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PERFORMANCE OF LAMBS UNDER FARM AND FEED LOT MANAGEMENT IN ARID REGION

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SUMMARY

Six male lambs each of Marwari, Magra and indian Karakul breeds 135d old were raised under farm management (T_1); 8 hrs grazing grass or legume plant plus supplementation of a concentrate mixture at 300g/h/d or feed lot management (T_2) i. e. ad 1ib feeding of a concentrate mixture and Ziziphus nurnrnularia leaves (40:60) for a period of 75 days. The data was analyzed as regression of nutritional parameters on initial weight of lambs. The effect of genetic groups was observed to be significant on initial weight, final weight, live weight gain, growth rate, dressing percentage, DMI (% of BW, g/$W^{0.75}$kg), cost of concentrate, cost of Ziziphus nummularia leaves, total feed cost, DCP intake (g/$W^{0.75}$kg) and total nitrogen excretion. Effect of treatments was observed in all the cases under consideration viz. final weight, live weight gain, growth rate and dressing percentage; except initial weight, whereas interaction was significant in live weight gain and growth rate only. Regression was significant in final weight, live weight gain, feed efficiency and cost per kg gain. Interaction effect was significant in case of final weight and live weight gain. Growth rate was similar among genetic groups under farm management whereas under feedlot management, it was significantly ($P \leq 0.05$) higher in Indian Karakul breed (0.151 kg/h/d). Indian Karakul was observed to have significantly ($P \leq 0.0$ 1) higher dressing percentage (T_1 44.55; T_2 48.00). Nutrient digestibility and nitrogen retention were statistically similar among breeds. Lowest feed cost was observed in Indian Karakul after taking regression into consideration. The results indicated that animals respond to better management, wherein higher final weights as well as higher dressing percentage can be expected from lambs raised under feedlot vs. farm management conditions. Under feedlot management it is cheaper to raise lambs of Indian Karakul due to higher growth, feed efficiency, dressing percentage and lower feed cost per kg gain followed by Marwari and Magra breed in hot arid region with Ziziphus numrnularia leaves as basal diet.

Keywords: *Marwari, magra, Indian karakul, growth, farm, feedlot, management*

INTRODUCTION

Mutton production is one of the main aspects of sheep rearing in hot arid tropics. Usually sheep breeders allow the animals to graze on forage/ pasture resources available on the road sides, fallow lands with minimal input in terms of supplementary feed. This affects feed and nutrient intakes which in turn influences production performance of animals. Supplementation improves the productivity

through efficient utilization of feed and forage resources in the arid zone. Thorny bush of *Ziziphus nummularia* is an important browse species of the region. During dry periods, sheep mostly browse on *Ziziphus nummularia* leaves (More and Sahni, 1980). Dry leaves are fed during feed scarcity, they are rich in crude protein but low in energy (Nath *et al.*, 1969); major part of protein in the leaves is not available as its major fraction is lignin bound (Sehgal and Bhatia, 1983). Under farm conditions moderate levels of concentrate is supplemented for optimum growth of lambs. Hence considering earlier observations, experiment was planned to evaluate growth pattern among different genetic groups on grazing or feedlot management under arid conditions. Feed utilization was also studied among animals raised under feedlot management with *Ziziphus nummularia* leaf based diet.

MATERIALS AND METHODS

Six male weaned lambs each of Marwari (G1), Magra (G2) and Indian Karakul (G3) breed, were reared as control (T_1, farm management) group and treatment group (T2 feedlot management) for a period of 75 days. Animals in T_1 was maintained under farm management condition under which 8 hrs grazing with 300g/h/d concentrate supplement was provided. Animals under feedlot management were individually fed ration containing 60% *Ziziphus nummularia* leaves and 40% concentrate mixture. Concentrate mixture contained groundnut cake-40 parts, barley-40 parts, wheat bran-17.5 parts and common salt, 2.5 part. Mineral mixture was supplemented at 5g/h/d. Water was provided free choice twice daily. Animals of both groups were monitored weekly for changes in live weight. Feed intake of animals under feedlot was monitored daily and at the end of experiment a 7 day metabolic trial was conducted on 4 animals of each breed to assess nutrient intake and digestibility. Slaughter studies were conducted at the end of the experiment on all animals. Samples of feeds offered, feces and feed residues were analyzed for proximate principles (AOAC, 1990). Urine samples were analyzed for nitrogen by Kjeldhal method. Data was statistically analyzed, (Snedecor and Cochran, 1968) by considering the regression of nutritional parameters on initial weight of lambs, wherever the regression was non-significant; analysis was done without considering the covariate.

RESULTS AND DISCUSSION

Chemical composition of feed ingredients (% DM) revealed that pelleted sheep feed, concentrate mixture and *Ziziphus nummularia* leaves contained 89.80, 87.06, 86.73 OM; 22.81, 23.80, 13.75 CP; 3.54,5.39, 3.20 EE; 12.58, 13.01, 12.82 CF; 50.87,44.86, 56.96 NFE and 10.20, 12.94, 13.27 Ash, respectively. *Ziziphus nummularia* leaves were observed to be rich source of protein. Crude protein content was observed to be closer to the values observed earlier (Nath *et al.*, 1969).

Raw means and standard errors (SE) and adjusted means and SE of important feed lot characteristics are given in tables la and 2a and respective analysis of variance with and without regression with results of Duncan's Multiple Range Test are given in tables 1 b and 2b respectively. Further raw means and SE and adjusted means and SE with results of statistical analysis of some nutritional parameters with and without regression are given in tables 3a and 3b respectively. The raw means and

SE of rest of the nutritional parameters with results of statistical analysis are given in table 4.

Table 1a. Performance of lambs raised under different management systems

Attribute	Initial weight (Kg)	Final weight (Kg)	Gain (Kg)	Dressing (%)	Regression coefficient (Kg/d)
G_1	13.883±0.474	20.192±0.560	6.308±0.293	43.16±0.47	0.085±0.004
G_2	17.309±0.780	23.584±0.746	6.275±0.172	43.36±0.75	0.074±0.003
G_3	17.642±0.873	24.725±0.527	7.084±0.473	46.27±0.54	0.094±0.004
T_1	17.111±0.589	21.311±0.495	4.200±0.234	43.02±0.47	0.041±0.003
T_2	15.444±0.602	24.356±0.515	8.911±0.310	45.50±0.51	0.127±0.003
G_1T_1	14.733±0.613	18.238±0.657	3.550±0.357	41.65±0.46	0.043±0.005
G_2T_1	18.017±0.755	23.000±0.856	4.983±0.283	42.86±1.02	0.043±0.004
G_3T_1	18.583±1.474	22.650±1.019	9.067±0.533	44.55±0.84	0.036±0.006
G_1T_2	13.033±0.724	22.100±0.906	9.067±0.464	44.67±0.82	0.126±0.006
G_2T_2	16.600±1.364	24.167±1.222	7.567±0.196	43.86±1.11	0.104±0.004
G_3T_2	16.700±0.936	26.800±0.273	10.100±0.781	48.00±0.68	0.151±0.005

Table 1b. ANOVA for the effect of genetic groups, treatments and their interaction on weight gain and dressing %

Source of variation	Initial Weight (Kg)	Final weight (Kg)	Gain (Kg)	Dressing (%)	Regression Coefficient (kg/d)
G	51.9336**(2)	66.7155**(2)	2.5103(2)	36.4250**(2)	0.001235**(2)
T	25.0000(1)	83.4170**(1)	195.7511**(1)	55.8260**(1)	0.067081**(1)
G x T	0.1658(2)	8.0175(2)	10.3869**(2)	5.0885(2)	0.002165**(2)
Error	6.3815(30)	4.5946(30)	1.3554(30)	4.3214(30)	0.000158(30)
Result of DMRT	G → $(G_1)(G_2G_3)$	G → $(G_1)(G_2G_3)$	T_1 → $(G_1G_3)(G_2G_3)$	$(G_1G_2)(G_3)$	T_1 → $(G_3G_2G_1)$
			T_2 → $(G_2)(G_1G_3)$		T_2 → $(G_2)(G_1)(G_3)$
		T → (T1)(T2)	G_1 → $(T_1)(T_2)$		G_1 → $(T_1)(T_2)$
			G_2 → $(T_1)(T_2)$	$(T_1)(T_2)$	G_2 → $(T_1)(T_2)$
			G_3 → $(T_1)(T_2)$		G_3 → $(T_1)(T_2)$

G-Genetic group, T-Treatment, G1-Marwari, G2-Magra, G3-Indian Karakul, T1-Farm management, T2-Feedlot management, Any two means coming in the same parenthesis are not significantly different, Any two means not coming in the same parenthesis are significantly different, * P<0.05, **P<0.01. ^Regression of weight of weight on age.

Dependence of nutritional and other parameters on initial weight of lambs is known whereas the trend of dependence may vary with the type of genetic group under study, however, regression cannot be over looked as it helped in better comparison of results. Regression of initial weight was observed to be significant (P≤0.0l) on final weight, live weight gain, feed efficiency and cost per kg gain (Tables 2b and 3b). After adjustment of initial weight (tables 2a and 2b) significant (P≤0.01) interaction was observed in case of final weight whereas, no interaction was observed prior to taking regression into consideration in case of final weight. In case of T_1; Marwari lambs (G_1) were observed to have significantly (P≤0.01) least final

weight followed by Indian Karakul (G_3) and Magra (G_3) breed, Indian Karakul and Marwari grouped together. Whereas, in case of animals under T_2, Indian Karakul lambs were observed to have significantly higher ($P \leq 0.01$) final weights, Marwari and Magra grouped together. Higher final weights ($P \leq 0.01$) were observed in animals under feedlot management (T_2) in all the genetic groups than those under farm management (T_1). Similar trend was observed in case of live weight gain after adjustment. This indicates that results of significance of genetic groups or their trend changes after adjustment.

Table 2a. Adjusted means and standard errors for the effect of genetic groups and treatments on final weight (Kg) and gain (Kg)

Attribute	Final weight	Gain
G_1	21.997±0.336	5.719±0.337
G_2	22.807±0.298	6.529±0.298
G_3	23.697±0.305	7.419±0.305
T_1	20.683±0.244	4.405±0.244
T_2	27.985±0.244	8.706±0.244
G_1T_1	19.448±0.424	3.170±0.424
G_2T_1	21.689±0.428	5.411±0.428
G_3T_1	20.913±0.441	4.634±0.441
G_1T_2	24.546±0.471	8.268±0.471
G_2T_2	23.924±0.409	7.646±0.409
G_3T_2	26.482±0.410	10.204±0.410

Table 2b. ANOVA for the effect of genetic groups, treatments and their interaction under different management systems on final body weight and gain

Source of variation	Final weight	Gain
G	6.2546**(2)	6.254922**(2)
T	147.241120**(1)	147.2411400**(1)
G x T	9.757340**(2)	9.756926**(2)
Regression	108.779220**(1)	11.605052**(1)
Error	1.001992(29)	1.002009(29
Result of t-test		
T_1	$(G_1)(G_3G_2)$	$(G_1)(G_3G_2)$
T_2	(G_2G_1) (G_3)	(G_2G_1) (G_3)
G_1	$(T_1)(T_2)$	$(T_1)(T_2)$
G_2	$(T_1)(T_2)$	$(T_1)(T_2)$
G_3	$(T_1)(T_2)$	$(T_1)(T_2)$

Genetic groups were observed to be significantly ($P \leq 0.01$) different with respect to initial weight, Marwari lambs were observed to have significantly lowest initial weight, Marwari by Magra and Indian Karakul; Magra and Indian Karakul grouped together. Interaction was significant ($P \leq 0.01$) in respect of growth rate and no genetic group effect was observed for animals raised under farm management, however, in case of feedlot management all genetic groups differed, significantly ($P \leq 0.01$) with lowest growth rate in Magra and highest in Karakul. Lambs of II. I genetic groups

raised under feedlot management had significantly higher (P≤0.01) growth rate than those raised under farm management (Tables la and lb). Animals raised under feedlot management had significantly higher (P≤0.01) dressing percentage than those raised under farm management. Indian Karakul lambs were observed to have significantly higher (P≤0.01) dressing percentage than Marwari and Magra breed; Marwari and Magra grouped together having least dressing percent. Thus indicating raising lambs under feedlot management at post weaning stage had beneficial effect over those raised under farm management. Further, pasture quality in arid region seemed to be nutritionally inadequate for optimum growth expression due to which differences were observed.

Feed dry matter intake (DMI) either through concentrate or *Ziziphus nummularia* leaves was not affected due to breeds, however, when DMI was expressed as percentage of body weight and g/kgW0.75, it was significantly higher (P≤0.05) in case of Marwari and Indian Karakul than Magra breed (Table 3a). When nutrient intake was expressed on metabolic body size, TDN intake was not affected due to breed however, DCP intake was found to be significantly (P≤0.05) higher in Marwari breed than that of Magra or Karakul and Marwari grouped together. Nutrient intake (DCP and TDN) in all the breeds was comparable to those recommended by Kearl (1982) whereas as per ICAR (1998) standards, DCP intake was higher and TDN intake was comparable to the present study. This was due to higher DCP intake through *Ziziphus nummularia* leaves. Feed efficiency was statistically similar among genetic groups before and after adjustment (Tables 3a and 3b). However after adjustment, Marwari breed had highest feed efficiency before adjustment but after adjustment it had least feed efficiency. Economics of feeding revealed that cost of concentrate and *Ziziphus nummularia* leaves and of total feed cost was significantly higher (P≤0.05) in Indian Karakul but was statistically similar among Marwari and Magra breeds. This was due to higher feed intake by animals of Indian Karakul breed. No significant differences among breeds were observed even after adjustment of means for feed cost per kg gain, however, after adjustment trend was reversed. Marwari breed had least feed cost per kg gain before adjustment but after adjustment it had highest feed cost per kg gain. (Tables 3a and 3b) indicating that on free choice basis, cost of feed consumed for achieving marketable weight is not affected by breed differences.

Water intake either through teed or orally (Table 3a) was not affected due to breed. Excretion of water either through urine or faeces was also found to be similar among breeds. Thus, indicating that the entire breeds rose in the experiment had similar water requirements and similar water excretion and conservation at same age.

Breed differences did not affect organic matter digestibility and nutrient intake (Table 3a, b); this may be due to maintenance of proper concentrate: roughage ratio in the diet of animals. Nitrogen balance studies (Table 4) on the three breeds reared under feedlot management revealed that intake of nitrogen through concentrate and *Ziziphus nummularia* leaves was statistically similar, it was related to feed dry matter intake among breeds.

Table 3a. Growth performance, feed and nutrient intake of feedlot group of lambs

Attribute	Marwari	Magra	Indian Karakul
Dry matter intake (g/d)			
Concentrate	301.58±14.24	293.32±24.42	354.28±12.67
Zizphus nummularia leaves	432.32±20.17	418.82±.34.03	507.25±18.63
Total DMI	733.90±34.36	712.13±58.44	861.53±31.29
$^{\Delta}$DMI (% of BW)*	4.20^{b}±0.001	3.53^{a}±0.002	4.04^{b}±0.002
DMI (g/$W^{0.75}$Kg)*	85.60^{a}±2.65	74.70^{b}±3.58	87.01^{a}±3.22
DCP intake (g/d)	93.92±4.41	90.45±7.42	104.70±3.80
TDN intake (g/d)	380.12±17.81	379.93±31.17	425.17±15.44
DCP (g/$W^{0.75}$Kg)*	10.96^{a}±0.34	9.49^{b}±0.45	10.58^{ab}±0.39
TDN intake (g/$W^{0.75}$Kg)	44.34±1.37	39.85±1.91	42.94±1.59
$^{\Delta}$Feed efficiency (%)	16.46±0.002	14.564±0.0.32	15.59±0.027
Economics of feeding (Rs/h)			
Concentrate	118.66^{a}±5.14	115.19^{a}±8.67	139.54^{b}±5.21
Mineral mixture	20.25±0.00	20.25±0.00	20.25±0.00
Zizphus nummularia leaves	139.58^{a}±6.13	135.50^{a}±10.24	164.28^{b}±6.14
Total feed cost*	278.48^{a}±11.27	270.93^{a}±18.91	324.06^{b}±11.35
Feed cost (Rs/ kg gain)	30.82±0.60	36.03±3.09	33.07±2.85
Water intake and excretion			
Water intake (ml/d)			
Feed	126.35±9.75	139.88±9.17	151.38±14.39
Oral	3317.93±317.47	3010.23±179.88	3232.08±171.77
Total	3444.28±313.57	3150.10±179.23	3383.45±184.25
$^{\Delta}$Oral water intake as % of BW	15.90±0.03	13.17±0.01	13.51±0.01
Water intake (ml/$W^{0.75}$ kg/d)			
Feed	13.10±1.19	13.60±1.53	14.03±1.30
Oral	340.93±26.77	288.08±12.69	299.30±14.43
Total	353.98±26.28	301.68±13.78	313.30±15.58
Water excretion (ml/d)			
Faeces	535.15±68.60	488.60±49.25	548.05±80.47
Urine	756.30±299.70	417.08±99.73	383.98±52.05
Total	1291.45±287.13	905.68±84.90	932.03±97.25
Water excretion (ml/$W^{0.75}$ kg/d)			
Faeces	55.20±7.37	47.78±7.07	50.80±7.55
Urine	76.35±29.00	39.60±8.70	35.5±4.60
Total	131.55±26.52	87.38±9.81	86.35±8.93

Table 3b. Adjusted means and SE of nutritional parameters

Attribute	Marwari	Magra	Indian Karakul
$^{\Delta}$DMI (% of BW)*	14.48±0.009	15.48±0.007	16.64±0.007
Feed cost Rs/kg gain	35.47±1.68	33.80±.1.50	30.65±1.51

* $P \leq 0.05$ means having different superscripts differ significantly.

$^{\Delta}$ Reconverted from angles.

Table 4. Organic nutrient digestibility and nitrogen balance in lambs of different breeds

Attribute	Marwari	Magra	Indian Karakul
Nutrients digestibility (%)			
DM	50.70±3.92	53.83±2.40	48.80±0.54
OM	541.13±3.77	56.58±2.10	51.88±0.53
CP	67.93±3.08	68.55±1.65	65.35±1.37
EE	51.00±4.26	53.63±2.16	51.05±2.36
CF	50.08±4.97	53.10±4.09	45.28±2.02
NFE	51.15±4.34	53.50±1.91	48.95±0.95
Nutrient intake (% of DM)			
$^{\Delta}$DCP	12.78±0.009	12.69±0.002	12.15±0.002
TDN	51.80±3.85	53.35±1.963	49.35±0.538
Nitrogen intake (g/d)			
Concentrate	12.68±0.97	14.00±0.78	15.00±0.51
Zizphus nummularia leaves	11.63±0.72	12.53±0.60	13.48±0.49
Total	24.30±1.68	26.53±1.38	28.48±0.99
Nitrogen excretion (g/d)			
Faeces N	7.80±0.94	8.30±0.54	9.83±0.33
Urine N	3.60±0.00	4.65±1.19	6.28±0.87
Total N excretion*	11.40^{a}±0.94	12.95^{ab}±1.23	16.10^{b}±0.94
N retention	12.90±1.39	13.58±1.16	12.38±1.21
N retention as % of intake	52.85±3.22	51.23±3.48	43.30±3.47
$^{\Delta}$N retention as % of absorbed	77.76±0.05	75.37±0.40	66.44±0.28

* $P \leq 0.05$ means having different superscripts differ significantly.

$^{\Delta}$ Reconverted from angles.

Excretion of nitrogen either through faeces or urine was also statistically similar among breeds however, Marwari with least total excretion differ significantly ($P \leq 0.05$) from Indian Karakul witll highest total excretion. This resulted in similar nitrogen retention among breeds. Retention of nitrogen in the body was not affected after absorption and due to its content, in the feed. Earlier observations revealed that *Ziziphus nummularia* leaves could be fed up to 50% of the ration (Sehgal, 1984; Sehgal *et al.*, 1985), beyond this level nutrient digestibility is affected (Bhatia and Ratan, 1981; Sehgal and Bhatia, 1983). Whercas, the results of the present study reveal that growth rate could be achieved with 60% *Ziziphus nummularia* leaves in the diet in arid region. This would help further to reduce feed cost to raise lambs under feedlot management. Growth rate and dressing percentage can be improved by change of feed mangement. Raising lambs of Indian Karakul under feedlot management is cheaper due more growth, feed efficiency, dressing percentage and lower feed cost per kg gain in hot arid region on *Ziziphus nummularia* leaves based diet (60% of diet) as it is commonly available feed resource of the region.

REFERENCES

AOAC., 1990. *Official Methods Analysis.* 15th Ed. Association of Analytical Chemists, Washington, D.C.

Bhatia D.R. and M. Ram Ratan. 1981. Note on evaluation of four pala *(Ziziphus nummularia)* leaf based ration with crossbred weaners. Indian Journal of Animal Science 51: 675-677.

ICAR, 1998. Nutrient Requirements of Livestock and Poultry. Indian Council of Agricultural Research, New Delhi.

Kearl, L.C., 1982. Nutrient Requirements of Ruminants in Developing countries. p57. International Feedstuffs Institute, Utah Agricultural Experiment Station, Utah State University, Logan, Utah, USA.

Kumar, R., 1982. Inhibition of ruminal proteolysis of tannins of pala *(Ziziphus nummularia)* leaves. Proc. Nat. Seminar "Top feed resources, their production, utilization and constraints" 27th-28th Dec, CSWRI Avikanagar.

More, T. and K.L. Sahni, 1980. Studies on pasture quality under semi-arid conditions. Indian Journal of Animal Science, 50: 727-732.

Nath, K., N. S. Malik and O.N. Singh, 1969. Utilization *of Ziziphus nummularia* leaves by three breeds of sheep. Australian Journal of Agricultural Research 20: 1137-1142.

Sehgal, J.P and D.R. Bhatia, 1983. Utilization of four pala leaf *(Ziziphus nummularia)* based rations by crossbred weaners. Indiatl Journal of Animal Health 22: 7-10.

Sehgal, J.P., 1984. Tannin content of different top feed leaves and utilization of tannin rich pala *(Ziziphus nummularia)* leaves with concentrate for growing lambs. Indian Journalof Animal Science 54: 126-128.

Sehgal, J.P, M. Singh , R.N. Singh and D.L. Bapna, 1985. Evaluation of pala *(Ziziphus nummularia)* leaf based rations for mutton production. Indian Journal of Animal Science 55: 964-967.

Snedecor, G.W and W.G. Cochran, 1968. *Statistical Methods,* 6th Ed., Oxford and IBH Publishing Company, Calcutta.

أداء الحملان تحت أسلوبى المزرعة والتسمين فى منطقة قاحلة

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مركز بحوث الأغنام والصوف، بكنار، الهند

ربيت ٦ حملان ذكور من أنواع ما رواري ، ماجرا ، الكراكول الهندى عمرها ١٣٥ يوماً تحت أسلوب المزرعة، (معاملة ١) T1 : رعى لمُدة ٨ ساعات مع إضافة مخلوط علف مركز بمعدل ٣٠٠ جم / رأس/ يوم، أو أسلوب التسمين (معاملة ٢) T2 بالتغذية الحرة على مخلوط علف مركز مع أوراق زيزيفس نملرايا بمعدل ٤٠:٦٠ لفترة ٧٥ يوماً . حللت البيانات بحساب معامل انحدار المقاييس الغذائية على الوزن الابتدائي للحملان . لوحظ أن تأثير النوع كان معنوياً على الوزن الابتدائى والوزن النهائى ومعدل الزيادة فى الوزن الحى ومعدل النمو ونسب التصافى والمأكول من المادة الجافة (% من وزن الجسم أو جم/ وزن ٠,٧٥ كجم) وتكلفة العلف المركز وتكلفة التغذية على الزيزيفس نملرايا والتكلفة الإجمالية للغذاء والمأكول من البروتين الخام المهضوم (جم / وزن ٠,٧٥ كجم) والنتروجين الكلى الخارج. لوحظ تأثير المعاملات فى جميع الحالات لكل من الوزن النهائى والزيادة فى الوزن الحى ومعدل النمو ونسب التصافى – فيما عدا الوزن الابتدائى، بينما كان التداخل معنوياً فى الزيادة فى الوزن الحى ومعدل النمو فقط. كان الانحدار معنوياً فى الوزن النهائى والزيادة فى الوزن الحى وكفاءة الغذاء والتكلفة لكل كجم زيادة وبينما كان تأثير التفاعل غير معنوياً فى حالة الوزن النهائى والزيادة فى الوزن الحى.

كان معدل النمو متشابها بين الأنواع تحت أسلوب المزرعة بينما كان أعلى معنوياً تحت أسلوب التسمين فى نوع الكراكول الهندى(٠,١٥١ كجم / رأس / يوم). لوحظ أن الكراكول الهندى كان أعلى معنوياً فى نسبة التصافى (المعاملة الأولى) : ٤٤,٥٥، المعاملة الثانية : ٤٨,٠٠) كان هضم المواد الغذائية احتجاز النتروجين متشابهاً إحصائياً بين الأنواع، ولوحظ أن أدنى تكلفة غذاء كانت فى حالة الكراكول الهندى بعد أخذ الانحدار فى الاعتبار . توضح النتائج أن الحيوانات استجابت لتحسن الأسلوب حيث كان من المتوقع الحصول على أوزان نهائية أعلى وكذلك نسبة تصافى أعلى من الحملان المرباة تحت أسلوب التسمين عن ظروف أسلوب المزرعة.

أمكن إستنتاج أن تربية حملان الكراكول الهندى تحت أسلوب التسمين أرخص بسبب الزيادة فى النمو وكفاءة الغذاء ونسبة التصافى والانخفاض فى التكلفة للزيادة فى الكيلو جرام يليها الماروارى والماجرا فى المنطقة الحارة القاحلة وباستخدام أوراق الزيزفس نملرايا كغذاء أساسي.