ຜົນຂອງລະດັບໃບມັນຕົ້ນບົ່ມທີ່ແຕກຕ່າງກັນຕໍ່ປະສິດຕິພາບການຈະເລີນເຕີບໂຕຂອງໝູພັນລູກປະສົມ

ອັນນະພອນ ພຸດທະນາ[1], ບຸນເລີດ ສີວິໄລ[1]

ບົດຄັດຫຍໍ້

ການນຳໃຊ້ໃບມັນຕົ້ນເປັນອາຫານທົດແທນໃນການລ້ຽງໝູ ຂອງຄະນະກະເສດສາດໃນຄັ້ງນີ້ ແມ່ນເພື່ອສຶກສາເຖິງວິທີການເຮັດໃບມັນຕົ້ນບົ່ມ ແລະ ປະສິດຕິພາບການຈະເລີນເຕີບໂຕຂອງໝູລຸ້ນ ຊຶ່ງມີຂໍ້ສົມມຸດຕິຖານວ່າ: ປະສິດຕິພາບການຈະເລີນເຕີບໂຕຂອງໝູຈະດີ ເມື່ອໃຫ້ໃບມັນຕົ້ນບົ່ມ ເທົ່າ ທຽມກັບອາຫານສຳເລັດຮູບ. ໝູທີ່ນຳມາສຶກສາຄັ້ງນີ້ ແມ່ນໝູພັນລູກປະສົມ Landrace + LargWhite + Duroc ມີໝູຈຳນວນ 15 ໂຕ ນ້ຳໜັກສະເລ່ຍ 10 ± 2 ກລ, ຮູບແບບການທົດລອງຄັ້ງນີ້ ແມ່ນໃນຮູບ ແບບການສຸ່ມແບບສົມບູນ (Completely Randomized Design, CRD) ປະກອບມີ 3 ກຸ່ມ ຊຶ່ງແຕ່ລະ ກຸ່ມ ໄດ້ນຳໃຊ້ອາຫານແຕກຕ່າງກັນ ຄື: ກຸ່ມ CLS0 ແມ່ນໃຫ້ອາຫານສຳເລັດຮູບ 100%, ກຸ່ມ CLS60 ແມ່ນໃຫ້ອາຫານສຳເລັດຮູບ 40% + ໃບມັນຕົ້ນບົ່ມ 60%, ກຸ່ມ CLS80% ແມ່ນໃຫ້ອາຫານສຳເລັດຮູບ 20% + ໃບມັນຕົ້ນບົ່ມ 80%.

ຜ່ານການທົດລອງເຫັນໄດ້ວ່າ ອົງປະກອບທາງເຄມີຂອງອາຫານບົ່ມ ທີ່ໃຊ້ເວລາແຕກຕ່າງກັນ ແມ່ນບໍ່ມີຄວາມແຕກຕ່າງທາງສະຖິຕິ (P>0.05). ການກິນໄດ້ຂອງວັດຖຸແຫ້ງ ມີແນວໂນ້ມສູງໃນກຸ່ມ CLS0 ແລະ ຄ່ອຍໆຕ່ຳລົງ ເມື່ອທົດແທນດ້ວຍ CLS (P>0.05) ຊຶ່ງໃນນີ້ການກິນໄດ້ຂອງທາດຊຶ້ນລວມ ແມ່ນສູງສຸດ ໃນກຸ່ມຂອງ CLS60 ຄື: 26.86 ກຼາມ ທາດແຫ້ງ/ຕ ແລະ ຕ່ຳລົງໃນກຸ່ມ CLS0 (25.23 ກຼາມ ທາດແຫ້ງ/ຕ) ແລະ ກຸ່ມ CLS80 (23.38 ກຼາມ ທາດແຫ້ງ/ຕ) ຕາມລຳດັບ (P>0.05). ປະ ສິດຕິພາບການຈະເລີນເຕີບໂຕ ຂອງສັດແຕ່ລະກຸ່ມ ແມ່ນບໍ່ພົບຄວາມແຕກຕ່າງ ທາງດ້ານສະຖິຕິ (P>0.05). ແຕ່ວ່ານ້ຳໜັກເພີ້ມລວມ ແລະ ນ້ຳໜັກເພີ້ມສະເລ່ຍ ແຕ່ລະວັນ ມີຄື: ກຸ່ມ CLS = 55.29 ກລ/ຕ ແລະ 532.62 ກ/ຈ/ວ, ກຸ່ມ CLS60 = 48.15 ກລ/ຕ ແລະ 458.57 ກ/ຈ/ວ ແລະ CLS80 = 40.27 ກລ/ຕ ແລະ 383.57 ກ/ຈ/ວ. ເນື່ອງຈາກວ່າ ປະລິມານການກິນໄດ້ ບໍ່ແຕກຕ່າງກັນ (P>0.05) ຈຶ່ງສົ່ງຜົນສະທ້ອນໃຫ້ FCR ທີ່ເປັນຮູບແບບສົດ ມີຄ່າຕ່ຳສຸດ ຄື: 2.64 ເມື່ອທຽບກັບ CLS60=4,09 ແລະ CLS80= 4.72 ຕາມລຳດັບ (P<0.01). ແຕ່ວ່າ ເມື່ອມີການໃຫ້ສິ່ງເສດເຫຼືອຈາກການກະສິກຳ ເຊັ່ນ: ໃບມັນຕົ້ນ ເປັນອາຫານໝູ ຊາວກະສິກອນຕ້ອງຄຳນຶງເຖິງທາດເບື່ອ ເຊັ່ນ: ໄຮໂດຣໄຊຍານິກ (HCN) ແລະ ອາຫານທີ່ເປັນເສັ້ນໄຍ (CF) ເພາະມີຜົນຕໍ່ສຸຂະພາບສັດ ແລະ ການຈະເລີນເຕີບໂຕ.

ຄຳສັບທີ່ສຳຄັນ: *ໃບມັນຕົ້ນບົ່ມ, ໝູລູກປະສົມ, ປະສິດຕິພາບການຈະເລີນເຕີບໂຕ.*

[1]ພາກວິຊາລ້ຽງສັດ ແລະ ການປະມົງ ຄະນະກະເສດສາດ ມະຫາວິທະຍາໄລ ແຫ່ງຊາດ. P O. Box 7322, Vientiane Lao P D R.

Effects of different levels of cassava leaves silage as feed on growth performance in growing crossbred pigs

Phoutthana V[1] and Sivilay B[1]

Abstract

In this experiment was conducted for study on effects of different levels of cassava leaves silage as feed on growth performance in growing fattening pigs at farm of Faculty of Agriculture, NUOL. With the aims of determine technical cassava leaves silage making and growth performance of pigs when they were replaced with different levels cassava leaves silage. The hypothesis to be test is that: the biological growth performance will be responded to levels of Cassava leaf silage feed.

Fifteen castrated crossbred pigs from Nongtang Pig Breeding Center with average body weight of 10 ± 2 kg were allocated to three treatments (herein, completed feed as control, then it was replaced by cassava leaves silage levels 60% and 80% respectively). During the experiment, feeds offer and refusal, body live weight, and feed intake will be collected. After 105 days, data basis will be analyzed following Completely Randomized Design with 5 replications by using GenStat program. The chemical compositions of silage in different times were not significant (P>0.05), dry matter feed intake was higher tendency in control and decreased when CLS were offered to the growing pig, but they were not also significant (P>0.05) here in crude protein (CP) intake of CLS60 (26.86 DMkg/h) was highest tendency (P>0.05) and then decreased in control (25.23 DMkg/h) and CLS80 (23.38 DMkg/h) respectively. Growth performance of pigs fed basal diet and combining of basal diet with cassava leaves silage was not different (P>0.05). However, weight gain and average dairy gain were higher tendency in control (55.92 kg and 532.62g/h/d), CLS60 (48.15 kg and 458.57g/h/d) and CLS80 (40.27 kg and 383.57g/h/d) respectively. Due to feed intake was not significant (P>0.05) affecting on FCR in fresh matter of control was lowest (2.64) comparing to 4.09 and 4.72 in CLS 60 and CLS 80 (P<0.01) respectively. Therefore, when the pigs were fed by-product as cassava leaf, farmer should consider to hidrocyanic (HCN) and crude fiber (CF) on early weaning pigs causing of their digestive physiology are not perfected.

Key word: *Cassava leaves silage, Crossbred pig, growth performance.*

[1]Department of Livestock and Fisheries, Faculty of Agriculture, National University of Laos, P.O. Box 7322, Vientiane, Lao PDR.

Introduction

Pork is protein source for human consumption, but swine production is not success because of high feed cost, especially in Laos and it is the main factor of pig production. Expensive protein resources, in term of fish meal, soybean meal and etc. are often used in pig diets, if they were lose affected to pig growth performance. Therefore, if they can be replaced by cheaper local feed stuffs, the cost of production can be reduced (Kaensomabth, 2005).

Therefore farmers tried to find the natural protein source to feed their pigs, emphasize on plant by-product. Herein, Cassava leaf is a kind of protein and energy sources from plant composed of cassava leaf and root that can be used for pigs diet as well as mixed feeds (Bui Huy *et al*., 1996) Cassava is currently the third most important crop in Laos, after rice and maize. It is widely grown throughout the country by upland farmers but in small areas using local varieties and with very few inputs. Lao can cultivate cassava about 19,761.9 kg/ha/year from 4,200 ha of total production area (htpp://apps.fao.org./faostat/collections, 2004).

However, the goal of cassava production is cassava root only and mainly sold for use as animal feed and industrial processing for serve as a secondary staple food but cassava leaf was become by-product. In fact, cassava leaf has played an increasingly important role to be resource of protein (20 – 21% of crude protein) for animal feed. In some area, we can product 30 ton/ha/year of dry cassava leaf or 6 ton/ha/year of protein (Marnisaeng, 2005; Montaldo, 1977).

A factor limiting cassava leaves as a feed stuff is related to the high HCN concentration of nearly 1,000 mg kg-1DM, but cassava leaf can be decreased 88 - 93.5% by solar in 2 – 3 days (Ravindran, 1990), or after ensiling (which convert the toxic cyanide into non-toxic cyanide) it can safely be fed to pigs (Du Thanh Hang, 1998; Le Viet Ly, Bui Van Chinh and Do Viet Minh, 1997). Silage making is a method of preservation of high moisture materials by a controlled fermentation (McDonald *et al.*, 2002), with simple processing equipment and low capital investment (Rustad, 2001) and then later used as feed for livestock (Smith, 1977). Lien *et al*. (1994) stated that silage can render some previously unpalatable products useful to livestock by changing the chemical nature of the feed. Tran Thi Bich Ngoc *et al* (2005) reported that ensiling cassava leaves mixed with tubers can be reduced the HCN content to around 55% of the original content at the 30^{th} days of fermentation.

The aims of the present study was to determine technical cassava leaves silage making and effects of replacing completed diet by cassava leaves silage on pig growth performance, as well as for improvement farmer production by using Cassava Leaf Silage in pig diets.

Materials and Methods

Animals and Location

Fifteen castrated crossbred pigs from Nongtang Pig Breeding Center with average body weight of 10 ± 2 kg were used to study on growth performance based with a completed feed and replaced by cassava leaves silage 60% and 80% respectively. Animals were de-wormed (external and internal parasite) before starting and the animals were housed in individual pen in farm of Faculty of Agriculture, NUOL.

Treatments and Experimental design

Three treatments, 5 replications were used in Completely Randomized Design (CRD) as below for determine respond effects from cassava leaves silage levels:

- Control (Ctrl) = Completed feed (100%) + (0%) cassava leaves silage as control.
- Treatment 1 (T1) = Completed feed (20%) + (80%) cassava leaves silage.
- Treatment 2 (T2) = Completed feed (40%) + (60%) cassava leaves silage.

Feeds and feeding

Completed feed for piglet, and growing pig with No 551 and No 552 respectively from Hi-Gold Company, Thailand were used to be basal diets and replacing by different levels of Cassava leaves silage. Three treatments were offered by ad-libitum. Pigs were fed twice a day (at 7:00 am in the morning and 4:00 pm in the afternoon) and free clean water.

Cassava leaves silage

Cassava leaves were taken and then let them wilted (under shade for 8 hours) before making silage. 10% of rice bran and 1% of salt were added as an additive for making silage in order to improve the microorganism activities in the silage which result of good silage. The silage was keep for 21, 35 and 45 days and selected the best before feeding.

Measurements

The animals were weighed every 15 days. Feed intake was recorded daily (offered minus refused). Samples of feed offer, refusal and cassava leaves silage were taken for analysis of dry matter (DM), crude protein (CP), pH, Fat and crude fiber (CF) content (AOAC, 1990).

Data analysis

Body weight gain, growth rate and feed intake were collected during the experiment and basic data were subjected to the ANOVA, single factor using Genstat program. Pair wise comparisons of means were made with the DUNCAN method.

Results and discussions

Ingredient and chemical composition of the diets

Fresh cassava leaves, completed feed and cassava leaves silage were collected for analysis for dry matter (DM), crude protein

(CP), pH and CF content of feeds and they were shown in Table 2. DM, CP and pH of cassava leaves silage in different periods were not significant difference, but pH of CLS 21 days was lowest and it can be utilizes in animals feed, especially on pigs feed because common pH level in pig and piglet stomach are 2 – 3 and 3.2 - 4 respectively (Chivers and Langer, 1994). Crude protein content in CLS 21, 35 and 45 were quite high (20.25, 20.24 and 20.25 respectively) due to cassava leaves is a feed stuff protein source comparing to cassava root is contented low percentage of crude protein (2 – 2.3 %) but higher energy (Ravindran. 1990). In addition, Kaensombath, (2005) report that feed chemical compositions in cassava leaves silage at Faculty of Agriculture area in term of DM, CP and Ash were 41, 19.04 and 89 respectively. Phoutthana and Southammavong, (2006) experimented on farm in Borlikhamxy province at farmer area and stated that chemical compositions of cassava leaves silage in term of DM, CP and CF were 32.56, 18.09 and 12.18 respectively.

Feeds and nutrients intake

Feeds and nutrients intake are presented in Table 3. DM and CP intake were better tendency in control and cassava leaves silage 60% which a combined of basal diet 40% and cassava leave silage 80% was decreased when a cassava leave silage was supplemented higher to growing pig but they were not significant (P>0.05), which indicated that replaced of cassava leave silage between 60 and 80% for cross bred pig has no effects on DM and CP intake due to higher DM content (87%) in completed feed (Hi-Go company, 2006) was added different levels in treatments and cassava leaves was decreased HCN and increased palatability by fermentation to perk up feed intake event CLS was low DM content because silage making is a method of preservation of high moisture materials (McDonald *et al*., 2002), with simple processing equipment and low capital investment (Rustad, 2001). Lien *et al.* (1994) stated that silage can render some previously unpalatable products useful to livestock by changing the chemical nature of the feed. In addition, Phoutthana and Southammavong, (2006) report that DM intake was not significant (P>0.05), but CP intake was significantly difference (P<0.01) when fattening pigs were fed different levels of CLS as 0%, 25% and 50% (3.68, 11.68 and 13.43 kg/h respectively).

Growth performance

Cross bred pigs were generally healthy and biological treatment effects were shown in Table 4. The major parameters of growth performance in pigs were not differences (P>0.05). However, weight gain, and daily gain in CLS60 and CLS80 were not better than control group (P>0.05) to be caused by complete feed has played an increasingly important role to be resource of energy, vitamins, mines and protein for animal feed (Chivers and Langer., 1994). On the contrary, cassava leaves silage contents 20 – 21% of crude protein but it is high fiber and HCN with low energy, vitamins and mines (Marnisaeng, 2005; Montaldo, 1977). In addition, FCR in fresh matter was slightly lower when CLS levels were replaced by

completed feeds (P<0.01) because silage making is a method of preservation of high moisture materials (McDonald *et al*., 2002), but FCR in dry matter was not difference (P>0.05) and periodicals live weight gain (Figure 1) were slowly increased and they were not significant different (P>0.05) because animals were fed different both complete feeds and cassava leaves silage they can meet some nutrient requirement, particularly energy and protein resource for maintenance and growth comparing to three treatments which are contented of both energy and protein resources from completed feeds and ensiled cassava leaves, respectively (Kaensombath and Sivilay, 2005).

Conclusions and Recommendations

The chemical compositions of silage in different times were not significant (P>0.05) and growth performance of pigs fed basal diet and combining of basal diet with cassava leaves silage was not different (P>0.05). However, weight gain and average dairy gain were higher tendency in control, CLS 60 and CLS 80 respectively. Feed intake was not significant (P>0.05) affecting on FCR in fresh matter of control was lowest (2.64) comparing to 4.09 and 4.72 in CLS 60 and CLS 80 (P<0.01) respectively. Therefore, when we need to feed by-product to the pigs emphasized on cassava leaves silage should not be present on early weaning pigs causing of their digestive physiology are not strong enough.

Acknowledgement

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Table 1: The components of cassava leaves silage (CLS)

No.	Ingredients	% as fresh basis
1	Cassava leaves	89
2	Rice bran	10
3	Salt	1

Table 2: Chemical compositions of the feeds

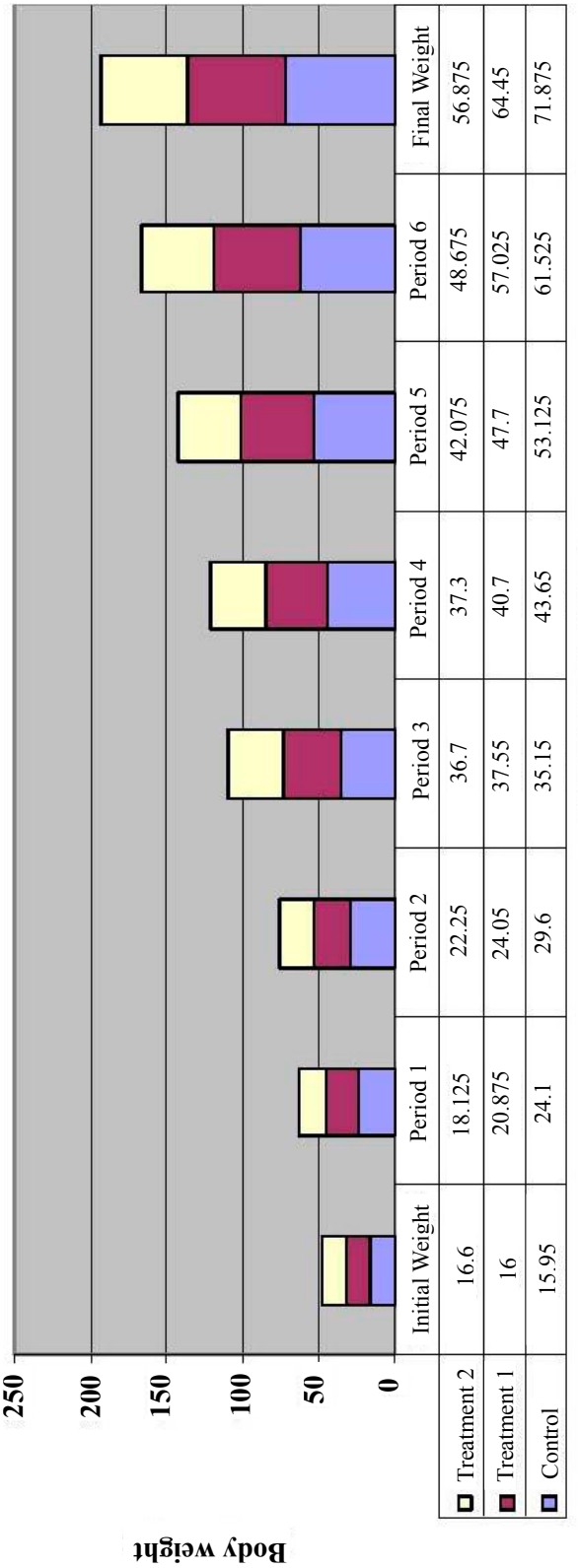
Ingredient	Parameter (%)				
----------DM----------					
			FC	pH	Fat
Fresh cassava leaves	32.29	22.59	12.72		6.68
Completed feed No. 551	85.53	21.22	4.07		2.55
Completed feed No. 552	84.13	15.47	8.44		2.88
	40.93	20.25	11.12	4.16	6.98
CLS (35 days)	39.98	20.24		4.29	8.25 7.20
CLS (45 days)	42.19	20.25		4.38	0.44
P-value	**0.33**	**0.99**		**0.75**	**0.44**
% CV	**4.10**	**6.70**		**8.19**	**7.12**

Table 3: Effect of replacing basal diet by cassava leaves silage on daily feed and nutrients intake of growing pigs.

	Dietary treatment			%CV	P-value
	Controle	Treatment 1			
	5	5	5		
Total feed intake, kg/h	**147.83**	**194.66**	**187.06**	**18.72**	**0.15**
CLS	0	117.83	140.29		
Basal diet	147.83	77.83	46.76		
Dry matter intake, kg/h	**124.96**	**117.88**	**96.99**	**19.95**	**0.24**
CLS	0	43.72	57.42		
Basal diet	124.96	74.16	39.56		
CP intake, DM kg/h	**25.23**	**26.86**	**23.38**	**19.59**	**0.60**
CLS	0	8.85	11.62		
Basal diet	25.23	18.01	11.75		
Daily CP, DM g/h/d	**240.62**	**255.87**	**222.67**	**19.59**	**0.62**

Table 4: Effects of dietary feed replacing on growth performance.

	Dietary treatment			%CV	P-value
	Control	Treatment			
	5	5	5		
Initial live weight, kg	15.95	16.00	16.60	9.47	0.80
Final live weight, kg	71.87	64.15	56.87	16.50	0.19
Weight gain, kg	55.92	48.15	40.27	20.32	0.13
Days	105	105	105		
ADG, g/h/day	532.62	458.57	383.57	20.32	0.13
FCR, fresh matter	2.64a	4.09b	4.72b	18.45	0.006
FCR, dry matter 2.23 2.48 2.45 16.60 a, b, within row, mean value with different superscript letters are significant different					0.65
(P<0.05)					



	Initial Weight	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Final Weight
Treatment 2	16.6	18.125	22.25	36.7	37.3	42.075	48.675	56.875
Treatment 1	16	20.875	24.05	37.55	40.7	47.7	57.025	64.45
Control	15.95	24.1	29.6	35.15	43.65	53.125	61.525	71.875

Figure 1. Show live weight gain of pigs in 105 days of each experimental period. The pigs were replaced by cassava leaves silage for increasing body weight gain slightly.