

UTILIZATION OF SOYBEAN SAUCE INDUSTRY BY PRODUCT FOR FATTENING SHEEP

Endang Purbowati and Agung Purnomoadi¹

Abstract

The previous experiment showed that soybean sauce industry by product could be given to lambs up to 15% concentrate, without negative effect on the sheep's performance, physiology, and carcass production. The present study was aiming to investigate the effect of soybean sauce industry by product on the sheep performance at higher level (45%) supplementation. The study was also aiming to minimizing feed cost through the utilization of soybean sauce industry by product in concentrates. A completely Randomized design was applied in this experiment. Twenty sheep aged nine months old and weighed 14.31 ± 2.45 kg were used. The sheep were raised on individual pen and were divided randomly into four groups of treatments. The treatments were, (T0) Concentrate without soybean sauce industry by product; (T1, T2 and T3) Concentrate containing 15%, 30% and 45% soybean sauce industry by product respectively. Concentrate composed of rice bran, coconut cake and minerals. The ration was formulated based on Ranjhan (1981). Concentrate was given 70% of the total DM requirement, while field grass and water were allowed *ad libitum*. This experiment showed supplementation of soybean sauce industry by product in concentrate up to 45% give a significantly increase the DMI and crude protein intake, daily gain and feed conversion. From the highest, DM intake was in orderly found in T1 (927.45 g), T3 (878.54 g), T2 (798.64 g), and T0 (711.18 g). The CP intake were T0 (85.53 g), T1 (121.11 g), T2 (104.97 g) and T3 (120.20 g). TDN intake among the treatments was not significantly different (T0 = 393.66 g, T1 = 500.67 g, T2 = 378.28 g and T3 = 484.98 g). The highest daily gain was found in T1 (64.25 g) followed by T3 (51.01 g), T2 (40.58 g) and T0 (17.39 g). The utilization of soybean sauce industry by product in concentrate can improve feed conversion as shown by T1 (14.57), T2 (21.98) and T3 (22.43) that better than T0 (47.48). The most promising economically calculated based on feed cost per gain was T1 (11129.34 Rp/kg), followed by T3 (11978.24 Rp/kg), T2 (13405.37 Rp/kg) and T0 (28845.89 Rp/kg). It can be concluded that the supplementation of 15% soybean sauce industry by product in concentrate for fattening sheep improved feed consumption, daily gain and feed conversion. This supplement is also shown the most economics.

Keywords: Soybean sauce industry by product, Productive performance, Local sheep

¹ Faculty of Animal Agriculture Diponegoro University, Semarang

Introduction

Soybean sauce industry by product is one of promising feedstuff as shown by its composition, i.e. CP 30.29%, Ash 15.66%, CF 24.46%, EE 26.47%, NFE 3.12% and TDN 71.15% (Purbowati *et al.*, 1999). The limitation factor using it is the high content of NaCl (about 13.28%), thus a study on the limit amount in allowance to animals should be done. Lubis (1992) stated that NaCl for sheep is 0.1 g/kg body weight. The previous experiment showed that soybean sauce industry by product could be given to lambs up to 15% of concentrate, without negative effect on the lamb's performance (Purbowati *et al.*, 1999), physiology (Widayati *et al.*, 1999), and carcass production (Adiwinarti *et al.*, 1999).

The present study was aiming to investigate the effect of soybean sauce industry by product on the lamb performance at higher level supplementation. The study was also aiming to minimize feed cost through the utilization of soybean sauce industry by product in concentrate.

Materials and Methods

This study was carried out in livestock and drought animal laboratory, Animal Agriculture Faculty, Diponegoro University for seven months. A Completely Randomized design was applied in this experiment. Twenty lambs aged 9 months old and weighed 14.31 ± 2.45 kg were used. The lambs were raised on individual pens and were divided randomly into four groups of treatments. The treatments were (1) Concentrate without soybean sauce industry by product (T0); (2) Concentrate containing 15% soybean sauce industry by product (T1); (3) Concentrate containing 30% soybean sauce industry by product (T2); and (4) Concentrate containing 45% soybean sauce industry by product. Concentrate composed of rice bran, coconut cake and minerals. The ration was formulated based on Ranjhan (1981). Concentrate was given 70% of the total DM requirement, while field grass and water were allowed *ad libitum*.

The experiment consisted of four periods, namely preparation, adaptation, preliminary (each for two weeks) and collecting data for ten weeks. Preparation period was preparing the pens, feed and analyzing feed composition. Feeds were analyzed in the Laboratory of Agricultural product processing, Faculty of Agricultural Technology, Gadjah Mada University, Yogyakarta. During the adaptation period, deworming by using "Vermiprazol" was done. In this period the animals were also fed experimental feeding for allowing animal to adapt the feeds and knowing the feed consumption. Preliminary period was given to eliminate the effect of previous feeds. At the end of this period, the body weight was measured and recorded as initial body weight. In data collection period, body weight was measured fortnightly to adjust the amount of feed required. The daily feed intake

was determined by weighing the orts. Concentrate was given twice a day (morning and evening). Field grass was given at two hours after morning concentrate.

Parameters measured were the consumption of feeds, crude protein and TDN; daily gain, feed conversion and feed cost per gain ratio. Analysis of variance (ANOVA) described by Steel and Torrie (1980) was used to analyzed data, except for feed cost per gain ratio. The significance of that analysis was then analysis by Duncan's Multiple Range Test.

Results and Discussion

Four data were eliminated for statistical analyzed due to the three animals died (two in T0 and one in T1) and another one animal was severely sick. Therefore, the data was analyzed by using unbalance replication. The result of experiment is presented in Table 1.

Table 1. The result of experiment using soybean sauce industry by product.

Parameters	T0	T1	T2	T3
Daily gain (g/day)	17.4 ^a	64.3 ^b	40.6 ^{ab}	51.0 ^b
Dry Matter Intake (g/day)	711.2 ^a	927.4 ^c	798.6 ^{ab}	878.5 ^{bc}
DMI Concentrate (g/day)	123.0 ^a	326.3 ^a	182.2 ^a	204.3 ^a
DMI Roughage (g/day)	588.2 ^a	601.2 ^a	616.5 ^a	675.9 ^b
Crude Protein (g/day)	85.5 ^a	121.1 ^b	105.0 ^b	120.2 ^b
Total digestible nutrients (g/day)	393.7	500.7	378.3	485.0
Feed conversion rate	47.5 ^b	14.6 ^a	22.0 ^a	22.4 ^a

^{a,b,c}Different superscript in the same raw indicated significantly different (P<0.05)

The results show that supplementation of soybean sauce industry by product on the diet increased the total dry matter intake (DMI) (P<0.05). The significantly different (P<0.05) on contribution of DMI from concentrate and from roughage was found in T1 and T3, respectively, that both were higher than other treatment. This also shown the NaCl in soybean sauce industry by product up to 6.6% (T0 = 0%; T1 = 2.21%; T2 = 4.43% and T3 = 6.64%) has no bad effect on feed intake.

The soybean sauce industry by product in this experiment increased an average daily gain (ADG) (P<0.05). The increase of ADG was correlated with increase in DMI as well as CP and TDN intakes. These figures, however, contributed the increasing Feed Conversion Rate (FCR) on animals given soybean sauce industry by product though statistically was not found significantly different. In calculation on feed cost per gain, the diet containing soybean sauce industry by product was found

better than the diet without soybean sauce industry by product, being 11129.34; 11978.24; 13405.37; 18845.89 rp/kg for T1, T3, T2 and T0.

Conclusions

As conclusion, this study found that using soybean sauce industry by product up to 45% can increase the DMI but the best result was found at 15% level (T1). Further study should be taken on the higher level of soybean sauce industry by product more than 45%. This will give any benefits on reducing feed cost for farm management.

References

- Adiwinarti, R., C.M.S. Lestari, E. Purbowati, E. Rianto, and J.A. Prawoto, 1999. Carcass and non-carcass characteristics of lambs given different level of soy-sauce by-products as feed supplement. *Journal of Tropical Animal Development*. Faculty of Animal Agriculture, Diponegoro University, Semarang. 24(4) : 137-145
- Lubis, DA. 1992. *Ilmu Makanan Ternak*. PT. Pembangunan, Jakarta.
- Purbowati, E., C.M.S. Lestari, and H. Cahyanto, 1999. Performance of indigenous lambs as influenced by different levels of soy sauce waste in concentrate. *Journal of Tropical Animal Development*. Faculty of Animal Agriculture, Diponegoro University, Semarang. 24(4) : 154-161
- Ranjhan, S.K. 1981. *Animal Nutrition in Tropics*. Second Revised Edition. Vikas Publishing House PVT LTD, New Delhi.
- Steel, R.G.D. and J.H. Torrie. 1980. *Principles and Procedures of Statistics A Biometrical Approach*. Second Edition. McGraw-Hill Kogakusha, LTD., Tokyo.
- Widayati, N., E. Rianto and R. Adiwinarti, R. 1999. Physiological response of indigenous male sheep to different levels of soy sauce residue in feed concentrate. *Journal of Tropical Animal Development*. Faculty of Animal Agriculture, Diponegoro University, Semarang. 24(4) : 170-175.