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Effect of self formulated economic feed on growth performance of crossbred hamshire pig

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Abstract
The study was carried on two months old piglets reared on uniform housing and managemental condition in a private farm at Sonkurhia village, Nalbari district of Assam with an objective to cut down cost of feed per unit weight gain. First group was fed with commercially available feed which is completely replaced in second group with locally available feed ingredients. During experimental period, monthly body weight gain, blood biological analysis besides daily feed intake were recorded. The intake of feed/kg gain in body weight was found to be 3.88±0.26 and 3.95±0.43 kg respectively in standard and treated groups which did not differ significantly. There were no significant difference obserbed in the blood biochemical profile in both the groups on collecition days. The cost of feed formulated locally was approximately Rs 19.23/kg which is less than the standard commercial feed of Rs 26.00/kg attributed greatly to the cost of meat production in the study which is Rs 75.46/kg in comparision to Rs 58.08/kg in the treated group.

Keywords: Pig locally available, cost of feed, Moringa powder

Introduction
Pig husbandry plays a major role in rural economy of the North East India where the tribal community rear pigs in backyard system [5]. Pig population is 2.10 million in Assam state only according to 20th Livestock census 2019. The food habit of the tribal population of this region mostly being non-vegetarian, where there is high demand for all kinds of meat. Pork is the most preferred meat in the entire region. But this region is not able to produce the required amount of pork due to high cost of commercially available feeds that renders the farmers to provide unconventional low quality feeds to the pigs. Moreover, the rearing/ management practices prevailing in this region is very unscientific which further reduces the productivity of the animals. Due to the faulty management practices and lack of required nutrients in the unconventional diets, the production always remained suboptimal in this region. In the present study, 30 numbers of crossbred hampshire grower pigs were kept in two separate groups where one group was fed with commercially available feed and the other group was fed with self formulated low cost high quality feed to reduce the production cost without hampering the growth of the animals.

Materials and Methods
The present experiment was conducted to study the effect of low cost high quality feed on hampshire crossbred pig through assessment of growth performance, feed conversion efficiency, blood biochemical alterations. Hence, an experiment entitled “Effect of self formulated economic feed on growth performance of crossbred hamshire pig” was conducted in the MG Pig Breeding farm at Sonkurhia village, Nalbari district of Assam.

Experimental layout
The experiment was carried out on 30 hamshire crossbred weaned piglests of age 2 months which were randomly divided into two equal groups (group 1 and group 2) having 15 each in such a way that the average group body weight did not vary significantly between each other. At initiation of experiment, all piglets were dewormed properly.

Diets and feeding regime

Both groups were feed commercially available feed for 7 days from initiation of study (upto day 7) for adjustment. From day 7, first group of animals were given commercially available feed from reputed manufacture and second group of animals were given the feed formulated at farm level which contains maize (31%), rice polish (29%), rice flakes waste (25%), MOC (10%), moringa leaf powder (0.75%) etc. Both the groups were fed equal standard amount of feed (kg) for entire duration of experimental period. Body weight was measured monthly for both the groups upto 120 days of experiment.

Observations and records

At day 7, body weight was measured for all individual animals of both the groups and representative blood samples were collected for blood biochemical analysis (n=3) after identification of animals. At 120 days of experiment, again blood samples were collected before feed distribution from the representative animals (n=3). The blood was used for evaluation of Hb (g/dl), glucose and serum iron by using acid hematinic method by Barker *et al.* [3], spectophotmeter method and coulometrically [7] (n=3). The experiment was conducted upto 120 days where the age of pig attains 6 months. Average feed efficiency and economics of production was calculated.

Statistical analysis

Analysis of variance was done to see the effect of both the diets on growth of piglets according to Snedecor and Cochran [8].

Results

The average CP (%) and energy (ME/kcal) of standard and formulated feeds were evaluated and recorded as 16.1 & 3189 and 13.6 & 2920 respectively which is presented in the Table 1. The standards CP (%) and energy (ME/kcal/kg) were experimentally evaluated at institutional facility of Lakhimpur College of Veterinary Science because their level were not listed in the website.

Table 1: Standard and calculated CP and energy level of both the feed.

Feed formulation	CP (%)	Energy (me/kcal)
Standard	16.1	3189
Formulated feed	13.6	2920

The feed which is formulated at institutional level with localy available ingredient is shown in Table 2 which is fed in the second group of animals for 120 days. Maize, rice polish, ricel flake waste, MOC, Soya meal along with mineral mixture, salt and moringa leaf powder were the ingredients of the formulated feed. The cost of per kg of formulated feed is calculated based on market price of the ingredients at experimental place.

Table 2: Per cent composition of various concentration mixture and cost evaluation.

Ingredient	Amount (kg)	Cost (Rs)	Per quintal cost (Rs)
Maize	31	713.00	2300.00
Rice polish	29	507.50	1750.00
Rice flake waste	25	275.00	1100.00
MOC	10	180.00	1800.00
Soya meal	3	90.00	3000.00
Min Mix added with probiotic	1	150.00	150.00/kg
Salt	0.25	2.50	1000.00
Moringa leaf powder	0.75	4.50	6000.00
	100 kg	1923.00	
Per kg cost Rs 19.23			

The body weight recorded from the initiation of the study for both the group are presented in the Table 3. In group 1, the body weight gain is recorded 13 ± 2.81 kg at 7 days of experiment which is recorded 65 ± 5.54 kg at 120 days of experiment whearas in group 2 the same is recorded as 12 ± 2.21 kg and 62 ± 4.76 kg respectively.

Table 3: Comparision of body weight of both the groups (n=15)

Experimental days	Group 1 (kg)	Group 2 (kg)
7 days	13±2.81	12±2.21
30	25±4.18	24±3.56
60	35± 3.96	33±4.23
90	46±4.46	42±5.06
120	65±5.54	62±4.76

Values bearing superscript (*) differ significantly in colounm $p<0.05$.

The blood biochemical parameters of both the groups were evaluated at experimental day 7 and day 120 which were represented in Table 4A and 4B. The average Hb% of group 1 in day 7 was 11.75 ± 0.55 which is 12.17 ±1.02 at day 120 wheareas in group 2, in day 7 the HB% was 11.98 ± 0.91 and in day 120 was 13.81±1.76. The evaluated iron level in group 1 were 24.19±5.62 ng/dl & 31.67±4.70 nd/dl at day 7 and day120 respectively which was recorded in group 2 as 25.71±4.23 ng/dl & 26.17±3.79ng/dl.

Table 4A: Blood biochemical parameters of both the groups on initiation of study, i.e. day 7 (n=3)

Parameter	Group 1	Group 2
Hb%	11.75±0.55	11.98±0.91
Glucose(mg/dl)	60.91±7.56	66.46± 7.84
Iron(ng/dl)	24.19±5.62	25.71±4.23

Table 4B: Blood biochemical parameters of both the groups on end of study, i.e. day 120 (n=3)

Parameter	Group 1	Group 2
Hb%	12.17±1.02	13.81±1.76
Glucose (mg/dl)	58.72±6.35	62.74± 8.63
Iron (ng/dl)	31.67±4.70	26.17±3.79

The average feed efficiency and economics of production in both the groups were calculated at the end of experimental period of 120 days and presented accordingly in Table 5. Total feed consumption per pig during experiment period in group 1 animal is recorded 150.96 kg where as in group 2 it is

recorded as 151 kg. Feed efficiency (Feed conversion ratio) for production of per kg body weight is 3.88±0.26 and 3.95±0.43 kg respectively in group 1 and group 2 piglets. The average cost per kg gain in body weight is calculated Rs 75.46 & Rs 58.08 respectively in group 1 and group 2 animals.

Table 5: Average feed efficiency and economics of production (n=15)

Particulars	Group 1	Group 2
Feed consumption (kg) per pig during experimental period of 120 days	150.96	151
Total weight gain (kg) in 120 days per pig	52	50
Feed efficiency	3.88±0.26	3.95±0.43
Total cost of feed	3924	2904
Average cost/kg gain in body weight (Rs)	75.46	58.08

Discussion

The calculated CP and energy of control has slightly higher than formulated one which is mainly due to ingredients used and replaced. Though feed formulations are different, the biochemical profiles had no significant difference which may be due to breed specification and findings are in agreement with Deng *et al.* [4]. The total average body weight gain, total feed consumption and feed conversion efficienty during 120 days of experimental period were found to be almost same in both the groups. Though in the treated group, the body weight was found to be slightly lower than the control group, but there was no statistical significance observed. The feed gain ratio obtained in this experiment by inclusion of waste rice flake and *Moringa olifera* leaf powder had no adverse effect. The data presented here indicate that the growing piglets consuming with *Moringa Oleifera* powder has effective results in early age which is supported by the results of Thierry *et al.* [10]. Afuang *et al.* [2] and Mukumbo *et al.* [6] reported that daily feed intake in pigs fed diets containing *Moringa olifera* leaves may be attributed to a increase in nutrient availability owing to the presence of phyto-chemicals. Furthermore, MOC and soya meal which are used in the formulated feed may be viable alternative protein sources to SBM for pigs especially during the growing and finishing periods of pig growth as MOC and soya have high levels of lysine and reasonable levels of other essential amino acids, with protein digestibility being lower than that of SBM [9].

The feed conversion efficiency of the experiment was concensus with the previous report of Acda *et al.* [1]. Morever, the formulated feed treated groups animal were noticed of improving body coat and hair colour which might be due to presence of adequate mineral mixture, probiotic and may be attirubted by the powder of *Moringa olifera* leaf. The economics of feeding has been calculated taking into the account the feed cost on the basis of prevailing market prices of various feed ingrdients which is listed in Table 2 is almost Rs 7 cheaper than the market price of per kg feed which leads to no adverse effect of weight gain till 120 days of experiment. Morever, cost of average per kg gain (live weight) is Rs 17 less in the formulated feed compared to control one is one of the most attributing factor of the present study which needs further validation and detail study with all used feed ingredints.

Conclusion

The results of the current study support the idea that the feeding locally available ingredients reflects the pig's feeding motivation, with faster rates associated with increased weight gain. Feeding behaviour traits were highly correlated with growth performance as well as cost of production. Namely, growth rate, final body weight was positively related to feed intake and feeding rate, but negatively related to the time spent eating (not shown here). Among the behavioural traits, feeding rate was the one most frequently and highly correlated with daily feed intake, growth rate and protein. Manipulating the feed ingredient would no affect on feed in intake and subsequently growth performance and positive impact on cost of feed production, but would have little influence on feed efficiency.

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