EFFECT OF USING KOCHIA INDICA ON PRODUCTIVE PERFORMANCE OF RUMINANTS

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SUMMARY

Fifteen Egyptian cross-bred (½ Finn. X ½ Rahmani) rams aged about 2 years with an average body weight of 62 kg were used in five digestibility trials (three rams in each experiment) to determine the nutritive value of five experimental rations. Ration 1 (Control) consisted of 100% berseem hay (BH); while in the other four rations (R2, R3, R4 and R5) 25, 50, 75 and 100% BH were replaced by dried Kochia indica (DKI). Rumen liquor and blood samples were collected at the end of the experimental period. While, the feeding trial was carried out using twenty-one male buffalo calves aged 5 months with an average body weight of 131±2.4 kg and divided into three similar groups (seven calves in each group) which were fed on three diets. The control diet 1 (D_1) consisted of 60% concentrate mixture (CM) + 40% BH, while in D_2 and D_3 50 and 25% from BH replaced by DKI respectively.

Results of digestibility trial show that the CP and CF content decreased, while the NFE and ash content increased by the increasing of DKI level in the rations. Daily DM intake decreased ($P<0.05$) by increasing the level of DKI in the ration, while the differences between R_1 and R_2 were not significant. The digestibility of all nutrients were decreased ($P<0.05$) by increasing the level of DKI in R4 and R5 comparing with those in R1, R2 and R3. The nutritive value as TDN, ME and DCP for R1 and R2 were higher ($P<0.05$) than those for R3, R4 and R5. The ruminal pH values were lower ($P<0.05$) while the NH3-N concentration were higher ($P<0.05$) in the rumen fluid of rams fed on R_1 and R_2 than those fed on R3, R4 and R5. The total VFA's concentration decreased ($P<0.05$) by increasing the level of DKI in the rations. The nitrogen balance for rams fed on R_1 and R_2 was higher ($P<0.05$) than those for rams fed on R_3, R_4 and R_5. The count of RBC's, WBC's and Hb concentration in blood of rams fed on R1,

R2 and R3 were higher ($P<0.05$) than those fed on R4 and R5. While, the concentration of TP, AL and GL (g %) were higher ($P<0.05$), while the concentration of GOT (IU/L) in serum of rams fed on R1 and R2 were lower ($P<0.05$) than those fed on R3, R4 and R5. The results of feeding trial indicated that the average daily gain of buffalo calves fed D_1 and D_2 was higher ($P<0.05$) than those fed D_3. The feed conversion and economical efficiency were improved, while the feed cost were decreased for animals fed D_1 and D_2 comparing with those fed D_3.

Key words: Kochia indica, lambs, digestibility, rumen fermentation and Buffalo calves performance.

INTRODUCTION

In summer, most animals are in fact in a starving condition receiving less than their maintenance requirements because there is a serious shortage in feeding stuffs which represents a real problem in Egypt. This may be due to the limited area assigned for forage production and the shortage in supply of concentrates for feeding livestock. Also, there is high shortage of conventional fodders in arid and semi-arid areas of the desert in Egypt. Halophytes have been used as forages to solve this problem (El-Shear, 1981).

In the Nile Delta region of Egypt (Tanta, El-Mahalla El-Koubra and Kafr El-Sheikh), Kochia indica plant attained its maximum phytomass, i.e. production, (1182 g dry weight / m^2) and maximum contents of most the estimated nutrients during the vegetative stage. Its production is much higher than many of the vegetation types in the Mediterranean deserts which were partially related to differences in soil moisture and fertility, as well as the nutrients content of this plant is as much or more than some of the forage species currently used for pasture, and many of the range species in the Western Mediterranean desert of Egypt. This plant has been developing in extensive stands in neglected fields, along road and railway sides, canal terraces and in waste areas (Shaltout and El-Beheiry, 1997).

Several ecophysiological studies have been done on Kochia indica plants aiming at using its green crops as a fodder for animals (Zahran, 1986 and El-Dingawy, 1990). They used Kochia indica as

a green fodder for animals during the summer season when the other kinds of green fodder such as *Trifollim alexandrinum* are finished as a winter green fodder, because , Kochia indica plants can grow at any time of the year.

Fahmy and Ibrahim (2005) reported that green Kochia indica is a good quality roughage and it can be used in feeding lambs in the arid lands. However, El-Dingway (1990) found that no bad effects had been detected in the animals (Sheep and Cattle) fed on Kochia, all were healthy and were growing normally during and after the period of the experiment.

The present study aimed to investigate the effect of partial replacing berseem hay by dried Kochia indica in the ration of ram lambs on the chemical composition, digestibility of nutrients, nutritive value, rumen fermentation parameters, nitrogen balance, blood profile, and on growth performance of buffalo calves.

MATERIALS AND METHODS

The present study was carried out with the cooperation between Department of Animal Production, Faculty of Agriculture, Kafrelsheikh University; Sakha Experimental Station, Animal Production Research Institute, Ministry of Agriculture and Private farm belong at Motobis City, Kafr El-Sheikh Governorate, Egypt.

Green Kochia indica were collected from different area of Kafr El-Sheikh governorate and dried, while berseem hay (BH) was made from the 4th cut of berseem. Both of dried Kochia indica (DKI) and BH were ground by roller mill grinding and stored until using in the experimental rations.

Fifteen Egyptian cross-bred (1/2 Finn. X 1/2 Rahmani) rams aged about 2 years with an average body weight of 62kg were used in five digestibility trials (three rams in each experiment) to determine the nutritive value of five experimental rations. Ration 1 (Control) consisted of 100% berseem hay (BH); while in the other four rations (R2, R3, R4 and R5) 25, 50, 75 and 100% BH were replaced by DKI. The experimental rams were put individually in feeding stalls and were fed each ration twice a day at 8.00 a.m. and 3.00 p.m. according to NRC requirements (1988), the water was available at all time. Each digestibility trial lasted for 15 days as

preliminary period followed by 7 days for collection of total feces and urine. Composite samples of experimental rations, feces and urine were taken and analyzed according to AOAC (1990).

At the end of the digestibility trial, rumen liquor samples were collected from each ram by using stomach-tube at 4 hours after the morning feeding. The samples were strained through double layers of cheesecloth into plastic containers and pH was immediately measured. The rumen samples were transferred into covered plastic tubes containing 0.25 ml concentrated hydrochloric acid for stopping microbial activity and kept in a deep freezer until total volatile fatty acids (TVFA's) were determined according to Warner (1964) and ammonia-Nitrogen (NH_3-N) concentration according to AOAC (1990). At the same time of rumen liquor collection, blood samples were taken from the jugular vein into two clean tubes from each animal. The first one contained EDTA as anticoagulant and used for analysis hemoglobin by the method described by Drabkin (1932). Red blood cells (RBC) and white blood cells (WBC) were counted by using a haemocytometer. While, in the second one blood serum was separated within one hour and analysis for glucose by the method described by Trinder (1969), total protein (Gornall et al., 1949), albumin (Drupt, 1974), urea-N (Patton and Crouch, 1977), activity of glutamic oxaloacetic transaminase (GOT) and glutamic pyruvic transaminase (GPT) according to Varoley (1976). All the blood constituents were determined calorimetrically by using commercial kits.

In feeding trail, twenty one male buffalo calves aged 5 months with an average body weight of 131±2.4 kg and divided into three similar groups (seven calves in each group), which fed on three diets. The control diet 1 (D_1) consisted of 60% CM + 40% BH, while in diets 2and 3, 25 and 50% from BH replaced by DKI, respectively. All rations were given almost in two equal parts at 8.0 a.m. and 4.0 p.m., according to their body weight to cover their requirements according to Ranjhan (1980). Fresh water was offered to the animals four times daily. Calves were weighed (before the morning feeding) on 2 consecutive days at the beginning and at the end of the treatment period; and thereafter at fifteen days intervals till the end of the experiment, which lasted for

120 days. Feed intake was calculated and adjusted every fifteen days according to the changes in animal body weight.

The obtained data were statistically analyzed using General Liner Models Procedure (one-way ANOVA model) adapted by SPSS (1997).

RESULTS AND DISCUSSION

The chemical composition of the different rations, which were used in the digestibility trials and concentrate mixture are shown in Table (1). These results indicated that the CP and CF content decreased while the NFE and ash content increased by the increasing of DKI level in the rations. From these results, we may conclude that ash and NFE content of DKI were higher by 46.71 and 37.71%, respectively than that BH. While, CP content of BH was higher by 47.66% than that of DKI..

Table (1): **The chemical composition of the five rations (which used in the digestibility trials) and concentrate mixture.**

Item	DM %	Composition of DM%					
		OM	CP	CF	EE	NFE	Ash
R_1(BH)	92.90	87.69	14.22	38.69	1.82	32.96	12.31
R_2	93.67	87.22	13.54	36.22	1.42	36.04	12.78
R_3	92.47	86.14	12.34	32.83	1.47	39.50	13.86
R4	94.40	85.00	10.84	31.40	1.31	41.39	15.00
R_5 (DKI)	90.74	81.94	9.63	25.20	1.72	45.39	18.06
CM	90.06	91.78	14.43	13.33	3.18	60.84	8.22

R1: 100% berseem hay (BH). R2: 75% BH + 25% Dried kochia indica (DKI).
R3: 50% BH + 50% DKI. R4: 25% BH + 75% DKI. R5: 100% DKI.
CM: concentrate mixture(consisted of 25% undcorticate cotton seed meal, 30% yellow corn, 32% wheat bran, 10% rice bran, 2% limestone, 0.5% common salt and 0.5% minerals mixture.

These results are in agreement with Fahmy and Fayed (2000). They found that ash content of Kochia indica hay (KIH) was approximately higher by 55% than that of BH since such fodder is considered as a halophytic plant. Berseem hay contained more CP than that of KIH (105% more). Soluble carbohydrates percentage of KI exceeded that of BH by 23.3%. ADF content of BH was higher by 58.7% than that of KIH, whereas, KIH contained more acid detergent lignin (ADL) than BH by approximately 77.7%. While, Fahmy and Ibrahim (2005) found that the green

Kochia indica content from ash, CP and potassium were almost similar to those of BH (15.8, 12.5, 1.8 Vs 14.1, 13.9, 2.0 %).

The results in Table (2) showed that the daily DM intake decreased significantly ($P<0.05$) by increasing the level of DKI in the ration, while the differences between R_1 (control) and R_2 (25% DKI) were not significant, the lower intake from DKI may be due to the higher content of ash in DKI compared with BH (18.89 vs. 12.11%). These results were in agreement with those reported by Fahmy and Fayed (2000), who reported that the intake of ration contained BH plus CM was higher (10.1%) than that fed on KIH as a replacement of BH in goat's rations. However Baker and Baker (1952), found that the intake of Kochia by yearling steers was lower than that fed on other forages (alfalfa or brome grass), so that the performance of yearling steers grazing Kochia was slightly lower than for those grazing alfalfa and brome grass.

On the other hand, Tag El-Din et al. (1991) observed that no significant differences in the DM intake when Rahmani rams were fed complete diets containing 0, 15, 30 and 45% Kochia. Also, Nour (1995) found that higher intake of sundried Kochia was obtained as compared with fresh Kochia. However, total intake of Kochia and rice bran or wheat bran was higher than fresh Kochia alone. The differences were significant ($P<0.05$). Fahmy and Ibrahim (2005) observed that Barki lambs consumed more DM and OM amounted 31.9% and 29.9% from green Kochia indica than BH. The difference in DM intake between the two diets was significant ($P<0.05$).

Results in Table (2) showed that digestion coefficients for all nutrients were decreased by increasing the level of DKI in the rations. The differences were significant ($P<0.05$) between the control (R1) and rations 4 and 5 only, while, there is no significant differences in the digestion coefficients of OM, CP, EE and NFE in R1, R2 and R3. The differences between R1 and R2 were not significant in the digestion coefficients of DM and CF. These results were in agreement with those reported by Sherrod, (1971); and Finley and Sherrod (1971), who indicated that Kochia digestibilities were lowest in fullbloom and highest in prebloom. The present results are different from that obtained by Fahmy and Fayed (2000), who found that sheep fed Kochia hay was able to

digest DM, CP, EE, NFE, ADF and ADL much better than that fed BH as roughage. Also, Tag El-Din et al (1991) reported that the digestion coefficients of Kochia by Barki sheep for DM, OM, CP and NFE were significantly (P<0.05) higher than those of BH.

Table (2): The average of DM intake, digestion coefficients of nutrients and nutritive value of five experimental rations.

Item	Rations				
	R_1	R_2	R_3	R_4	R_5
DM intake (g/day)	2062±14.08^a	2007±5.49^a	1823±16.76^b	1561±16.76^c	1316±73.87^d
Digestion coefficients %					
DM	58.42±0.62^a	57.55±0.30^{ab}	55.60±0.99^b	53.00±1.26^c	52.72±0.45^c
OM	57.10±0.73^a	55.75±0.31^a	54.93±0.86^a	51.12±0.89^b	50.44±0.47^b
CP	61.93±1.93^a	60.74±0.60^a	59.07±0.63^a	56.52±1.23^b	56.12±0.75^b
CF	49.54±1.00^a	47.16±0.98^{ab}	46.07±0.56^b	41.78±0.68^c	40.47±1.64^c
EE	54.83±0.98^a	53.77±0.80^a	52.07±1.32^a	45.80±1.86^b	45.58±0.32^b
NFE	64.02±0.65^a	62.59±0.01^a	61.11±1.45^a	56.96±0.94^b	54.95±0.96^b
Nutritive value					
TDN, %	51.32±0.66^a	49.59±0.26^{ab}	48.69±0.50^b	44.20±0.79^c	42.31±0.39^d
DCP, %	8.81±0.27^a	8.23±0.08^{ab}	7.30±0.08^b	6.13±0.13^c	5.40±0.07^d
ME, Mcal/KgDM	1.85±0.05^a	1.80±0.06^a	1.75±0.09^b	1.59±0.10^c	1.52±0.08^d

^{abc}Means within the same column with different superscripts are significantly different at (P<0.05)
R 1: 100% berseem hay(BH). R2 : 75% BH + 25% Dried kochia indica (DKI).
R3 : 50% BH + 50% DKI. R4 : 25% BH + 75% DKI. R5 : 100% DKI.
ME, Mcal/kg DM=(TDN×3.6)/100 (Ranjhan, 1980; and Church and Pond, 1982).

Data for the digestion coefficients of dried Kochia were different from those obtained by Sherrod (1973), Mir et al. (1991) and Nour (1995). This may be attributed to the differences in soil, environmental changes and stage of growth.

The results in Table (2) also showed that the TDN value and ME (Kcal/Kg DM) decreased by increasing the level of DKI in the rations. The differences were significant (P<0.05) except the differences between R1 and R2 were not significant. Also, the DCP % for the experimental ration decreased significantly (P<0.05) by increasing the level of DKI in the rations except between R1 and R2 and also between R2 and R3 the differences were not significant. These results agree with those observed by Fahmy and Fayed (2000). They reported that TDN% of BH diet was higher (P<0.05) than KIH diet (51.5 vs. 44.9%). Also DCP% of BH diet was higher than that of KIH diet (7.44 vs. 6.21).

The present values for TDN of DKI (42.31%) and BH (51.32%) were different from those obtained by Sherrod (1973), who found that the TDN % for ground Kochia hay and ground alfalfa hay were 55.0 and 50.3 %, respectively. Moreover, Nour (1995) reported that the TDN for fresh and dried Kochia were 73.2 and 60.4%, respectively. Such high values may due to the stage of growth. Also, Fahmy and Ibrahim (2005) found that the nutritive value of green Kochia indica as TDN and DCP% were significantly higher (57.8 and 9.93%, respectively) than those for clover hay (51.1 and 7.85 %, respectively).

Data in Table (3) showed that the ruminal pH value for rams fed on R_1 and R_2 were significantly lower ($P<0.05$) than those for rams fed on R_3, R_4 and R_5. While total VFA's concentration were decreased ($P<0.05$) by increasing the level of DKI in the rations. These results were in accordance with those reported by Mullen (1973), who found that rumen pH values were decreased as the concentration of total VFA's increased. While, Fahmy and Fayed (2000) reported that total VFA's were similar in the rumen liquid of sheep fed BH diet and that of those fed KIH diet.

No significant differences in NH_3-N concentration in the rumen fluid of rams fed on R_1 and R_2, while the NH_3-N concentrations were significantly decreased by increasing the level of DKI in R_3, R_4 and R_5. This may be due to the decreasing of crude protein content by increasing the level of DKI in the rations. These results are in agreement with those reported by Fahym and Fayed (2000) they found that NH_3-N concentration in the rumen fluid of sheep were significantly higher ($P<0.01$) for animals offered BH diet than that of those fed KIH diet but were within the normal range, the increase of rumen NH_3-N concentration for animals fed BH diet may be due to its higher crude protein content (11.7 vs. 5.7%) compared to KIH diet.

Also, data in Table (3) showed that nitrogen balance for rams fed on R_1 and R_2 were significantly higher ($P<0.05$) than those for rams fed on R_3, R_4 and R_5. These results may be due to the lower nitrogen content in DKI comparing with BH. Fahmy and Fayed (2000) reported that sheep and goats fed BH as roughage consumed more nitrogen than their mates fed the KIH diet by 40% and 57.2%, respectively. The lower nitrogen intake from KIH may

be attributed to the lower nitrogen content. However, Finley and Sherrod (1971) reported that the lower nitrogen retentions were probably functioning of both lower total protein intake and lower protein digestibility with the later stages of growth. Reductions of nitrogen retention with the second and third stages were also influenced by less efficient utilization of absorbed nitrogen as indicated by the higher percentage of total nitrogen intake excreted as urinary nitrogen. Fahmy and Ibrahim (2005), observed that the nitrogen balance expressed as mg N/ kg BW was 321% higher ($P<0.05$) for lambs fed on green Kochia indica plus CM than those fed on the control diet (consisted of berseem hay plus CM).

Table (3): The rumen activity and nitrogen utilization of rams fed different levels of Kochia indica.

Item	Experimental rations				
	R_1	R_2	R_3	R_4	R_5
Rumen activity					
pH	6.47±0.07^c	6.57±0.06^b	6.86±0.07^a	6.73±0.07^a	6.95±0.06^a
VFA's (mM/100ml)	10.33±0.18^a	9.73±0.07^b	9.00±0.12^c	8.13±0.07^d	8.33±0.18^d
NH_3-N (mg/100ml)	11.22±0.10^a	11.22±0.04^a	9.99±0.07^b	8.30±0.06^c	6.20±0.20^d
Nitrogen utilization					
N. intake (g/day)	46.92±0.31^a	43.50±0.33^a	35.99±0.14^b	27.09±0.28^c	20.27±1.16^d
N. in feces (g/day)	17.87±0.84^a	15.57±0.47^b	16.21±0.28^{ab}	11.73±0.27^c	8.91±0.59^d
N. in urine (g/day)	22.91±0.95^a	21.41±0.22^a	15.25±0.23^b	12.42±0.41^c	9.55±0.55^d
N. balance (g/day)	6.87±0.07^a	6.52±0.09^a	4.53±0.11^b	2.94±0.07^c	1.81±0.09^d
N. balance as % of NI	14.64±0.08^a	14.99±0.15^a	12.58±0.26^b	10.85±0.09^c	8.98±0.47^d

a,b,c,d Means in the same row with different superscripts are significantly different ($P<0.05$).
R1: 100% berseem hay (BH). R2: 75% BH + 25% Dried kochia indica (DKI).
R3: 50% BH + 50% DKI. R4: 25% BH + 75% DKI. R5: 100% DKI.

The presented data (Table, 4) revealed that count of RBC's, WBC's and Hb concentration in blood of rams were decreased ($P<0.05$) by increasing the level of DKI in the rations over than 50% (R4 and R5) comparing with R1, R2 and R3. The present counts are within the physiological normal values (9 - 15 x 10^6 and 4 – 12 x 10^3/mm^3 for RBC and WBC, respectively) as reported by El-Reweny (1999). Also, data in Table (4) showed that the concentration of TP, AL and GL (g %) were higher ($P<0.05$), while

the concentration of GOT (IU/L) in serum of rams fed on R1 and R2 was lower than those fed on R3, R4 and R5. On the other hand, there are no significant differences between the five rations in the concentration of glucose and GPT in the serum of rams.

Table (4): The blood constituents of rams fed on rations containing different levels of Kochia indica.

Item	Experimental rations				
	R_1	R_2	R_3	R_4	R_5
RBCx10^6	9.39±0.24^a	8.67±0.25^a	8.74±0.43^a	7.96±0.24^b	6.72±0.36^c
WBCx10^3	12.90±0.26^a	12.90±0.29^a	12.73±0.68^a	11.47±0.43^b	10.37±0.44^b
Hb, g %	11.83±0.26^a	11.50±0.38^a	11.00±0.15^a	10.17±0.32^b	8.870±0.18^c
TP, g %	7.40±0.12^a	7.27±0.13^a	6.77±0.18^b	6.41±0.14^b	6.14±0.04^c
AL, g %	3.24±0.12^a	3.41±0.13^a	3.25±0.07^b	2.94±0.17^c	2.93±0.04^c
GL, g %	4.16±0.09^a	3.86±0.16^a	3.52±0.22^b	3.47±0.31^b	3.21±0.29^c
Glucose, g/dL	58.73±1.93	59.53±1.87	56.83±1.77	57.73±2.74	56.77±1.41
GOT,IU/L	49.60±1.53^b	53.20±2.20^b	58.27±1.34^a	60.13±1.09^a	59.83±1.04^a
GPT, IU/L	19.85±0.40	20.25±1.85	21.02±0.67	20.73±0.44	21.13±1.21

^{a,b,c} Means within the same column with different superscripts are significantly different at (P<0.05).
R1: 100% berseem hay(BH). R2: 75% BH + 25% Dried kochia indica (DKI).
R3: 50% BH + 50% DKI. R4: 25% BH + 75% DKI. R5: 100% DKI.

These results are within the normal level of sheep blood as reported by many authors (Saleh, 2001; Ali and El-Saidy, 2003; Al-Shami and Abo Omar, 2005; and Ali et al., 2005), who found that sheep blood contains 6 - 9 g % total protein, 3 - 4.7 % albumen, 3.0- 4.3 % globulin, 8.0 -12.8 % hemoglobin, 22 - 46.7 IU/L GOT, 12 - 21.3 IU/L GPT and 51.8 -59.6 g/dL glucose.

The results of the digestibility trails indicated that the lambs fed rations 4 and 5 had lower (P<0.05) feed intake as well as the lower (P<0.05) digestibility of all nutrients, while the rations 1, 2 and 3 were nearly similar. Therefore, they used in the feeding trial. The results in Table (5) showed that the average daily gain of buffalo calves fed D_1 (723 g/h/d) and D_2 (658 g/h/d) were significantly (P<0.05) higher than those fed D_3 (429 g/h/d).The feed conversion for animals fed D_1 and D_2 were improved by 34.38 and 31.57 %, respectively comparing with those fed D_3, also economical efficiency was improved by 33.55 and 36.18 %, while the feed cost were decreased by 25.20 and 26.82 % for animals fed D_1 and D_2, respectively comparing with those fed D_3.

Table (5): Growth performance, feed intake and feed efficiency of groups of buffalo calves fed on experimental rations.

Item	Experimental diets			SEM
	D_1	D_2	D_3	
Growth performance:				
Period of experiment, day	120	120	120	--
No. of animals	7	7	7	--
Av. initial body weight, Kg.	132.50	131.25	131.75	2.45
Av. Final body weight, Kg	219.25[a]	210.25[a]	183.256[b]	4.92
Av. Total live weight gains, Kg	86.75[a]	79.00[a]	51.50[b]	2.61
Av. Daily live weight gains, g	723[a]	658[a]	429[b]	12.90
DM intake (kg/h/day):				
Concentrate	3.515	3.315	3.155	--
Roughage 1 (100% BH)	2.292	-	-	--
Roughage 2 (75% BH+25% DKI)	-	2.190	-	--
Roughage 3 (50% BH+50% DKI)	-	-	2.090	--
Total	5.807	5.805	5.245	--
Feed conversion:				
Kg concentrate DM intake/Kg gain	4.862	5.038	7.354	--
Kg roughage DM intake/Kg gain	3.170	3.328	4.872	--
Total	8.032	8.366	12.226	--
Concentrate %	60.53	60.22	60.15	--
Roughage %	39.47	39.78	39.85	--
Av. Feed cost/Kg gain(LE):				
Concentrate	5.01	5.19	7.57	--
Roughage	2.22	1.75	2.19	--
Total	7.27	6.94	9.76	--
Economical efficiency*	1.79	1.87	1.33	--

[a,b] Means within the same column with different superscripts are significantly different at (P<0.05).

D_1: 60% CM+ 40 BH . D_2: 60% CM+ 30% BH + 10% DKI.

D_3: 60% CM+ 20% BH + 20% DKI.

The feed cost was calculated according to the price list of one ton (season 2005) of concentrate mixture, berseem hay and dried kochia indica were1030, 750, 200 LE, respectively.

***Economical efficiency= price of one kg LBW (13 LE) / feed cost (LE/kg gain).**

Although kochia has been studied extensively, very little is known about the effect of using Kochia on the farm animals performance. Hinojosa et al., (1986) reported that Kochia hay was

inferior to alfalfa hay when average daily gain, feed efficiency and apparent organic matter digestibilities were measured in cattle. However, Fahmy and Ibrahim (2005) reported that total gain and average daily gain was similar between Barki lambs fed on diet 1 (berseem hay plus CM) and diet 2 (green kochia indica plus CM). Feed intake as kg DM required to produce one kg daily gain for lambs fed kochia indica diet was 12.7 % less than those fed berseem hay diet showing better efficiency. The total feed cost and net return of Kochia diet were 28.3% and 28.4% higher than berseem hay diet.

The difference in the animals performance between the present study and those obtained by Hinojosa et al., (1986); and Fahmy and Ibrahim (2005) may be due to the difference in the environmental conditions and the variability of growth stage.

It could be concluded that DKI could be used successfully as a replacement (25%) for BH in the rations of sheep and buffaloes without any adverse effects on animal performance.

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الملخص العربي

تأثير استخدام الكوخيا على الأداء الانتاجى للمجترات

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أستخدم في هذه الدراسة ١٥ من الكباش الخليط (٢/١ فنلندي x ١ /٢ رحماني)، متوسط وزنها ٦٢كجم و متوسط عمرها سنتين لإجراء ٥ تجارب هضم (٣ كباش في كل تجربة) لتقدير القيمة الغذائية لخمس علائق تجريبية. العليقة الأولى (ع١) تكونت من ١٠٠% دريس برسيم (كنترول). بينما تكونت العلائق الثانية (ع٢) و الثالثة (ع٣) و الرابعة (ع٤) و الخامسة (ع٥) من عليقه الكنترول (ع١) مع استبدال ٢٥، ٥٠، ٧٥، ١٠٠% من دريس البرسيم بالكوخيا الجافة. كما أخذت عينات من سائل الكرش و الدم في نهاية فترة التجربة.كما استخدم ٢١ عجل جاموس متوسط عمرها ٥ شهور، متوسط وزنها ١٣١كجم في تجربة نمو استمرت ١٢٠ يوما حيث قسمت إلى ثلاث مجموعات ٧ حيوانات في كل مجموعة والتي غذيت علي ثلاث علائق. تكونت عليقة الكنترول (ق١) من ٦٠% مخلوط مركز+٤٠% ع١ بينما في العليقة الثانية(ق٢) والثالثة(ق٣) استبدلت ع١ في الكنترول ب ع٢ و ع٣ علي الترتيب. وأوضحت النتائج ما يلي:

١- انخفض محتوى العلائق من البروتين الخام والألياف الخام بينما ازداد محتواها من الكربوهيدرات الذائبة والرماد بزيادة مستوى الكوخيا الجافة فى العلائق. كما انخفض الماكول من المادة الجافة معنويا (٠,٠٥) بزيادة مستوى الكوخيا الجافة فى العلائق، ولكن الفروق كانت غير معنوية بين عليقه الكنترول (ع١)، ع٢.
٢- انخفضت معاملات هضم كل المركبات الغذائية (٠,٠٥) بزيادة مستوى الكوخيا الجافة فى العلائق ٤، ٥ مقارنة بالعلائق ١و٢ و٣. و كانت القيمة الغذائية (مجموع المركبات الغذائية المهضومة، البروتين المهضوم، الطاقة القابلة للتمثيل) للعلائق ١، ٢ أعلى معنويا (٠,٠٥) عنها للعلائق ٣، ٤، ٥.
٣- ازدادت قيم الpH وتركيز الامونيا (٠,٠٥) فى سائل كرش الحيوانات المغذاة على العلائق ١، ٢ عنها للعلائق ٣، ٤، ٥. بينما انخفض تركيز الأحماض الدهنيه الطيارة الكلية (٠,٠٥) بزيادة مستوى الكوخيا الجافة فى العلائق.

٤- كان ميزان الازوت للكباش المغذاة علي العليقة ١, ٢ أعلى (٠,٠٥) منه للكباش المغذاة علي العلائق٣, ٤, ٥.
٥- كان عدد كرات الدم الحمراء والبيضاء و تركيز الهيموجلوبين أعلى معنويا (٠,٠٥) في دم الكباش المغذاة على العلائق ١و٢ و٣ مقارنة بالعليقة ٤, ٥. كما كان تركيز البروتين الكلى والالبيومين والجولبيولين أعلى (٠,٠٥) بينما كان نشاط ال GOT اقل معنويا (٠,٠٥) فى سيرم دم الكباش المغذاة على العلائق ١و٢ مقارنة بالعليقة٣, ٤, ٥.
٦- كان معدل النمو للعجول المغذاة علي ق١ و ق٢ أعلى معنويا (٠,٠٥) مقارنة بالمغذاة علي ق٣. كما تحسن كل من معامل تحويل الغذاء والكفاءة الاقتصادية بينما انخفضت تكلفه الغذاء للحيوانات المغذاة علي ق١ و ق٢ مقارنة بالمغذاة على ق٣.