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PERFORMANCE AND BLOOD BIOCHEMICAL PROFILE OF GROWER PIGS FED GREEN BERSEEM IN A BASAL DIET OF KITCHEN WASTE

Ravindra Kumar[1], Anil Kumar[2] and M. Patel[3]

Ranchi Veterinary College, Birsa Agriculture University, Ranchi, Jharkhand 834006, India

[1,2]GBPUA&T, Pantnagar, [3]Dept. of LPM, IVRI. E mail-ravindrakumar_rvc@yahoo.com

ABSTRACT

A study was made on 24 Large White Yorkshire pigs to see the effect of different levels of green Berseem (*Trifolium alexandrinum*) and balanced ration along with equal quantity of kitchen waste on growth performance and blood biochemical profile. The pigs were divided into 4 groups (T_1, T_2, T_3 and T_4) having 6 in each. T1 (10% green berseem+40% balanced ration), T_2 (15% green berseem+35% balanced ration), T_3 (20%green berseem+30% balanced ration) and T_4 (25% green berseem+15% balanced ration) along with 50% kitchen waste were given to each group. No significant differences were observed in overall live weight gain. However, no significant difference was observed among later three groups. Among plasma biochemical parameters significantly (P<0.01) highest value for blood glucose and total cholesterol were observed for group I followed by group II, III and IV. Whereas, significantly (P<0.01) highest value HDL cholesterol and HDL:total cholesterol were observed for group IV followed by group III, II and I. However, non-significant difference was observed for total protein, albumin, globulin and A/G ratio. It was concluded that green berseem can be introduced into the diet of pigs up to 25% without affecting the performance adversely.

Key words : *Berseem, bio-chemical profile and pig*

In India, livestock production systems are mainly based on low cost agro by products as nutritional inputs, using traditional technologies. In this system pig rearing fits very well. Under the prevailing shortage of grains, attempts have to be made to use more of the garbage from hotels, kitchen wastes and green pasture, in place of grains to the extent feasible in pig ration without affecting the performance adversely. For decades, forage crops were an essential part of a swine feeding programme. High-quality forages can still be utilized to simplify the feeding and management of the breeding and fattening herds. Practically, sole feeding of any leguminous fodder is also not advisable due to high fiber content. Unlike developed countries there is no concept of developing pasture for pig production in India. Under Indian condition feeding of cultivated fodder like Berseem may be used as feed for pigs maintained in intensive system of management.

MATERIALS AND METHODS

Experiment was designed using 24 Large White Yorkshire piglets of about 3 months age. The animals were randomly divided in to 4 groups (T_1, T_2, T_3 and T_4) of 6 each. The study would continue for two months. The *ad libitum* feeding was done during experiment.

The green berseem was provided to pigs after overnight wilting. The kitchen waste required for the research work was collected from the hostel mess in fresh form. After collection, it was thoroughly mixed to make it uniform in its contents. In order to study the biochemical parameters in the plasma, blood samples (approximately 5 ml) were collected aseptically from the ear vein /anterior venacava in sterilized disposable syringes (24 gauge needle) at 0 day and end of experiment. Collected blood samples were transferred to heparinized centrifuge tubes and centrifuged at 3000 rpm for 10 minutes for separation of plasma. Plasma was stored at -20°C till the estimation of different biochemical parameters. However, glucose estimation was done immediately after harvesting plasma. The different biochemical constituents in plasma were estimated by using diagnostic kits.

RESULTS AND DISCUSSION

The proximate composition (% on DM basis) of experimental diet has been presented in Table-2. At the end of growing stage no significant difference were observed in final body weight gain and daily weight gain among groups. Average body weight at the end of growing stage was 43.75 ± 1.78, 45.58 ± 2.19, 45.33 ±

Table-1 : Distributions of feed in different groups of finisher pigs.

(T_1)	(T_2)	(T_3)	(T_4)
10 % Green berseem + No Kitchen waste + 90 % Balanced ration	10 % Green berseem + 25 % Kitchen waste + 65% Balanced ration	10 % Green berseem + 50 % Kitchen waste + 40% Balanced ration	10 % Green berseem + 75 % Kitchen waste + 15% Balanced ration

1.13 and 47.50 ± 1.52 for group I, II, III and IV, respectively. These findings are in conformity with the scientist (1). Better growth rate with kitchen waste incorporated diet might be due to high nutritious value diet which contains meat, bread, paneer, vegetable, pulses, rice etc and better digestibility of nutrients. This was also supported by (1, 2) who estimated crude protein value of kitchen waste to be 29.17 and 26.23 %, respectively which is even more than those of NRC recommendation.

The data for plasma concentration of glucose, total protein, albumin, globulin, A:G ratio, total cholesterol, HDL cholesterol and HDL:total cholesterol during initial and growing stage of the experiment are presented in Table-4.

The plasma glucose concentration in pigs of group I, II, III and IV ranged from 5.08 ± 0.06 to 5.38 ± 0.12 mmol/l but there was no statistical significant difference among different treatments during 0 day of experiment. Further, glucose concentration was slightly decreased and was highest for group I (5.03 ± 0.06) followed by group II (5.00 ± 0.12), III (4.89 ± 0.10) and IV (4.79 ± 0.06) at the end of growing stage. However no significant difference was found among groups.

Plasma total protein concentration (g/l) before start of experiment ranged from 58.83 ± 0.79 to 60.00 ± 0.52. However, no significant difference was found among the treatments. Plasma total protein value differ significantly ($P<0.05$) among the groups at the end of growing stage however, no significant difference were observed among group I, II and III and between group II and IV but did not show any particular trend. Plasma albumin concentrations at 0 day of experiment ranged from 31.67 ± 0.84 to 33.17 ± 0.60, no significant difference were observed. At the end of growing stage, significantly ($P<0.05$) highest value were observed in group III (33.83 ± 0.31) followed by group IV (32.17 ± 0.40), I (32.00 ± 0.73) and II (31.50 ± 0.67), however no significant difference were observed among group I, II and IV. Plasma globulin concentration (g/l) during start of experiment ranged from 27.17 ± 0.31 to 27.50 ± 0.56, which did not differ significantly. At the end of growing stage plasma globulin concentration was significantly ($P<0.01$) highest for group I (28.33 ± 0.33) followed by group II (27.83 ± 0.31), III (26.83 ± 0.48) and IV (26.17 ± 0.48). However no significant differences were observed between group I and II, group II and III and between group III and IV. Plasma A:G ratio ranged from 1.17 ± 0.06 to 1.28 ± 0.04 which did not differ significantly among different treatment groups during initial stage. At the end of growing stage

Table-2 : Proximate composition (% on DM basis) of experimental diet.

Constituents	Treatments			
	I	II	III	IV
Dry matter	52.32	48.52	44.73	40.93
Organic matter	92.69	92.41	92.13	91.85
Total ash	7.32	7.59	7.88	8.16
Crude protein	19.63	19.71	19.80	19.88
Crude fiber	4.34	5.12	5.89	6.67
Ether extract	8.06	8.02	7.98	7.94
Nitrogen free extract	60.58	59.48	58.38	57.28

Table-3 : Growth Performance of pigs maintained under different treatments

	T_1	T_2	T_3	T_4	
Ave. Initial body weight (Kg)	15.46±1.17	14.83±1.24	15.17±1.20	15.50±1.59	NS
Ave. final body weight (Kg)	43.75±1.78	45.58±2.19	45.33±1.13	47.50±1.52	NS
Ave. final daily weight gain (g/day)	630.95±23.81	672.62±38.48	583.33±38.76	625.00±37.74	NS

Table-4 : Blood biochemical parameters of grower pigs at different stages.

Parameters	Group I	Group II	Group III	Group IV	Significance
		Initial stage			
Glucose (mmol/l)	5.35 ± 0.07	5.38 ± 0.12	5.26 ± 0.09	5.08 ± 0.06	NS
Total protein (g/l)	60.00 ± 0.52	59.50 ± 0.43	59.83 ± 0.67	58.83 ± 0.79	NS
Albumin (g/l)	32.83 ± 0.70	32.00 ± 0.86	33.17 ± 0.60	31.67 ± 0.84	NS
Globulin (g/l)	27.17 ± 0.31	27.50 ± 0.56	27.50 ± 0.56	27.17 ± 0.48	NS
A : G ratio	1.21 ± 0.04	1.17 ± 0.06	1.28 ± 0.04	1.17 ± 0.04	NS
Total cholestrol (mmol/l)	3.77 ± 0.03	3.74 ± 0.03	3.84 ± 0.02	3.76 ± 0.02	NS
HDL cholestrol (mmol/l)	1.38 ± 0.02	1.40 ± 0.01	1.39 ± 0.03	1.38 ± 0.03	NS
HDL : Total Cholesterol	0.37 ± 0.01	0.38 ± 0.02	0.36 ± 0.01	0.37 ± 0.01	NS
Glucose (mmol/l)	5.03 ± 0.06	5.00 ± 0.12	4.89 ± 0.10	4.79 ± 0.06	NS
Total protein (g/l)	60.33 ± 0.56^{a}	59.17 ± 0.60^{ab}	60.67 ± 0.42^{a}	58.33 ± 56^{b}	*
Albumin (g/l)	32.00 ± 0.73^{a}	31.50 ± 0.67^{a}	33.83 ± 0.31^{b}	32.17 ± 0.40^{a}	*
Globulin (g/l)	28.33 ± 0.33^{a}	27.83 ± 0.31^{ab}	26.83 ± 0.48^{bc}	26.17 ± 0.48^{c}	**
A : G ratio	1.13 ± 0.04^{a}	1.13 ± 0.03^{a}	1.26 ± 0.03^{b}	1.23 ± 0.03^{b}	*
Total cholestrol (mmol/l)	3.60 ± 0.07	3.49 ± 0.07	3.72 ± 0.10	3.72 ± 0.10	NS
HDL cholestrol (mmol/l)	1.43 ± 0.03	1.41 ± 0.02	1.47 ± 0.04	1.47 ± 0.04	NS
HDL : Total cholestrol	0.40 ± 0.01	0.42 ± 0.01	0.41 ± 0.01	0.39 ± 0.01	NS

^{abc}Means bearing different superscripts in a row differ significantly from each other (** P < 0.01), NS = Non-significant.

no particular trend was observed, however significant difference were observed among groups. However, no significant difference was observed between group I and II and between group II and III.

Plasma total cholesterol concentration (mmol/l) ranged from 3.74 ± 0.03 to 3.84 ± 0.02 during initial stage of experiment having no significant difference. Slightly lower value of total cholesterol in comparison to initial stage were found in all the groups at the end of growing stage, which was highest for group IV (3.72 ± 0.10) followed by group I (3.60 ± 0.07), II (3.54 ± 0.07) and III (3.49 ± 0.07). However, no significant differences were observed among groups.

Plasma high density lipoprotein (HDL) cholesterol (mmol/l) ranged from 1.38 ± 0.03 to 1.40 ± 0.01 at 0 day of experiment, which did not differ significantly among groups. At the end of growing stage the plasma HDL cholesterol value becomes slightly higher in comparison to initial stage which ranged from 1.41 ± 0.02 to 1.47 ± 0.04. However, neither significant difference nor definite trends were observed among groups. HDL : Total cholesterol during initial stage ranged from 0.36 to 0.38 and no significant difference among groups were observed. At the end of growing stage slightly higher value of HDL : Total cholesterol which ranged from 0.39 to 0.42 were observed in comparison to initial stage however, no significant difference were observed among groups.The replacement of concentrate with green berseem along with kitchen waste did not affect the blood biochemical constituents significantly, but a trend was observed for glucose and cholesterol. Glucose and total cholesterol level decreases slightly whereas HDL cholesterol

increases slightly at the end of growing stage. This is also supported by who studied the effect of feeding 0, 5, 10 and 15% levels of *Ipomoea asarifolia leaf meal* (IALM) as a replacement for concentrate diet for pigs. No significant difference was observed. salso supported for decrease in serum glucose for pigs fed 20% alfalfa meal in comparison to 0% alfalfa meal.

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