis to achieve meat goat fattening purposes, in addition to the feed meat goat farm is a determinant of the level of production of meat produced.

Feed concentrates and supplement can be given. Concentrate is the feed comprising the feed material containing carbohydrates and protein. Supplement The composition of the materials or combinations of certain ingredients were added to the feed. Supplements provided can come from the vitamins, one of which is vitamin E *(alphatocoferol*).

The addition of vitamin E in the diet one of the alternatives to increase meat production in goats. Vitamin E can suppress lipid peroxidation of the cell membrane that protects the membrane from damage (Omara *et al.*, 1993). The integrity of cell membranes remain intact will maintain cell metabolism running normally and cell functions primarily as a transportation hub nutrients into and out of cells can take place either because the function of normal cells depends on the membrane of normal cells (Murray and Granner 2009). Based on the above, it is expected after the addition of vitamin E can increase dry matter intake goats, dry matter, and body weight gain of male goats.

MATERIALS AND METHODS

Materials

The equipment used in this study is the cage with the type of individual who totaled 16 units, digital scales, hanging scales, scales sitting, ropes, shovels, buckets, tarpaulins, hoes, sickles, plastic, oven, and a sack.

Materials used in this study were PE goats as many as 16 head with average 28-35 kg / head, ration (cassava, copra oil, rice bran coarse, cassava leaves, and vitamin E), and lime used as floor cleaning materials of pathogenic microorganisms, especially fungi that cage in sterile conditions.

Methods

This study was conducted experimentally using a randomized complete block design (RCBD). Each group consists of four goats. These groupings are: Group 1 (20-45 kg), Group 2 (21-46 kg), Group 3 (20-36 kg), and group 4 (20-47kg). The treatments used were:

1. R0 = basal diet
2. R1 = R0 + 100 mg vitamin E (in 1 kg of dry matter)
3. R2 = R0 + 200 mg vitamin E (in 1 kg of dry matter)
4. R3 = R0 + 300 mg vitamin E (in 1 kg dry matter)

Variables

Parameters observed in this study include:

1. intake of dry matter, calculated by subtracting the amount of feed given to the amount of feed leftovers the next day;
2. dry matter digestibility obtained by calculation Paramita *et al*. (2008) as follows:

$$KCBK = \frac{BK consumption\ \ (kg) - BK\ fases\ (Kg)}{BK\ Consumption\ \ (Kg)} \times 100\%.$$

3. Average Daily Gain (ADG) obtained by calculation Tilman *et al*.,(1998) as follows:

$$ADG = \frac{\text{Weight Body End} - \text{Weight Body Preliminary}}{\text{Time}}$$

Data Analysis

Data obtained from the study were analyzed using analysis of variance (Anova) and if significant it will be the Least Significant Difference (LSD) (Steel and Torrie, 1991).

RESULTS AND DISCUSSION

A. Dry Matter intake

The results of variance analysis in this study showed that administration of vitamin E had no significant effect (P> 0.05) on dry matter intake. Giving vitamin E in this study conducted orally it is intended that vitamin E can be consumed properly. However, when granting vitamin E mixed into the feed possibility to increase feed intake in relation to the role of vitamin E as an antioxidant that can prevent the oxidation of the feed so the feed which has a high fat content easy to rancidity, with the feed quality is maintained to increase the palatability cattle to feed.

Based on Table 1. average - average dry matter intake was lowest for the R1 is the use of vitamin E as much as 100 mg with the average - average 1.34 ± 0.40 (kg / head / day). R3 has a tendency to dry matter consumption is highest among other treatments. The use of vitamin E 300 mg may improve feed intake with the average - average of 1.58 ± 0.16 (kg / head / day). This illustrates that the goats have the effect of vitamin E 300 mg so as to increase feed intake in goats. The purpose of the provision of vitamin E in addition to increasing consumption as well as an antioxidant that is able to improve the body's resistance to disease and to improve the production and reproduction of livestock.

Vitamin E supplementation with different levels did not significantly affect the dry matter intake. Word, *et al.* (2013) suggest that vitamin E supplementation with

different levels in the diet did not significantly affect the consumption of dry matter (DM) ration. The protein content of feed used in this study amounted to 12.09%. Rehatta (2011) stated that the quality of feed for fattening usually based on protein content usually ranges between 12-15%.

Parakkasi (1995) stated that a good quality feed consumption level is higher than the low-quality feed so the feed quality is relatively the same, the level of consumption is no different. In addition to the ration*palatability,prellium* also can affect feed intake. According Krisnan (2011), observations were made after the three-week adaptation period. In this study, conducted over a period of adaptation ration ± 30 days, so it can be considered the length of the adaptation period is sufficient.

B. Dry Matter digestibility

Results of analysis of variance in this study showed that administration of vitamin E significantly (P <0.05) to the consumption of ration dry matter. **A**verage dry matter digestibility in goats can be seen in Table 1.

After a further test of Least Significant Difference (LSD) showed that the basal ration (R0) was significantly different from the ration treatment with the addition of 300 mg of vitamin E on the level (P <0, 05). But the basal ration (R0) was not significantly different from R1 ration treatment (addition of vitamin E of 100 mg) and R2 (addition of vitamin E 200 mg).

Supplementation of vitamin E 300 mg may improve the digestibility of feed, it is this is due to the role of vitamin E as an antioxidant that can prevent the oxidation of PUFAs cell membrane (Channon and Trout, 2002) so that the cell membrane integrity can be maintained. The integrity of cell membranes remain intact will maintain normal cell metabolism runs and cell functions primarily as nutrient transport pathways into and out of cells can take place properly for normal cell function depends on the membrane of normal cells. The cells of the intestinal mucosa which is an organ of absorption (Church, 1988) can function optimally absorb nutrients when the cell membrane fluidity can be maintained due to changes in membrane fluidity. Interchangeability of cell membrane fluidity although little can cause abnormal function and pathological processes of cells (Murray and Granner, 2009) or in other words, the normal cell function depends on the membrane of normal cells. The amount of nutrients that can be absorbed to determine the benefits of feed ingredients like saying McDonald *et al*. (1988) that the benefits are determined by the digestibility of feed ingredients and the amount of nutrients that can be absorbed in the digestive tract.

The higher the number the digestibility of a food material means food material that has good quality for livestock consumed and utilized for metabolic processes of the body. This is because generally feed containing digestible food substances that can be high, it will be higher the nutritional value (Suarti, 2001).

C. Average Daily Gain

Increase in body weight is one of the variables that can be used to assess the quality of animal feed ingredients. Analysis of variance showed that the addition of vitamin E with different levels of male goats do not significantly affect the daily body weight gain (P> 0.05).

Average - Average weight early used in this study in succession - succession of R0 (35 kg), R1 (31 kg), R2 (28 kg), and R3 (35 kg) This indicates that administration of vitamin E do not increase the accretion animal body weight. However, of all the results mean for research that has the highest mean body weight gain contained in R3 is the average - average 0.10 ± 0:03 (g / head / day), it is directly proportional to dry matter intake and digestibility value. Dry matter intake which R3 has the highest average of 1.58 ± 0.16 (kg / head / day) with a digestibility of 75.53 ± 4.33. This is in line with the statement Tanuwiria *et al*. (2006) that the amount of feed intake that much shows the amount of nutrients absorbed for basic living needs, production, and reproduction increases, causing increased growth as well.

Talib (2004), states that the ruminant body weight gain is strongly influenced by the quality and quantity of feed, meaning cattle weight gain votes proportional to the ration consumed. The ration given to each treatment in this study had the same quality so as to produce body weight gain (PBT) were not significantly different.

One of the factors that influence body weight gain daily feed intake, the higher the amount of feed consumed, the higher the rate of growth of livestock (Parakkasi, 1999). This happens in R3 has a value - average dry matter intake and digestibility of the highest when compared with the treatment R0, R1, and R2, to obtain the resulting body weight gain higher. Livestock weight gain occurs when cattle were able to transform substances derived feed into livestock products such as fat and meat, after basic needs are met.

Church and Pond (1988) states that the better quality ration was given it will be followed by body weight gain higher. National Research Council (2006) adds that weight gain is influenced by several factors such as total protein obtained each day, type of animal, age, genetic state of the environment, the condition of each individual and governance management. Daily body weight gain is a reflection of the accumulated consumption, fermentation, metabolism and absorption of nutrients in the body of livestock (Anthony, 2009).

CONCLUSIONS

Conclusions

Based on the research that has been done can be concluded that:

1. Vitamin E supplementation significantly affect the ration dry matter, but did not significantly affect the ration dry matter intake and body weight gain of goats.
2. Supplementation of vitamin E at a level of 300 mg (R3) produces the highest digestibility values than the other treatments (R0, R1, and R2)

Acknowledgments

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Tabel.1. The nutrient content of the ration based on dry matter (DM)

Chemical Composition (%)	Concentrate	forage	ration
Dry matter	100 100		100
Protein rough	12.56	19.16	13.2
Fiber rough	23.79	26.64	24.1
rough Fat	11.63	5 ,22	11.0
Abu	5.92	4.96	5.8
BETN	46.44	56.44	55.4

Source: Proximate analysis, Animal Nutrition Laboratorium, University of Lampung (2016)

Table 2. Consumption of ration dry matter, digestibility, and body weight gain goats

Treatment	parameters		
	DM intake (Kg /head/day)	DM Digestibility (%)	ADG (Kg/head/day)
R0	1.54 ± 0.33	60, 95 ± 7.76[a]	0.08 ± 0.02
R1	1.34 ± 0.40	65.45 ± 3.71[a]	0.09 ± 0.05
R2	1.41 ± 0.23	68.73 ± 3, 03[a]	0.09 ± 0.04
R3	1.58 ± 0.16	75.53 ± 4.33[b]	0.10 ± 0:03

Description:

Values with letters *superscript* in the same row are not significantly different shows based on analysis of variance.

R0: basal diet (cassava 35%, copra oil 25%, pulp 15%, maize 15%, and cassava leaves 10%)

R1: R0 + vitamin E 100 mg

R2: R0 + vitamin E 200 mg

R3: R0 + vitamin E 300 mg