



Effect of Using Sun-Dried *Sesbania sesban* Leaves in Concentrate on Growth Rate of Quail

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Abstract This paper dealt with the experiment on “Using sun-dried *Sesbania sesban* leaves with petioles in concentrated feed on growth rate of quail”. It took 42 days to completely undertake the trial to evaluate a) quail’s growth rate (daily live body weight gain and weekly live body weight), b) feed intake (FI), c) feed conversion ratio (FCR), and d) economic efficiency (EE). *S. sesban* leaves mixed petioles being completely sun-dried and finely ground contains 27.62% crude protein, 19.28% crude fiber in 89.13% dry matter basic. The foliage meal with different level of 0%, 5%, 10%, and 15% was concentrated with a basic diet of maize, dried fish, rice bran and soybean (T0, T1, T2, and T3). Two hundred forty 5-day-old quails were used and then fed with each treatment diet consisting of 27% and alternatively 24% crude protein for the first and the second stages, respectively. Total expense, income, daily feed intake, and weekly body weight were recorded. The result indicated that there were differences ($P < 0.05$) of the daily body live weight gain ($T_0 = 3.94$ g, $T_1 = 3.89$ g, $T_2 = 3.64$ g, and $T_3 = 3.31$ g); of the finishing live body weight of quails between all treatments ($T_0 = 187.2$ g, $T_1 = 184.8$ g, $T_2 = 174.0$ g and $T_3 = 160.8$ g); and of FCR ($T_0 = 2.69$, $T_1 = 2.72$, $T_2 = 2.92$, and $T_3 = 3.24$). However, there were no significances of FI in which each treatment quail took in 11-12 grams of the feed per day, and of EE in which all treatment diets provided profit around 10-13 cents as expense on the quail product was one dollar. In sum, the inclusion of *S. sesban* foliage meal to a maximum of 5% is recommended for quail rising.

Keywords quail, *Sesbania sesban* leaves, growth rate

INTRODUCTION

This paper dealt with the experiment on “using sun-dried *Sesbania sesban* leaves with petioles in concentrated feed on growth rate of quail” which was conducted for BSc thesis at Royal University of Agriculture (RUA) in 2010.

Quail consumption was estimated to be more popular for supporting food demand because it is a kind of poultry with its very delicious meat and its 22.55% crude protein (Chreng, 2007). Its meat product can readily match market demand because of its short production cycle from four to five weeks (Barrette et al., 1998 cited from Kheang, 2006). Furthermore, quail requires a simple small

space for keeping and it is more resistant to any diseases and environment than other poultry such as chicken and duck (Randall, et al., 2008).

Because of the fact that raw materials for animal food processing in today's market is very expensive, quail production expenses are also affected seriously. Accordingly, to facilitate the quail keepers, especially in rural areas, as well as to alleviate their expenses on the raw materials; inclusion of *Sesbania sesban* leaves with petioles in concentrated feed for quail was conducted. *Sesbania sesban* including its leaves is a kind of plant which is eaten by humans and it is very inexpensive and freely available almost all over Cambodia. Furthermore, it was indicated that CP of its sun-dried leaves (27.62%), which was obtained from Saang district, Kandal province, Cambodia; is high and acceptable for concentrated feed of quail meat production with 86.13% DM and 19.28% CF (RUA, 2010).

For the reasons mentioned above, accompanied with the fact that sun-dried *S. sesban* leaves with petioles had never been used in the concentrated feed in Cambodia, this trial was conducted on "Effect of Using Sun-Dried *Sesbania sesban* Leaves in Concentrate on Growth Rate of Quail" which was mainly focused on a) the quail's growth rate, b) the feed intake (FI), c) the feed conversion ratio (FCR), and d) the economic efficiency (EE).

METHODOLOGY

Study site: The study was carried out at Animal Experimental Station, Faculty of Animal Science and Veterinary Medicine, Royal University of Agriculture (RUA), Phnom Penh, Cambodia. It was conducted with two hundred forty quails over 42 days between from February and March 2010.

Table 1 Concentrate Formula

Ingredient	T0 (%)	T1 (%)	T2 (%)	T3 (%)
1st Stage (0-3weeks)				
Maize	30	29	29	25
Rice bran	16.4	15	12.5	14.5
Dried fish	27	26	24.5	23
Soybean	25.6	24	23	21.5
Sun-dried <i>S.sesban</i> leaves	0	5	10	15
Salt	0.5	0.5	0.5	0.5
Premix	0.5	0.5	0.5	0.5
Total	100	100	100	100
Chemical Components				
CP (%)	27	27	27	27
ME (kcal/kg)	3366.8	3058.89 ^(*)	3022.42 ^(*)	2856.66 ^(*)
Ca (%)	1.5	1.44	1.35	1.3
P (%)	1.3	1.2	0.93	1.1
2nd Stage (4-6weeks)				
Maize	38	36.7	35.5	34
Rice bran	17	16.08	15	14
Dried fish	20	17.2	14.5	13
Soy bean	24	24.02	24	23
Sun-dried <i>S.sesban</i> leaves	0	5	10	15
Salt	0.5	0.5	0.5	0.5
Premix	0.5	0.5	0.5	0.5
Total	100	100	100	100
Chemical Components				
CP (%)	24	24	24	24
ME (kcal/kg)	3251.3	3197.8 ^(*)	3034.12 ^(*)	2865.3 ^(*)
Ca (%)	1.1	1.0	0.87	0.8
P (%)	0.9	0.96	0.88	0.62

* Note: ME value without including ME value of Sun-dried *S.sesban* leaves

Sampling size: It took five days to adapt two hundred forty one-day-age quails and then based on Completely Randomized Design (CRD); they were divided into four dietary treatments comprised

three replications with 20 quails each. The dietary treatments were comprised of T0 (control treatment), T1 (including 5% sun-dried *Sesbania sesban* leaves and petioles in concentrated feed), T2 (including 10% sun-dried *Sesbania sesban* leaves and petioles in concentrated feed) and T3 (including 15% sun-dried *Sesbania sesban* leaves and petioles in concentrated feed).

Concentrate formula: For feeding the quail in the experiment, there are two stages with different CP ratio of their diets over six weeks. Five-day-aged quails in each dietary treatment were fed with 27% CP diet over three weeks; and then alternatively, fed with 24% CP diet for another three weeks (Sam, 2001 cited from So Leakhena, 2007). The formula of concentrated feed is calculated and shown as in Table 1.

Data collection and analysis: Total expenses on each treatment including the price of 1-day-aged quail, housing, health care, and management of; as well as the total income of selling quails in each treatment were recorded in order to calculate the economic efficiency. In addition, feed intake of all experimental quails was recorded daily for determining food conversion ratio and their live body weight was also recorded weekly until the end of experimental periods. All data obtained was analysed using one-way ANOVA in SPSS version 15.0.

RESULTS AND DISCUSSION

Body live weight gain

There was significant difference ($P < 0.05$) of the daily live body weight gain of each treatment. It was observed that quail in T1 and T0 gained similarly high daily live body weight, while those in T2 and T3 gained significantly less (Fig. 1).

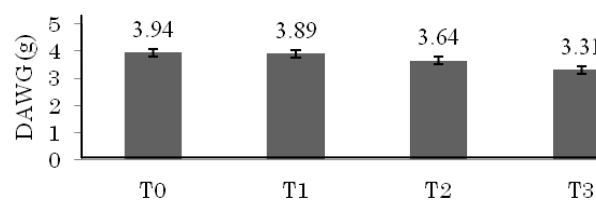


Fig. 1 Daily average weight gain

Table 2 Weekly body live weight

Age (week)	Parameters	T0	T1	T2	T3	P
0	N	60	60	60	60	0.399
	$\bar{X}$	21.6 ^{ns}	20.5 ^{ns}	20.3 ^{ns}	20.3 ^{ns}	
	s $\pm$	0.73	1.31	1.33	0.15	
1	N	60	60	60	60	0.122
	$\bar{X}$	42.9 ^{ns}	43.4 ^{ns}	42.7 ^{ns}	39.5 ^{ns}	
	s $\pm$	1.98	1.53	0.72	2.83	
2	N	60	60	60	60	0.03
	$\bar{X}$	67.2 ^a	64.5 ^a	58.5 ^b	54.0 ^b	
	s $\pm$	2.22	0.58	3.07	4.73	
3	N	60	59 ^(*)	59 ^(*)	60	0.007
	$\bar{X}$	85.5 ^a	84.7 ^a	81.8 ^a	75.4 ^b	
	s $\pm$	0.79	0.98	3.56	3.99	
4	N	60	59	59	59 ^(*)	0.004
	$\bar{X}$	120 ^a	114 ^{ab}	108.8 ^b	99.7 ^c	
	s $\pm$	2.26	4.75	1.62	7.63	
5	N	60	59	59	59	0.001
	$\bar{X}$	153 ^a	148.2 ^a	140.6 ^b	129.4 ^c	
	s $\pm$	3.86	2.01	2.08	6.37	
6	N	60	59	59	59	0.001
	$\bar{X}$	187.2 ^a	184.8 ^a	174.0 ^b	160.8 ^c	
	s $\pm$	5.47	1.94	1.62	6.61	

ns is no significance ($P > 0.05$), a, b and c show significant difference ($P < 0.05$)

Weekly live body weight

By the end of the first week, there was no significant difference ($P>0.05$) between quail's live body weight in each treatment. Alternatively, from second to sixth week it was significant ($P<0.05$) (Table 2). It was indicated that the average of the finishing live body weight of quail with dietary T0, T1, T2 and T3 was 187.2 g, 184.8 g, 174.0 g and 160.8 g, respectively. However, in the second week one quail died in T1 and T2; and in the third week in T3. The death was not caused by the concentrated feed impact based on the analysing quail corpses, but instead by mechanic causes.

Feed Intake (FI)

There was no significance ($P>0.05$) in average feed intake (g/bird/day) between all treatments (Fig. 2). Quail in all of the treatments consumed between 11-12 grams per day.

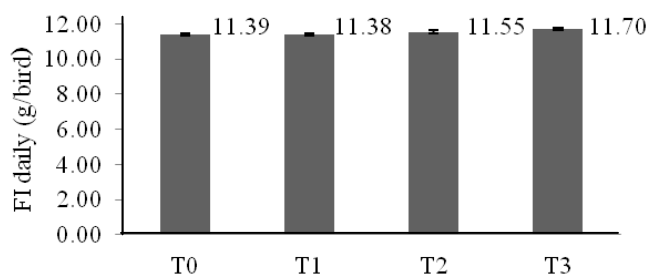


Fig. 2 Average feed intake (g/bird/day)

Feed Conversion Ratio (FCR)

The FCR value was calculated by the following formula.

$$\text{FCR} = \frac{\text{Total feed intake}}{\text{The last body live weight} - \text{The previous body live weight}}$$

The FCR of the different dietary treatments during overall experimental period is shown in Fig. 3. It indicates that there was significant difference ($P<0.05$) in FCR value between the treatments. Though, it was that T0-diet, T1-diet and T2-diet gave the same FCR value; and T3-diet different. According to the meaning of FCR; it takes less than three grams of T0, T1, and T2-diets to create one gram of quail's live body weight; but over three grams of T3-diet.

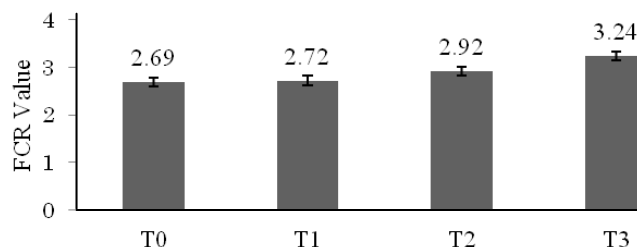


Fig. 3 Feed conversion ratio

Economic Efficiency (EE)

The EE value was calculated by the following formula.

$$\text{EE} = \frac{\text{Total income}}{\text{Total expense}}$$

Table 3 reflects that feeding diets with using sun-dried *Sesbania sesban* leaves and petioles for quail raising made no essential difference in profit compared to T0. It shows that one dollar spent on each treatment-diet provides around 11-13 cents of profit as compared to 10 cents for T0.

Table 3 Economic efficiency for each treatment

Treatment	Total income (US\$)	Total expenses (US\$)	Total profit (US\$)	EE (%)
T0	39.00	35.26	3.74	1.10
T1	38.35	34.53	3.82	1.11
T2	38.35	34.13	4.22	1.12
T3	38.35	33.73	4.62	1.13

CONCLUSION

Despite the fact that it provides no difference in profit compared to the control treatment diet, adding up to 5% of sun-dried *S. sesban* leaves mixed petioles in concentrated feed does not harm quail production. However, inclusion of this raw material in the concentrated feed should be limited to 5% due to the significantly lower finishing live body weight at higher levels, which would impact food security. According to Factsheet-*Sesbania sesban* (2007), using *Sesbania sesban* 10% in poultry concentrated feed could kill poultry. In sum, compared to the control treatment and based on the mentioned results, the inclusion of *S. sesban* leaves mixed petioles can be definitely recommended to use at 5% of concentrated feed.

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