Research article

Effect of Wheat Bran Utilization on the Performance of Finishing Pig at Tang Hang Ly Farm

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Abstract The experiment was conducted at the Tang Hang Ly pig farm, located in Kandal province. 24-crossbred growing pigs were identified initially as T_0, T_1, T_2, T_3 with average weight 49.17±0.75 kg, 49.33±1.37 kg, 49.33±1.63 kg, 49.83±1.47 kg respectively. The aims of this research were, (1) to determine the optimum level of wheat bran in the diet for growing-finishing pig and (2) to evaluate the economic efficiency of using wheat bran in pig diet. The experiment was randomly designed by CRD (completely randomized design) and was divided into four treatments and three replicates. There were two pigs in each replicate and the pigs were offered feed with different levels: 0%, 25%, 35% and 45% of wheat bran in the feed concentration. The results showed that, the average daily weight gain in T_2 (610.4±38.3g) with the 35% concentration of wheat bran was significantly higher than the feed concentrations of 45% in T_3 (570.8±79.7g) and 25% in T_1 (562.1±71.58g). The control diet in T_0 had a weight gain of 558.6±88.62g. The daily feed intake was highest with the 35% wheat bran concentration in T_2 (2.231±0.02 kg/head), followed by lower feed intake with the wheat bran concentrations of 45% in T_3 (2.018±0.11 kg/head). This did not differ from the control diet in T_0 (2.032±0.23 kg/head) and the 25% wheat bran concentration in T_1 (2.023±0.09 kg/head). It was noted that the diet of T_2 with a wheat bran concentration of 35% consumed the most feed compared to the other treatments. Besides, there was a significant interaction with feed conversion ratio ($P<0.05$) in which T_2 (3.66±0.21) were much higher than T_0 (3.65±0.24), T_1 (3.62±0.34), and T_3 (3.55±0.21). This means that wheat bran was more effective if it was used at a lower feed concentration in order to gain 1 kg of meat. In conclusion, the results showed that the T_2 which was fed the 35% concentration of wheat bran could be utilized effectively as basal diet for growing finish-pig, which started from 50 kg to 100 kg, with superior economic returns.

Keywords pigs, wheat bran, feed conversion ratio (FCR), feed intake (FI), weight gain

INTRODUCTION

Pig meats are the main current concern for food of human and food security in rural areas if people did not know how effective and efficient to raise pigs. Therefore, pig raising is a vital part to increase profitability of household income, and because farmers really want to find out new techniques of raising pigs with low spending and suitable level of nutrition, many scientists are trying to develop new techniques for them. As Pok et al.(1998) reported that it would have high demand for human-being in which provide meat account for 58 percent of total meat output, and 31 percent of world meat produce by developing countries in 1980 and would produce 60 percent in 2020.

Currently, the number of farms to raise pigs is gradually increasing in Cambodia meanwhile the demand on pig meats is sharply increased. Looking to the general census 2008 compiled by the ministry of planning, the population in Cambodia has 11,437,656 in 1998 to 13,395,682 in 2008 which has increased by about 1.96 million during the decade 1998-2008, it reach to 15,500,000 people in 2010. This showed that the higher demand increases, the more pigs need to be raised. Anyways, farmers in Cambodia mostly used traditional techniques to raise pigs without analyzing

the economics. For instance, they raised pigs with kitchen wastes and vegetable wastes with rice bran, etc. Also, some farmers had new acceptable techniques to raise pigs efficiently and effectively but they still not knew the benefit of wheat bran with other feed ingredients. The wheat bran had the cellular less than rice bran and it was also good smell and easily melted when the pigs ate (Sodany, 2005).

As consistent with Harris et al. (1982) reported that metabolism energy of wheat bran, calcium, and phosphor was about 2210 kcal/ kg, 0.13%, and 0.81% respectively. For the experiment in RUA (2008), it was about 18.14 for crude protein, 85.35% for dry matter and 9.62% for crude fibre in the wheat bran. These showed that the wheat bran had high benefit for farmers to raise their pigs. Moreover, the effect of wheat bran utilization on performance of finishing pigs was still not clearly investigated.

MATERIALS AND METHODS

There were four treatments to make an experiment at Tang Hang Ly pig farm, where located at Sdaou Kanlaeng village Dei Edth commune Kien Svay district Kandal province around 25km off Phnom Penh city, Cambodia.

Animals and experimental design

24-crossbred growing pigs (Large white x Landrace) were put initially by T_0, T_1, T_2, T_3 with average live weight 49.17±0.75 kg, 49.33±1.37 kg, 49.33±1.63 kg, 49.83±1.47 kg respectively. All pigs were de-wormed and vaccinated before making the experiment. The experiment was randomly designed by CRD (completely randomize design) that divided by four treatments and three replicates for each. There were two pigs to put in each replicate and offered feed by different dietary treatment as shown in table 1.

- T_0: Control (Mize, Broken rice, Soybean meal, Fish meal)
- T_1: Maize, Broken rice, Soybean meal, Fish meal within 25% of Wheat Bran
- T_2: Maize, Broken rice, Soybean meal, Fish meal within 35% of Wheat Bran
- T_3: Maize, Broken rice, Soybean meal, Fish meal within 45% of Wheat Bran

Table 1 Experimental design by CRD

Replicates	Treatment			
1	T_0	T_1	T_2	T_3
2	T_1	T_0	T_3	T_2
3	T_3	T_2	T_1	T_0

Feed and feeding

In table 2, the composition of feed stuffs used for the experiment was focused on maize, broken rice, soybean meal, fish meal, and wheat bran. The diets were formulated by the two growing phases; first, it was from 50-100 kg (phase1) in table 3 and 80-100 (phase2) in table 4. The daily feed allowance was distributed equally into 3 meals per day: morning at 7:00 am, afternoon at 12:00 pm and evening at 5:00 pm.

Table 2 Chemical composition of the feed stuffs used in the experiment

Feed stuff	DM,%	ME (kcal/kg)	% of dry matter		
			CP	Ca	P
Maize	84.70	3350	9.84	0.09	0.14
Broken rice	90.00	2976	7.50	0.20	0.40
Soybean meal	89.61	3757	49.80	0.26	0.67
Fish meal	93.76	3341	64.10	5.10	2.90
Wheat bran	88.90	2210	14.29	0.10	1.10

Table 3 Ingredient and chemical composition of the diets in Phase 1 (50-80 kg)

Ingredient, %	T_0	T_1	T_2	T_3
Maize	48.50	36.00	36.00	36.10
Broken rice	31.00	19.40	10.00	0.00
Wheat bran	0.00	25.00	35.00	45.00
Soybean meal	8.80	8.00	8.00	6.60
Fish meal	10.20	8.60	7.50	7.40
Salt	0.50	0.50	0.50	0.50
Premix	0.50	0.50	0.50	0.50
Minerals	0.50	0.50	0.50	0.50
oil	0.00	1.50	2.00	3.40
Total	100.00	100.00	100.00	100.00
Composition , % in DM (except for ME which is in kcal/kg DM)				
ME	18.00	18.00	18.00	18.00
Crude Protein	3218	3056	3004	3000
Calcium	0.84	0.74	0.68	0.66
Phosphorus	0.50	0.71	0.75	0.80

Table 4 Ingredient and chemical composition of the diets in Phase 2 (80-100 kg)

Ingredient, %	T_0	T_1	T_2	T_3
Maize	54.00	44.00	39.00	29.00
Broken rice	30.00	16.00	11.00	10.50
Wheat bran	0.00	25.00	35.00	45.00
Soybean meal	6.00	5.00	5.00	5.50
Fish meal	8.50	7.00	6.00	5.00
Salt	0.50	0.50	0.50	0.50
Premix	0.50	0.50	0.50	0.50
Minerals	0.50	0.50	0.50	0.50
oil	0.00	1.50	2.50	3.50
Total	100.00	100.00	100.00	100.00
Composition , % in DM (except for ME which is in kcal/kg DM)				
ME	16.00	16.00	16.00	16.00
Crude Protein	3211	3056	3016	2960
Calcium	0.75	0.66	0.60	0.55
Phosphorus	0.48	0.64	0.69	0.75

Measurements and statistical analysis

Feed consumption was balanced for the amounts given and then subtracted any remaining feed. The remaining feed and given one was recorded by every morning. If the remaining feed was wet, it had to dry up and rebalanced for estimating the intake amount. The pigs were individually weighed for every10 days at 5:30 in the morning before feeding and watering. Economic returns were estimated using current market prices of feed ingredients and lives pigs. Moreover, all data from the experiment were stored in Microsoft Excel and analyzed by ANOVA using SPSS Version 12.0 to analyze on compared mean, daily growth, feed intake, and others.

RESULTS AND DISCUSSION

Average of growing weight every 10 days

Regarding 80 day-experiment in pigs' farm by balancing pigs for every 10 days, there were many records of dietary, feed composition and average weight. In Fig.1 illustrated about the changing comparison between the average growing weights of crossbred pigs for four different treatments: T_0, T_1, T_2 and T_3. The pig growing trend for each treatment was not quite different from each other since the beginning of dietary.