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PERFORMANCE OF GROWING AND FINISHING PIGS FED $CuSO_4$ TREATED MOC

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ABSTRACT

An experiment was conducted to investigate the effect of feeding $CuSO_4$ treated MOC diet on the performance and nutrient utilization of growing and finishing pigs. Eighteen weaned crossbred (Hampshire X Assam local) piglets were distributed three groups having six piglets each in a completely randomized design. The experimental rations were prepared for growing (2-5 months) and finishing (5-8 months) pig containing no MOC (T_1), 10% MOC (T_2) and 10% treated MOC (T_3) and piglets were offered twice daily. No significant (P>0.05) effect on weight gain influenced by either untreated or treated MOC with $CuSO_4$. However, higher weight gain, better feed efficiency was observed in $CuSO_4$ treated group but no significant (P>0.05) differences was achieved in the carcass characteristics of pigs fed different diets.

Key words : $CuSO_4$, glucosinolate, MOC, crossbred piglets

Rapeseed is closely related to mustard and proteins of the two species are similar. Recently, rapeseed protein has been shown to have better emulsification capacity than that of whole egg[11]. Therefore, it could be used as a replacement for animal proteins. The glucosinolate concentration in Indian mustard varieties ranges from 1.2 to 9.0 per cent[3]. Major deleterious effects of glucosinolates ingestion in animals are reduced palatability, decreased growth and production[9]. The meal, despite of its high protein content and good nutrient composition have not enjoyed a popularity in poultry and swine feeding primarily due to presence of glucosinolate which interfere with the normal function of vital organs like liver and thyroid gland thus adversely affecting the biosynthesis as a whole. Several methods includes physical, thermal, chemical or microbiological treatments either singly or in combination has been employed to detoxify the rape seed meal in an attempt to improve its feeding value for livestock[5]. Chemical treatments of MOC with CuSO4 have shown some promising result by lowering the toxic factors in case of poultry[2]. Therefore a study was conducted to investigate the effect of feeding $CuSO_4$ treated MOC diet on the performance and nutrient utilization of growing and finishing pigs.

Ground Mustard oil cake (MOC) of expeller variety was pretreated with Copper Sulphate ($CuSO_4$) solution (8g $CuSO_4$ in one litre of water/kg MOC) at room temperature. The properly mixed material was incubated for 24 hrs and then sun dried by spreading thinly on plastic sheet to its original weight.

Eighteen weaned crossbred (Hampshire X Assam local) piglets were selected from All India Co-ordinated Research Project on pig, Assam Agricultural University, Guwahati-22 for this study. Piglets were distributed on the basis of body

weight (11.58 ± 0.27 Kg) among three groups having six piglets (three castrated male and three female) each in a completely randomized design. The piglets were housed in concrete pens and numbered for individual identification. They were dewormed and vaccinated against swine fever and Foot and Mouth disease prior to start of the experiment.

Three experimental rations were prepared for growing (2-5 months) and finishing (5-8 months) pig containing no MOC (T_1), 10% MOC (T_2) and 10% treated MOC (T_3) and piglets were offered twice daily at 9-00 AM and 3-00PM. Fresh and clean drinking water was provided *ad.lib*. throughout the trial. Feed intake was recorded daily by the difference of the feed offered and the residual amount. Individual body weights were recorded fortnightly. A digestibility trial was conducted for 5 days at the end of the feeding trial with 3 pigs from each group for determination of digestibility of organic nutrients (Table: 1).

At the end of the feeding trial, three pigs from each treatment were sacrificed as per standard procedure[10]. They were fasted for 24 h before slaughter but provided with drinking water. After evisceration, the carcass were cleaned thoroughly .The dressing percentage was calculated from hot carcass weight without head and feet. The average of back fat thickness was recorded at three location i.e. first rib, last rib and the last lumbar vertebra. Loin eye was traced on acetated paper by keeping it between 10-11th ribs. The traced area was measured by using planimeter and expressed in cm^2.

Feed ingredients, experimental rations, residual feed and faeces were analysed for proximate constituents[1]. The data were subjected to analysis of variance and means were tested for significance by least significance difference[6].

The chemical composition of MOC did not differ significantly due to $CuSO_4$ treatment. Experimental data on animal performance, digestibility of nutrients and carcass characteristics are presented in the table 2. Weight gain was not significantly ($P>0.05$) influenced by either untreated or treated MOC with $CuSO_4$. However, numerically higher weight gain was achieved through $CuSO_4$ treatment of MOC[2]. The reason might be that $CuSO_4$ treatment reduced the level of glucosinolate in the MOC. Because pigs are more severely affected by dietary glucosinolate compared to rabbit, poultry and fish. Better feed efficiency was observed in $CuSO_4$ treated group. Digestibility of organic nutrients was better in the CuSO4 treated group compared to the other two groups which resulted in better weight gain and feed efficiency in the group. This in turn resulted in the better cost gain ratio in $CuSO_4$ treated group (T_3) compared to control (T_1) and untreated MOC fed group (T_2).

The carcass characteristics of pigs fed different diets revealed no significant ($P>0.05$) differences among the different treatments (Table 2). Similar findings were also reported by various authors[8,7,4] while feeding unconventional feeds like tamarind seeds and molasses, ground nut haulms and guava pomace, respectively.

The total feed consumption, cost of experimental ration, total gain in body weight and total meat produced were considered while calculating the cost per kg live weight gain .Total feed the total feed consumed in the different treatment were 275.15, 276.29 and 274.87 kg respectively. The cost was reduced due to inclusion of MOC in the diet which is very much cheaper than GN Cake. The cost of feed per kg pork produced was Rs.40.73, Rs.40.01 and Rs. 37.76 in pigs fed T1, T2 and T3 diet respectively and there were significant difference among the groups.

Table 1: Chemical composition of experimental rations and treated MOC

Nutrients	Grower ration (%)			Finisher ration (%)			M.O.C. (%)	
	T_1	T_2	T_3	T_1	T_2	T_3	Treated	Untreated
D.M	89.65	89.75	89.50	89.40	89.82	89.90	90.32	92.70
C.P	18.25	18.31	18.35	16.18	16.24	16.27	35.18	35.40
C.F	6.74	6.69	6.70	6.89	6.98	7.02	12.34	8.60
E.E	6.14	6.46	6.49	5.82	6.50	6.54	9.54	14.20
NFE	59.12	59.16	59.08	61.64	61.23	60.82	34.22	33.70
T.A	9.75	9.38	9.38	9.47	9.35	9.35	8.72	8.30
Ca	1.24	1.22	1.25	1.22	1.10	1.12	0.76	0.82
P	0.79	0.89	0.91	0.84	0.79	0.81	1.06	1.13
ME(kcal/Kg)	2897	2880	2880	2898	2887	2887	-	-

Table 2: Performance of pigs on diet containing raw or $CuSO_4$ treated MOC

Particulars	Groups		
	T_1	T_2	T_3
Initial body weight (kg)	11.33 ± 0.42	11.75 ± 0.41	11.62 ± 0.62
Final body weight (kg)	77.00 ± 1.67	74.83 ± 1.47	78.50 ± 0.76
Av. daily gain (g)	0.395 ± 1.78	0.380 ± 1.70	0.403 ± 1.25
DM intake (kg/100kg b. wt.)	2.15	2.21	2.11
Feed efficiency ratio	4.19	4.38	4.11
Digestibility (%)			
DM	65.46 ± 0.72	64.72 ± 0.78	68.14 ± 0.68
CP	66.52 ± 0.62	64.30± 0.42	68.23±0.41
EE	67.18 ± 0.23	68.14 ± 0.51	71.44 ± 0.79
CF	58.24 ± 0.58	55.35 ± 0.35	63.74 ± 0.39
NFE	74.84 ± 0.59	70.58 ± 0.55	78.68 ± 0.48
Carcass characteristic			
Slaughter weight	73.25 ± 1.86	71.45 ± 1.54	75.15 ± 1.92
Dressing percentage	69.09 ± 1.45	79.27 ± 1.36	71.65 ± 1.14
Carcass length (cm)	72.33 ± 0.45	71.00 ± 0.78	75.50 ± 1.02
Back fat thickness	2.36 ± 1.45	2.38 ± 1.66	2.39 ± 1.95
Loin eye area $(cm)^2$	29.93 ± 1.78	29.45 ± 1.85	30.5 ± 1.88
Per cent yield			
Ham	25.88 ± 1.30	25.32 ± 1.36	25.98 ± 1.88
Shoulder	29.05 ± 1.26	28.92 ± 1.12	29.20 ± 0.96
Loin	26.55 ± 1.34	26.30 ± 1.32	26.75 ± 1.40
Bacon	16.50 ± 1.48	16.35 ± 1.74	16.70 ± 1.58
Cost/kg gain in live weight (Rs)	40.73	40.01	37.76

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