

Performance of Growing Goats Fed on Different Roughage Concentrate Proportions

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CONSUMPTION and utilization of a poor roughage (rice straw) by growing goats was investigated through two successive growth periods of 3 months each. In the 1st period, goats were assigned to 4 treatments. Restricted amounts of concentrate mixture were fed to cover 12.5, 25, 37.5 and 50% of energy requirements. Rice straw was fed *ad libitum*. Goats fed the 1st treatment consumed more rice straw. Amounts consumed of rice straw decreased by increasing concentrates in the ration. All treatments lost weight specially 1st treatment which also showed high mortality rate.

In the 2nd growth period goats fed 50, 80 and 100% of energy requirements from concentrates and rice straw was fed *ad libitum*. Goats fed 1st treatment, which was extension for 1st growth period, lost more weight and showed high mortality rate. The other two treatments gained weight because their rations covered the maintenance and productive requirement. The last treatment showed high gain in weight because goats were fed more productive nutrients.

The overall results showed that goats cannot subsist on poor roughages in the intensive method of production. Poor roughage should be less than 50% of the goat's ration in this method.

Goats can consume many types of roughages that neither cattle nor sheep can consume. Goats are able to adapt to extreme conditions and to enable human existence in borderline areas of the inhabited earth. Goats differ from other ruminants in their feeding habits and their ability to utilize poor quality roughages (Devendra and Burns, 1970, Malechek and Lein Weber, 1972, Gihad, 1976 and 1981, Gihad *et al.* 1981 and Gihad and El-Gallad, 1984). Despite goats similarly to other ruminants in general digestive efficiency, there is considerable evidence that they are exceptionally efficient at digesting crude fibre (Gihad, 1976 and Gihad *et al.* 1980).

This work was carried out to investigate the ability of goats to consume and survive on poor quality roughages.

Material and Methods

Restricted amounts of a concentrate mixture (CM), consisted of barley 20% and decorticated cotton seed meal 80%, were offered to growing goats while excessive amounts of rice straw (RS) were offered for liberal consumption by goats. Composition and nutritive values of the experimental rations are shown in Table 1. Studies were carried out through two successive growth periods. Each period lasted for 3 months. Growing goats were allowed for a transition interval of 3 weeks between the successive experimental periods.

In the first growth period, twenty four male Baladi (indigenous breed) kids of 3 months age were randomly divided into four similar groups. Goats were assigned for four treatments, T₁, T₂,

TABLE 1: Composition and nutritive value of the experimental rations.

Item	Treatments					
	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆
DM Composition, %						
Crude protein	8.89	11.83	13.04	14.09	14.58	15.22
Crude Fiber	26.05	19.64	17.00	14.65	13.63	12.26
Ether extract	1.92	2.44	2.65	2.86	2.93	3.04
N-Free extract	47.22	53.18	55.64	57.84	58.78	60.05
Ash	15.92	12.91	11.67	10.56	10.08	9.43
Nutritive value (DM):						
TDN, %	49.24	62.02	69.93	74.79	77.95	78.74
SE, %	36.32	53.44	62.82	68.89	72.45	73.83
WCP, %	2.50	6.98	8.70	10.69	11.77	12.16

T₂, and T₄. The CM was offered to cover approximately 12.5%, 25%, 37.5% of the energy requirements of growing goats in the four successive treatments.

In the second growing period, goats were divided into three groups. Animals in the first group (T₁) were the same goats used in the 1st period and fed the same ration. The rest of goats were randomly divided into two groups, T₅ and T₆. The CM was offered to cover 50% and 80% and 100% of the energy requirements of growing goats, Rice straw was fed *ad-libitum*.

Results and Discussion

The first period results showed that rice straw intake was the highest in T₁ where kids consumed the lowest amounts of CM. The amounts consumed of RS were decreasing against the progressive increase of CM as shown in Table 2. The total dry matter intake expressed as g/Kg W^{0.75} progressively increased by increasing the CM intake. Goats fed 50% of their requirements of CM in T₄ consumed similar amount to that recorded by Gihad (1976), using poor quality tropical grasses.

The starch equivalent (SE) and digestible crude protein (DCP) consumed by goats were far low than their growing requirements, even the maintenance needs. Webster and Wilson (1966) and Devendra (1967 a , b) reported that the maintenance levels as g SE/Kg W^{0.75} were 22.2 and 23.0, respectively. The NRC (1981) maintenance standards as g DCP/Kg W^{0.75} was 4.05. The low intake of energy and digestible protein was reflected in losses in body weight and high mortality rate (Table 2). The losses in body weight and mortality rate showed the highest values in T₁ and decreased progressively in the successive treatments.

The results of second period showed that extending the period of T₁ for another 3 months reflected in continuous losses in body weight and high mortality rate (Table 3). This treatment has not shown mortality in the 1st experimental period.

Goats exposed to T₅ and T₆ consumed more energy and digestible protein than the maintenance needs. The productive ration

nutrients reflected in gain in body weight. The T_6 which consumed more SE and DCP proved more gain than T_5 . Assuming the maintenance needs per $Kg/W^{0.57}$ are 25 g SE and 4 g DCP, the remaining productive nutrients in T_6 were almost two times to those of T_5 . Accordingly, the gain in weight for T_6 was almost two times that of T_5 (Table 3).

TABLE 2: Performance of growing goats in the 1st growth period.

I t e m	Treatment			
	T_1	T_2	T_3	T_4
Initial No. of Kids	6	6	6	6
Final No. of kids	3	5	5	6
Mortality rate, %	50	16.7	16.7	-
Feed intake, g/day				
Concentrate	61	122	183	244
Hice straw	104.5	75.6	70.2	60.2
DM intake, g/Kg $W^{.75}$	20.5	25.0	31.6	38.6
SE intake, g/Kg $W^{.75}$	9.06	14.04	19.39	25.17
DCP intake, g/Kg $W^{.75}$.91	1.87	2.77	3.76
Initial wt., Kg	14.20	13.80	14.00	13.70
Final wt., Kg	11.00	10.90	12.10	11.90
Loss in wt, Kg	3.20	2.90	1.90	1.80
Daily Loss, g	35.6	32.2	21.1	20.0

TABLE 3: Performance of growing goats in the 2nd growth period.

I t e m	Treatment		
	T ₄	T ₅	T ₆
Initial No. of kids	6	5	6
Final No. of kids	3	5	5
Mortality rate, %	50	-	16.7
Feed intake, g/day			
Concentrate	244	366	488
Rice straw	59	54	44
DM intake, g/Kg W ^{0.75}	45.70	56.7	75.5
SE intake, g/Kg W ^{0.75}	29.36	38.86	53.38
DCP intake, g/Kg W ^{0.75}	4.34	6.00	8.40
Initial Wt. Kg	11.30	12.60	11.80
Final wt., Kg	10.00	14.40	15.10
Gain in wt, Kg	-1.30	1.80	3.30
Daily gain, g	-14.8	20.0	36.7

The overall results showed that goats can not subsist on poor quality roughages as a main feed in the intensive production. Maximum portion of poor roughages in this method of goat production might be lower than 50% of the ration. This result may not be in line with the phenomenon that goats can subsist on what would be sub-standard levels of nutrition of other ruminants (Malechek and Leinweber, 1972). Moreover, Gihad (1976 and 1981) reported that goats are practically important animal being able to subsist on poor roughages and to maintain itself in hard environments. Goats differ from other ruminants in their feeding habits. The special feeding habits of goats are particularly

significant in areas where quantity and quality of feeds are low (Devendra and Burns, 1970). Goats are not scavenger animal but they are selective grazers. This feeding habit gives goats a special ecological niche in hard environment where they have enough time for grazing. In view of these feeding habits it may be advised not to over-estimate the capability of goats for consuming poor roughage in intensive production.

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استجابة الماعز النامي للتغذية على علائق مختلفة في نسبة المادة الخشنة الى المادة المركزة

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تمت دراسة الاستهلاك والاستفادة من العلف الخشن الفقير (قش الارز) في تجارب على الماعز النامي وذلك خلال فترتي نمو متتاليتين مدة كل منهما ثلاثة اشهر . قسمت الحيوانات في الفترة الاولى الى اربعة معاملات . واعطيت الحيوانات كميات محددة من مخلوط العلف المركز لتغطية ١٢٥ ، ٢٥ ، ٣٧.٥ ، ٥٠ ٪ من احتياجات الطاقة . وقدم قش الارز للشبع ولاحظ ان الحيوانات في المعاملة الاولى تناولت كميات أكبر من قش الارز . وقد انخفض المأكل من قش الارز بزيادة المقدم من مخلوط العلف المركز في العليقة . اظهرت جميع المعاملات نقصا في وزن الجسم خاصة في المعاملة الاولى والتي سجلت أيضا أعلى نسبة وفيات .

اما في فترة النمو الثانية فقد تناولت الحيوانات ٥٠ ، ٨٠ ، ١٠٠ ٪ من احتياجات الطاقة من مخلوط العلف المركز بجانب قش الارز للشبع . وفتنا لوضع على الحيوانات في المعاملة الاولى (والتي هي امتداد للمعاملة الرابعة في فترة النمو الاولى) نقص في الوزن مع نسبة عالية من الوفيات . اما في المعاملتين الاخرتين فقد اظهرت الحيوانات زيادة في الوزن لان التغذية غطت الاحتياجات الحافظة والانتاجية للحيوانات . بينما حيوانات المعاملة الأخيرة سجلت زيادة كبيرة في الأوزان بسبب تناولها كمية أكبر من الغذاء المنتج .

اظهرت هذه الدراسة ان الماعز حيوان لا يستطيع المعيشة على الاعلاف الخشنة الفقيرة في نظام الانتاج المكثف ، ويجب أن يشكل العلف الخشن الفقير نسبة أقل من ٥٠ ٪ من العليقة الكلية للماعز .