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PERFORMANCE OF GROWING CAMEL UNDER DIFFERENT FEEDING RÈGIMES

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ABSTRACT

In a growth trial for 150 days, ten growing camels with average weight 353 Kg and three years old were devided into tow equal groups. Group A (Control) was fed a concentrate mixture (14% CP) at 2% of live body weight and rice straw ad libitum. Group B (Treatment) was given the same concentrate mixture at 1% of live body weight and rice straw supplemented with urea 5% and molasses 10% of dry matter. The results of this study revealed that feeding growing camels on high concentrate diet with untreated rice straw detected more daily body gain and high feeding costs comparing with those fed low concentrate diet with treated rice straw, being 0.573 vs. 453 g/h/d and 7.49 vs. 5.11 LE/Kg gain. The supplementation of urea – molasses did not affect roughage intake. The digestibility coefficient of all nutrients except the ether extract (EE) was slightly higher in group A than in group B. The nitrogen retention was similar in both group A and B. The total volatile fatty acids concentration in rumen liqure of group B was significantly higher ($p < 0.05$) than group A. Ammonia nitrogen (NH3-N) and pH values were not significantly affected. Meanwhile, carcass characteristics and economical analysis were determind. Instead of feeding growing camels on a concentrate mixture (14% CP) at a level of 2% of body weight with rice straw, it could be advised to fed them on a concentrate mixture at level of 1% of body weight with rice straw supplemented with urea (5%) and molasses (10%) without significant reduction in daily body weight gain. This règime can reduce feeding cost which goes parallel with small farmer state under desert conditions.

Keywords: camel, intake, digestibility, supplementation, urea, molasses , règime and carcass analysis.

INTRODUCTION

The use of cereal straws for ruminant feeding is essentialy constrianed by it's low digestibility and voluntary intake, so that energy requirements for maintenance are not suffecient if given only to animals (Castrillo, *et al.*, 1991). Chemical treatments of such straw which generaly based on the use of alkali supplementation with urea has been comonlly used for improving their qualities (Camfling *et al.*, 1962, Chenort and Dulphy 1987, and Sundstol, 1988), but when requirements are above maintenance level, an energy supplements has to be added to meet those requirements. The response to such supplements to roughage depends on the quality of straw (Orett *et al.*, 1985), and also on the source (Berg and Dulphy 1985) and level (Garret *et al.*, 1979 and Henning *et al.*, 1980) of supplementation. In this connection Gouthier, *et al.*, 1981 reported that camels can perform well especially under adverse conditions in desert where the marginal feed resources are the most dominant one.

In Egypt , some farmers are acustomed to feed camels as well as calves, being fed on concentrate mixture (14% CP) at level of 2% of live body

weight. The present study aims to compare between camels offered two different regimes for studying body weight gain, digestibilty coefficients, carcass characteristics. Meanwhile, the economic feed efficiency was studied.

MATERIALS AND METHODS

Animals and management

In a growth trial (150 days), ten growing male camels (3 year old) of initial average body weight (353 Kg) were devided into two groups (Group A and B). Group A (control) was offered a concentrate mixture (14% CP) at 2% of of live body weight and rice straw for ad libitum. Group B (Treatment) was given the same concentrate mixture at 1% of live body weight and rice straw supplemented with urea and molasses. The camels had ad lib. Access to water and mineral salt bloks. They were offered their feed once a day at 08:00 a.m.

Experimental feeds:

Rice straw was chooped into 5 cm average length and was supplemented with a mixture of 5% urea and 10% molasses; dissolved in 1 litter of water / 1 Kg DM of straw. The solution was sprayed on the straw immediately before feeding, meanwhile, a concentrate mixture was offered either at 1% or 2% of live body weight. Table 1 represents the chemical composition of the experimental feeds.

Table 1: Chemical composition of the experimental feeds (DM basis).

Feedstuff	DM%	Chemical compositoin, %					
		OM	CP	CF	EE	NFE	Ash
Rice straw	90.00	78.87	4.74	36.33	1.87	35.93	21.13
Suppl. Rice straw	49.99	79.98	11.30	34.39	1.78	32.51	20.02
Conc. Feed mix.	85.23	83.76	14.27	9.46	3.02	57.01	16.24

Metabolism trials:

At the end of the experiment,three camels from each group were installed in individuall metabolic cages. The digestibility coefficient of nutrients and the nitrogen balance were determined based on 24 hours. Feces and urine were collected and analyzed for proximate analysis as well as nitrogen retention.

Rumen fermentation:

At the end of metabolism trials, rumen liqure samples were withdrawn from camels via a stomach tube. The rumen liqure was filtered through two cheese layers. The pH value was immediately determined, while, ammonia nitrogen and volatile fatty acids concentration were determined later in rumen liqure.

Carcass characteristics:

Three camels of each group were slaughtered to study the most important characteristics of carcass. Amino acids profile, mg/g meat were determined in the L. Dorsi muscle of the 9^{th}, 10^{th} and 11^{th} ribs.

Analytical methods:

Feeds and feces were chemically analyzed according to A.O.A.C. (1980). The volatile fatty acids and ammonia nitrogen concentration in rumen liqure were determined as previously described by Kampton and Leng (1979). Also, meat samples were hydrolyzed for amino acids determination according to Barkhot and Jansen 1989. Amino acids composition of hydrolsates was determined with a Beckhman Amino Acid Analyzer (Model7300, Beckhman Instruments, Palo, CA).

Statistical analysis:

The means of the two groups were statistiacally compared by T-test at alph level ($p<0.05$) using MSTAT-C , version 4 (Nissen,1989).

RESULTS AND DISCUSSION

Results in table 2 showed that a not significant diference had occurred in daily body gain, being 573 and 453 g/head/day for groups A and B, respectively. Total dry matter intake was significantly higher ($p<0.05$) in group A than group B. There was not significant difference of feed efficeincy of rations, being 15.5 and 12.12 for groups A and B. That could be attributed to the urea-molasses mixture which are an additional nitrogen and energy sources enabled the rumen microbs to act the digesta properly as mentioned by Van Soest, 1982.

Table (2): Body weight gain, feed intake, feed efficiency ratio, TDN intake nd DCP intake of camels fed the experimental rations.

Item	Group A	Group B
Initial body weight	353	353
Final body weight	439	421
Total body weight gain, Kg	86	68
Daily body weight gain, g	573	453
DM intake, Kg/h/d		
Roughage	1.78	1.94
Concentrate	7.10^{a}	3.55^{b}
Total	8.88^{a}	5.49^{b}
DM intake, g/Kg $W^{0.75}$		
Roughage	20.00	22.20
Concentrate	80.70^{a}	40.70^{b}
Total	100.70^{a}	62.90^{b}
TDN intake		
Kg/h/d	4.42^{a}	2.52^{b}
g/Kg $W^{0.75}$	48.22^{a}	28.27^{b}
DCP intake		
g/h/d	663^{a}	407^{b}
gKg $W^{0.75}$	7.5^{a}	7.7^{b}
Feed efficiency, Kg DMI / Kg gain	15.5	12.12

This indicates that feeding growing camels on ration containing 14%CP at level 2% of live body weight exceeded the total requirements of the camels. In this concern, Farid *et al.*, (1979) mentioned that the maintenance requirements of the camels were 23.7 g and 2.19 g /Kgw0.75 as total digestable nutrients (TDN) and digesable crude protein (DCP),

respectivelly. However, Mathur *et al.*, (1987) showed that camels are highly efficient in urea utilization as well as the true protein. Results in table 3 showed that digestibility coefficient of all nutrients, except the EE were not significatly higher in group A than in group B. That may be due to supplementation of group B with urea-molasses mixture which had improved the micribial activity and consequetlly, a proper digestion environment was enhenced, particularlly for protein

Table(3): Apparent digestibility coefficient and nitrogen balance of the experimental rations by camels.

Items	Group A	Group B
Apparent digestibility,%		
DM	57.03	53.46
OM	57.38	53.82
CP	60.49	55.92
CF	45.11	40.46
EE	67.21	68.51
NFE	59.66	55.88
Nitrogen balance, g/h/d.		
Intake, g/h/d	67.26	70.88
Fecal nitrogen, g/h/d.	26.60	31.03
Urinary nitrogen, g/h/d.	22.71	22.23
Total	50.31	53.26
Retention, g/h/d.	17.95	17.12

synthesis as well as nitrogen retention as described by Chappell, and Fontenot 1968. Mean while the daily nitrogen retention was similar in group A and B, being 17.95 and 17.12 g/h/d, respectively. This indicates that supplementation with urea at level 5% of the roughage dry matter could be utilized efficiently by camels as the true protein of the concentrate. These results agree with that obtained by Mathur *et al.*, (1987).

Results in table 4 indicated that feeding camels on ration supplemented with urea-molasses mixture produced significantly ($P<0.05$) higher TVFAs concentration as well as ammonia nitrogen, particularly 3 hrs post-feeding. Supplementation with molasses was insignificantly useful as confirmed previously by Kayouli *et al.*, 1991 and 1992. The ruminal pH stability which observed in the rumen liquor of both group A and B may be explained by the higher buffering capacity of camel's rumen (Vallenas and Steven, 1971).

Table (4): The total volatile fatty acid, ammonia nitrogen and pH of rumen liquor in camels fed the experimental rations.

Experimental group	PH		TVFAs (mmol %)		NH_3-N (mg %)	
	Samplaing time (hrs after feeding)					
	0	3	0	3	0	3
Group A	6.64	4.70	47.64	68.08	30.85	49.65
Group B	6.65	5.19	50.28	86.64	28.45	51.09

Carcass analysis (table 5) represents that the live body weight at slaughter was 477.5 and 420.0 kg in group A and B, respectively. There was no significant difference in dressing percentage, being 53.70 and 51.07% for

group A and B, respectively. Also no significant differences in edible parts percentage were noticed, theses results agreed with that obtained by Wilson (1978) who reported 51.4% as dressing percentage of sudanees camels (2 year old). Mean while Biala *et al.*, 1991 reported 51.24% for dressing percentage of Libyan camels. Results in table 6 indicated that there were no significant differences in amino acid profile in camels meat between the two experimental groups where the total amino acids concentration was 612.02 and 606.11 mg/g meat in group A and B, respectively.

Table (5):Live body weight and carcass traits of camels fed the experimental rations.

Item	Group A	Group B
Live body weight, kg	477.5[a]	420.0[b]
Hot carcass weight (1) kg,	372.5[a]	350.0[b]
Empty carcass weight, (2) kg	256.4[a]	214.5[b]
Dressing, %	53.70	51.07
Edible parts, kg	154.9[a]	125.8[b]
Edible parts, %	32.41	30.10
Hump fat weight, kg	23.50[a]	13.0[b]
Hump, % of carcass wt.	4.92[a]	3.07[b]
Best ribs cut		
Total weight, kg	6.37[a]	4.60[b]
Lean weight, kg	2.25[a]	1.85[b]
Lean, %	35.42[b]	40.22[a]
Fat weight, kg	2.21[a]	1.43[b]
Fat, %	34.84	31.10
Bone weight, kg	1.91	1.32
Bone, %	29.74	28.70
L. Dorsi muscle weight, kg	1.59	1.20

Table (6): Amino acid concentration (mg/g) in meat of camels fed two experimental régimes.

AA	Group A	Group B	AA	Group A	Group B
ASP	58.80	50.80	THR	29.39	29.35
SER	25.31	25.20	GLU	102.13	99.80
PRO	47.60	47.73	GLY	25.90[b]	26.50[a]
ALA	33.60	33.50	CYS	4.90[b]	5.57[a]
VAL	29.43	28.67	MET	17.50	15.85
ISO	27.30	26.70	LEU	52.50	51.77
TYR	19.60	19.60	PHE	25.17	23.70
HIS	18.57	19.57	LYS	55.30	52.70
			ARG	39.20	39.20

Results in table 7 showed that the total feed cost allover the experimental period (150 day) was 643.5 and 346.5 L.E. for groups A and B, respectively. According to the total body weight gain, camels in group B were significantly higher in economic efficiency being 5.11 L.E./kg body gain against 7.49 L.E./kg body gain for camels in group A.

Table 7: Economic efficiency of camels fed two experimental regimes.

Item	Group A	Group B
Concentrate cost, L.E./day	4.20	2.12
Rice straw cost, L.E./day	0.09	0.21
Total daily feed cost, L.E./day	4.29	2.31
Average daily gain, kg	0.573	0.453
Economic efficiency (cost L.E./kg gain)	4.499[a]	5.11[b]

CONCLUSION

Instead of feeding growing camels on a concentrate mixture (14% CP) at a level of 2% of body weight with rice straw, it could be advised to fed them on a concentrate mixture at a level of 1% of body weight with rice straw supplemented with urea (5%) and molasses (10%) without significant reduction in daily body weight gain. This regime can reduce feeding cost which goes parallel with small farmer state under desert conditions.

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أداء الجمال النامية تحت نظامين للتغذية

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فى تجربة نمو استمرت لمدة ١٥٠ يوم ، تم تقسيم ١٠ جمال نامية متوسط وزنها ٣٥٣ كجم ومتوسط عمرها ٣ سنوات الى مجموعتين متماثلتين من ناحية الوزن والعمر . المجموعة الأولى (الكنترول) غذيت على مخلوط عليقة مركزة (١٤ % بروتين خام) بمستوى ٢ % من وزن الجسم الحى مع توفير قش الأرز للتغذية حتى الشبع ، أما المجموعة الثانية (مجموعة المقارنة) فقد تم تغذيتها على نفس مخلوط العليقة المركزة ولكن بمستوى ١ % من وزن الجسم الحى مع التغذية حتى الشبع على قش الأرز المعامل بـ ٥ % يوريا و ١٠ % مولاس (وزن/ وزن) .

أوضحت النتائج أن تغذية الجمال النامية على عليقة مركزه بمستوى عالى مع قش الأرز غير المعامل أعطت أعلى معدلات نمو وكذلك أعلى تكاليف تغذية لانتاج واحد كجم لحم مقارنة بالمجموعة التى تم تغذيتها على عليقة مركزة بمستوى منخفض وقش الأرز المعامل ، حيث كانت القيم ٥٧٣ مقابل ٤٥٣ جم/ رأس/ يوم و ٤٩ر٧ مقابل ١١ر٥ جنيه / كجم نمو .

إضافة اليوريا والمولاس لم يكن لها تأثير معنوى على المأكول من العلف الخشن وكانت معاملات هضم المركبات الغذائية (فيما عدا الدهن الخام) فى المجموعة الأولى أعلى بدرجة معنوية مقارنة بالمجموعة الثانية . لم يكن هناك فرق معنوى فى كمية الأزوت المحتجز بالجسم بين كلا المجموعتين . زاد تركيز الأحماض الدهنية الطيارة الكلية معنويا فى سائل كرش حيوانات المجموعة الثانية مقارنة بحيوانات المجموعة الأولى ، فى حين لم تكن زيادة أمونيا الكرش ودرجة الحموضة معنوية . كما تمت أيضا دراسة خصائص الذبيحة واجراء تحليل اقتصادى لكل من نظامى التغذية . ومن خلال نتائج هذه التجربة فانه ينصح بتغذية الجمال النامية على مخلوط العلف المركز (١٤ % بروتين) بمستوى ١ % من الوزن الحى للجسم مع قش الأر ز المعامل باليوريا (٥ %) والمولاس (١٠ %) للشبع دون حدوث نقصا معنويا فى معدل الزيادة اليومية فى الوزن . كما يمكن لهذا النظام الغذائى أن يقلل من تكاليف التغذية وهو ما يتناسب مع ظروف المزارع الصغير .