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CHEMICAL AND BIOLOGICAL TREATMENTS OF SUGAR BEET TOPS SILAGE FOR RUMINANT FEEDING : 1- CHEMICAL COMPOSITION, SILAGE QUALITY AND NUTITIVE VALUES .

Saleh;M.R.M.;G.I.Elemam and M.M.Refaay
Animal Production Res. Institute, Agric. Research Center ,Dokki, Egypt .

ABSTRACT

The present study was carried out to investigate the effect of chemical and biological treatments of sugar beet tops (SBT) on oxalic acid toxicity and the nutritive value of experimental rations by Rhmany rams . Four digestition trials were carried out using three rams in each .The animals were nearly equal in body weight 67. 2± 0.49 kg , and fed the experimental diets according to NRC (1990) . group 1 fed 50 % concentrate feed mixture (CFM) + 50 % berseem hay (BH) as a control , group 2 fed 50 % CFM + 50 % untreated sugar beet tops silage (USBTS) , group 3 fed 50 % CFM + 50 % chemical treated sugar beet tops silage (CSBTS) and group 4 fed 50 % CFM + 50 % biological treated sugar beet tops silage (BSBTS) . The obtained results of chemical analysis indicated that CSBTS had lower oxalic acid content compared with the other types of silages . The biologically treated silage was significantly ($p < 0.05$) higher in DM , CP , EE and NFE contents than those of the other treatments , whereas CF and ash were lowered . On the other hand , the BSBTS was recorded lower NDF , ADF , ADL , hemicelluloses and cellulose contents . The results of amino acid of biological treated silage showed the highest values compared with the other tested treatments .The minerals content of treated or untreated SBTS indicated that the BSBTS had higher levels of all tested minerals. The silage quality of BSBTS had higher pH , lactic acid values and lower total VFA's and NH_3 – N concentration . The physical properties of CSBTS showed clearly good properties than the other types of silages . Whereas Mycotoxins were absent in chemical treated silage (CSBTS) . The aflatoxin (B1) and ochratoxin (A) were increased with USBTS group . Feed intake significantly ($p < 0.05$) increased with all types of silage compared with control group . The chemical analysis of CSBTS and BSBTS as well as OM , CP , CF , EE and NFE were in the same trend . On the other side the BSBTS silage was significantly higher ($p < 0.05$) in TDN and DCP. Finally the nitrogen balance results were clearly that is nitrogen intake and excretion in faeces and urine are the best in BSBTS than other treatments

Keywords : Sugar beet tops , Biological and chemical treatment , billy growing lambs and oxalic acid .

INTRODUCTION

The continuous increase in sugar demands lead to increase in sugar beet cultivation , especially in new lands . About 70221 feddans were caltivated with sugar beet at year 1999 in Khafr EL – Sheikh Governorate . This area produced about 877763 tons of fresh sugar beet tops (SBT) contained about 84265 tons DM . Moreover , about 46522 feddans were cultivated with sugar beet in year 2000 at Dakahlia Governorate , it also produced about 581525 tons of fresh SBT contained 60575 tons DM . Oxalic acid irritates the lining of the gut when consumed , and can prove fatal in large doses . The LD50 for pure oxalic acid is predicted to be about 378 mg / kg body weight, or about 22 g for a 60 kg human . The affinity of divalent metal ions is sometimes

reflected in their tendency to form insoluble precipitates . Oxalic acid also combines with metals such as calcium , iron , sodium , magnesium, and potassium in the body to form crystals of the corresponding oxalates , which irritate the gut and kidneys . Because it binds vital nutrients such as calcium , long - term consumption of feeds high in oxalic acid can lead to nutrient deficiencies . Since 1941 noticed that some fungal species for production large amount of oxalic acid on moist straw , that mean the oxalic acid is one of mycotoxin , its produced by *A . flavus and A . niger* (Gredek , 1974 & 1983) . Oxalic acid is found in mouldy straw and silage (Clarke and Clarke , 1978 ; Clarke *et al* .,1981 and Blood and Rodistits , 1989) .Yet it is also a phytotoxic organic acid which naturally presented in different plants substances as free acid or calcium oxalate (Nehring , 1972) .

The main objective of the present study was to evaluate the roll of chemical and biological treatments on oxalic acid content in sugar beet tops and their effects on Silage quality and nutritive values .

MATERALS AND METHODS

This study was carried out at 2006 in El-Serw Animal Production Research Station Animal Production Research Institute , Agricultural Research Center, Cairo , Egypt .

Experimental animals :

Sexual mature Rhmany rams were carried out in this study . (average live body weight of 67.2 ± 0.49 kg and about 3 years of age) . All rams were healthy and free of diseases . The rams were divided randomly into four similar groups (three rams in each) according to body weight . Rams were housed in groups and kept under shade .

Feeding and management :

The control ration (CBH) contained 50 % concentrate feed mixture (CFM) [yellow corn 50 % + soybean meal 12.5 % + wheat bran 35 % + dicalcium phosphate 2 % + common salt 0.5 %] + 50% berseem hay(BH) . The second group fed on 50 % CFM + 50 % USBTS and third group fed on 50 % CFM + 50 % CSBTS while forth group fed on 50 % CFM + 50 % BSBTS . Feeds were offered two times / day at 8 am and 3 pm. Feed intake and feces weight were recorded daily.The chemical analysis of feed ingredients and diets are presented in Table(1).

Silage making :

1- Untreated sugar beet tops (USBT) :

Whole green sugar beet tops were chopped manually using knives, then wilted by spreading under direct sun for a day then mixed with wheat straw (4 : 1 ratio) then 5% molasses+ 1 % urea were added . The mixture was ensiled in white plastic bags for 2 month before feeding . After ensilage period , the color and odor were examined and samples were taken for chemical analysis . determine silage quality .

2 – Chemical sugar beet tops silage (CSBTS) :

The chopped sugar beet tops as same in untreated sugar beet tops (USBT) were mixed with 3 % calcium carbonate during the silage industrialization

3 – Biological sugar beet tops silage (BSBTS) :

Also USBT were added with 1 % Probiotic [*Rhadopseudomonas plustris* (ATCC17001) + *Lactobaiullus plantaru* (ATCC8014) + (*Lactobaiullus case* ATCC7469) + (*Streptococcus lactis* (IFO12007)+ *Saccharomyces Cervisiae* (IFO 0203) + *Microhiza* during the silage industrialization .

Silage quality measurements :

Samples from both untreated silage (USBTS) and treated silages(TSBT) (chemically or biologically) were taken at the opening time and during the experimental period .The pH was measurmed using a digital pH mater, while ammonia concentration determined according to Conway (1962) . The left of the filtrate was kept frozen at -20°C for TVFA determination according to Warner (1964) Lactic acid determined using High Performance Liqui Chromatography (HPLC) as described by Waldo and Schultz (1956)

Amino acid determination :

Amino acid analysis was carried out in Foods and Feeds Laboratory Centeral , Agriculture Research Center by using Amio acid analyzer as described by Radwan *et al* ., (1987) . The samples were used for the identification and amino acids determination of ingredients and rations . Equal to 50 mg from ground sample was hydrolyzed with 6 NHCL (5 ml) in a sealed test tube at 110 °C for 24 hr. after hydrolyzed , an aliquot from the hydrolyzed (5 mg) was evaporated to dryness then dissolved in 2 ml loading buffer and filtrated through 0.22 um centrifugal microfilter before loading on to the amino acid analyzer . Then it completed to 50 ml by distillated water . Amino acid composition presented in Table (2) .

Digestibility trials :

Four digestibility trials were conducted using three adult rams for each to determine the digestion coefficients and nitrogen balance for the different experimental diets . Each trial lasted for 22 day the first 15 - day was considered as a preliminary period and 7 – days for collection .

Faeces and urine collection :

At the last week of the experiment , faeces and urine samples were collected daily for seven successive days from three animals for each group for nutritive values determination . Representativey samples of fresh faeces were dried and ground then mixed and kept for chemical analysis to estimator the nutrients digestibility . Urine was collected daily after mixed with 20 ml conc . sulfuric acid to keep ammonia messed .

Blood samples :

Blood samples were collected in heparinzed test tube from each animal before feeding from jugular vein . the samples was immediately centrifuged to separate the plasma at 3000 rpm for 20 minute . Samples were stored frozen immediately at-20° C till analysis .

Analytical methods :

hemical analysis of feed ingredients and feces was carried out according to A.O.A.C. (2000) . Plasma biochemical analysis was done using Biomerieux reagent kits . Total volatile fatty acid (TVFA) of silage aqueous extract was measyred by the methods of Patel and Mudgal (1974) . Oxalic acid was deterimined according to Pearson (1973) . Mycotoxins were determined according to Abdelhamid modified method (1981) .Calcium was

determined according to Elveback (1970) , p according to Ferdman *et al* . (1980) , Mg according to Oranye and Rhein , (1951) and iron according to Meites , (1977) . Amino acids were determined by amino acid analyzer according to methods of (Radwan *et a.l* (1987).

Statistical analysis :

All numerical data obtained were statistical analyzed by SAS (1996) procedures for personal computer . When F-test was significance , least significant differences (Duncan ,1955) were calculated for the comparisons between treatments .

RESULTS AND DISCUSSION

Chemical composition:

Results in Table (1) showed the chemical composition of the experimental feedstuffs . Biologically treated silage (BSBTS) was higher in DM, CP, EE and NFE compared with other silages , whereas it was decreased in CF and ash .

Table (1) .Chemical analysis of , feed ingredients , different types of silage and different types of silages and experimental rations fed Rhmany rams.

Items	Feed ingredients					
	CFM	BH	FRISH	USBTS	CSBTS	B CBTS
DM	89.82	88.11	14.58	34. 96	41.13	46.39
OM	90.17	89.23	81.23	79.57	73.19	81.03
CP	13.92	14.16	10.43	12.86	14.81	15.48
CF	11.78	24.79	13.64	10.31	9.70	8.92
EE	3.29	3.05	3.91	3.47	2.94	3.48
Ash	9.83	10.77	18.77	20.43	26.81	18.97
NFE	61.18	47.23	53.25	52. 93	45.74	57.15

	Experimental rations			
	COTROL	USBTS	CSBTS	B SBTS
DM	88.68	62.54	65.41	68.04
OM	89.92	84.75	81.56	82.48
CP	12.30	12.58	12.56	14.89
CF	18.29	14.30	14.00	13.61
EE	3.24	3.36	3.09	3.36
Ash	10.08	15.26	18.45	17.53
NFE	56.09	54.51	50.82	51.62
NDF	42.90a	37.11b	35.65b	31.14c
ADF	32.50a	28.66b	29.16b	24.52c
ADL	9.35a	7.72b	6.76b	6.54b
Hemicelluloses	10.40a	8.45b	6.49c	6.62c
Cellulose	23.15a	20.94b	22.40a	17.98c

BH = berseem hay , USBTS = Untreated sugar beet silage , CSBTS = Chemical sugar beet tops silage . BSBTS = biological sugar beet tops silage ,

On the other hand , the oxalic acid contents of chemically treatment silage (CSBTS) was lower than untreated and biologically treated silages .The biologically treated sugar beet tops silage (BSBTS) had the lower values of NDF, ADF, ADL and cellulose than untreated and chemically treated silage .

These results are inagreemen with Bendary *et al* . (1992 a & b) and Mohi El-Dien *et al. (* 2000) who indicated that sugar beet tops (SBT) as fresh , dried or silage made by different methods had high feeding value and more palatable compared to other roughage by – products . However , there are some problems to use the SBT in the form of fresh sugar beet tops because its high in moisture , potassium and oxalic acid . Decreasing of crude fiber of BSBTS may be due to urea addition and the effect of the libration of cellulose fromits bonds with lignin(delignification which increased solubility (Abd El-Hamid *et al* ., 1989) . This result agreed with Chauhan and Kakkar (1981) . and Zedan (1998) . Similar results have been reported with urea treatment of rice straw , corn stover sugarcan tops at ensilaging (Abd El – A ziz ,1993 ; Talha 1990 ; Tabanah 1994 , Chauhan , 1994 ; Mohamed , 1998 and , Abd El – A ziz , *et al* ., 1997) . Similar results were reported by Mohamed (1998) . who found that treatment corn stover silage with 1 % urea and 3 % molasses at ensiling decreased its NDF, ADF and ADL contents .

Amino acids :

Amino acids of rations are presented in table (2) . The results of analysis showed clearly that the biologically treatment (BSBTS) had higher values for all amino acids , compared with another silages . moreover the chemical treated silage had high level of amino acids content than untreated sugar beet tops (USBTS) this may be due to calcium carbonate supplemented to silage during silage industrialization , which cause a decrease in level of oxalic acid in silage and improvement the silage quality and utilization .

Table (2) : Amino acids contents (%) of experimental diets .

ITEMS	Experimental diets			
	CONTROL	USBTS	CSBTS	BSBTS
Alanine	6.2	4.6	5.4	7.9
Arqnine	3.7	0.0	0.0	2.8
Aspartic acid	5.3	3.5	4.8	7.4
Cystine	0.5	0.9	0.9	1.7
Glutamic acid	12.1	7.1	8.6	11.4
Glycine	5	2.6	3.6	5.8
Histiden	1.7	1	1.4	3.2
Lleucine	8.1	3.4	3.7	5.1
Iiso leucine	5.8	0	2.8	4.6
Lysine	0.6	0.5	1.9	3.1
Methionine	2.2	3.2	2.5	3.3
Phenyle A .	2.9	2.3	4.1	6.5
proline	1.4	0	0.3	2.7
Serine	1.8	0.9	1.2	3.6
Therionine	0.3	1	0.6	2.9
Treptophane	5.2	4.7	5.6	7.5
Tyrosine	1.6	1.3	1.7	3.1
Valine	5.1	3	4.9	6.8

Minerals content :

Minerals in different types of treated silage was presented in table (3) . The biological treated silage was higher contains of all minerals (p , Na , k , Fe , Z , Mn and MG) except for calcium than other silage and control diet . These results were in a good agreement with those obtained by Bendary *et al* . (1992c) .

Table (3) . Minerals (mg / 100 g) in different types of sugar beet tops silage fed by Rhmany rams.

Items	Control	USBTS	CSBTS	BSBTS
ca	8.6c	21.78b	36.43a	6.38c
P	7.90a	6.13a	4.88b	4.70b
Na	4.31c	8.56a	6.92 b	6.41b
K	21.50b	44. 69a	39. 03 a	36.15a
Fe	87.46c	192.37a	178.15b	167.23b
Z	75.21c	162.45a	138.92b	133.47b
Mn	35.18b	51.36a	47.19a	26.55c
Mg	0.68b	0.94a	0.72b	0.56c

Means in the same row superscripted by different letters significantly (P<0.05) .

Silage quality :

1 – silage pH :

The pH values in Table (4) were 4.41 , 4.89 and 4.98 for CSBTS , USBTS and BSBTS respectively .The data showed that the highest pH value were decreased . for BSBTS . This agreement with the result obtained by Austin (1967) who found a high significant correlation (r = 0.66) between Urea supplemented to silages and pH value .

2 – Lactic acid concentration :

lactic acid concentrations were 3.12 , 3.68 and 3.92 for CSBTS , USBTS and BSBTS respectively (Table 4) . The lower lactic acid concentration in treated sugar beet tops silage than that in untreated sugar beet tops silage indicated that addition of urea to SBT at ensilage Prosses inhibits lactic acid formation even mach carbohydrates are available as molasses . These results are in agreement with those of Chauhan (1994) who reported that the treated sugar beet tops was lower in lactic acid concentration than USBTS. Good quality silage characteristics was related a high level of lactic acid (Barnet , 1954) . Mohamed (1998) and Tabanah (1994) indicated that the pH values had an inverse trend to lactic acid production . The soluble carbohydrates are major source for lactic acid production , which improved the silage quality .

Table (4) : Mean values of different quality parameters of the tested Silage (on dry matter basis) .

ITEMS	USBTS	CSBTS	BSBTS
pH	4.89	4.41	4.98
Lactic acid (mg/100g)	3.68	3.12	3.92.
TVFA's (mEq/100g)	24.15	23.76	21.68
Ammonia-N (mg/100g	18.54	22.41	20.67

3 – Total volatile fatty acid concentration (TVFA) :

The total VFAs concentrations were 21.68, 23.76 and 24.15.for BSBTS , CSBTS and USBTS respectively .The BSTS is lower in TVFAs compared with another treatments.The high quality silage is characterized by low TVFA concentration (Langston *et al* ., 1958) .

4 – NH3 – N concentration :

Ammonia-N values were 18.54 , 22.41and 20.67 for USBTS , CSBTS and BSBTS respectively .The results clearly that USBTS was lower in ammonia nitrogen than other groups ,This result agreed with Langston *et al* .(1958) .

Physical properties :

The most important physical properties of silage quality a are the silage smell and color . The silage was excellent with a nice smell and a bright greenish – yellow color , which turned brown when exposed to air . In addition , some juice were collected at the bottom of the sugar beet tops silages(SBTS) which contained molasses . The color tended to be brown in the SBTS Schuerch and Davidson (1971) explained this phenomenon as a result of oxidation phenol groups or condensation of the aldehydic fractions in sugar with N bases via the Millard action . Hughes and Peralta (1981) observed that the SBT silage become a dark brown color with urea treatment

Oxalic acid and Mycotoxins :

Sugar beet tops had high content a natural oxalic acid specially with untreated sugar beet tops . Data in table (5) indicated that the chemical sugar beet tops silage was lower oxalic acid which may be due to calcium carbonate addtion to fresh SBT during ensilage and that is go overcome to pathogenic clinical against to kidney , lever disease , and another illness (Abdellhamid *et al* ., 1999) . On the other hand , the mycotoxins in both silages indicated that the chemical treated silage was mycotoxin free , whereas concentrate feed mixture had higher level of aflatoxin B1 and lower level of ochratoxin A than diets . The values of aflatoxin B1 were 47 , 35 and 24 PPB for control , chemical and biological treatments , respectively , whereas ochratoxin A values were 84 , 69 and 61 ppb for chemical , biological and control respectively .

Table (5) Oxalic acid contents of silage , faeces , urine and blood and Mycotoxins (AflatoxinB1 and Ochratoxin A PPb) in silages of rams fed on sugar bee tops silages.

Items	CONTROL	USBTS	CSBTS	BSBTS
Oxalic acid mg / 100 gm				
Silage	-	11.85a±0.04	4.35b±0.04	9.61a±0.06
Faeces	-	2.49a±0.07	1.12a±0.01	1.83a±0.02
Urine	-	1.94±0.02	1.47±0.04	1.25±0.05
Blood	-	4.72a±0.05	1.58b±0.06	4.21a±0.01
Mycotoxins PPb				
aflatoxin B1	47	35	-	24
ochratoxin A	61	84	-	69

Means having different superscripts within the same row are significantly different at P<0 .05.

Digestion trials :

Feed intake :

dry daily dry matter intake by rams fed either control diet (CFM) or treated silage diets(USBTS , CSBTS and BSBTS) in Table (6) . indicated that the daily DMI of group fed USBTS was higher ($p < 0.05$) than those fed CSBTS , SBTS and control .The values were 2316 , 2952 , 2848, 2661 g / h / d for USBTS , CSBTS and BSBTS, respectively . On the other hand the water consumption (ml / h / d) was 3850, 3243, 3467 and 3379 for control , USBTS , CSBTS and BSBTS . The data showed that water consumption of CFM group is higher than other groups.

Nutrient digestibility and feeding value :

Data in Table (7) clearly indicated that CSBTS was significantly higher ($p < 0.05$) in digestibilities of OM , CP , CF , EE and NFE compared with USBTS , BSBTS and control diet . At the same table , the chemical treatment was significantly higher ($p < 0.05$) for NDF, ADF ADL , cellulose and hemicellulose than other treatments , whereas USBTS had lower values than all groups. this result is not significant . increasing dose values may be due to the urea supplemented to fresh sugar beet tops during ensilage and decreasing the level of oxalic acid in this group . Data showed that the biological treatment had higher values of TDN and DCP compared with other groups .

Table (6) Daily feed intake by rams fed on the different silage of sugar beet tops .

ITEMS		DM (g/h/d)	DM (g/kg ^{75})	DM (%of Bw)	Overoll
Group 1	CFM	1260	211.48	1.23	221.4
	BH	1056	105.25	0.61	106.8
	TOTAL	2316c±49	338±92	1.84±40.3	328.2±0.03
Group 2	CFM	1278	214	1.16	208.80
	USBTS	1674	262	1.41	253.80
	TOTAL	2952a±28	476±5.7	2.57±0.04	462.6±0.01
Group 3	CFM	1080	189	0.88	158.04
	CSBTS	1667	261	1.21	217.8
	TOTAL	2747a±39	441±12	2.05±0.03	369±5.21
Group 4	CFM	1215	206	0.84	151.20
	BSBTS	1445	235	0.95	172.80
	TOTAL	2660b±18	441±10	1.79±40.01	324.0±0.04

Means having different superscripts within the same column are significantly different at P<0 .05 .

Nutrient digestibility and feeding value :

Data in Table (7) clearly indicated that CSBTS was significantly higher ($p < 0.05$) in digestibilities of OM , CP , CF , EE and NFE compared with USBTS , BSBTS and control diet . At the same table , the chemical treatment was significantly higher ($p < 0.05$) for NDF, ADF ADL , cellulose and hemicellulose than other treatments , whereas USBTS had lower values than all groups. this result is not significant . increasing dose values may be due to the urea supplemented to fresh sugar beet tops during ensilage and decreasing the level of oxalic acid in this group . Data showed that the

biological treatment had higher values of TDN and DCP compared with other groups .

Nitrogen balance :

Biological treatment BSBTS is more higher in nitrogen intake , faeces nitrogen , urine nitrogen , nitrogen balance and digestion nitrogen than the other treatments . This may be due to microorganisms supplemented and urea addition to green sugar beet tops during ensilage . These results agreed with those obtained by Bendary *et al* . 1992 a.

Table (7) Digestion coefficients and feeding values (% on dry matter bases) of different silages fed to Rahmany rams .

ITEMS	CONTROL	USBTS	CSBTS	BSBTS
DM , %	64.78±1.91	62.43±2.47	65.34±2.12	66.23±2.19
OM , %	62.40±1.18	60.94±1.08	64.84±0.6	62.37±0.8
CP , %	65.97±2.37	61.37±1.44	69.44±0.75	67.11±0.69
C F , %	55.41±1.38	49.34±0.67	61.71±0.79	56.97±0.94
EE , %	67.15±2.21	63.85±1.37	72.34±0.58	70.38±2.32
NFE , %	68.25±1.63	61.17±1.97	66.35±1.32	64.57±2.15
NDF , %	63.74c ±3.1	61.28c±4.21	71.25a±2.89	66.43b±3.72
ADF , %	58.22b±3.47	56.50b±1.69	64.12a±3.84	58.71b±2.36
ADL , %	8.79a±0.26	6.11b±0.35	8.91a±0.71	7.66a±0.52
Hemicellulose, %	62.37b±2.88	65.11b±2.92	69.57a±2.74	66.23a±1.59
Cellulose , %	44.83c±4.25	61.07b±1.53	66.18a±3.73	62.33b±3.44
Nutritive values				
TDN , %	58.485a±48	52.87b±0.38	55.74b±0.7	63.49a±27
DCP , %	9.87±0.07	9.34±0.04	10.60±0.06	10.20±0.09

Means having different superscripts within the same row are significantly different at P<0 .05 .

Table (8) Nitrogen balance rams fed on different silages of sugar beet tops silages .

ITEMS	Control	USBTS	CSBTS	BSBTS
Nitrogen intake	53.40b±0.90	57.80a±0.40	58.22a ± 0.60	62.58a±0.80
Faeces nitrogen	17.83b±0.20	19.06a±0.10	15.26c ± 0.40	14.89c±0.60
Urine nitrogen	21.35a±0.30	14.33b±0.10	16.65 b ± 0.5	13.42b±0.6
nitrogen balance	9.21c±0.070	24.41b±0.030	26.31 b ± 0.02	34.27a±0.30
Digestion nitrogen	28.15b±0.40	30.89b±0.20	35.55 a ± 0.1	39.11a±0.7
Digestion nitrogen of nitrogen intake	52.71b±0.60	5344b±0.30	57.06 a ± 0.5	63.49a±0.5

Means having different superscripts within the same row are significantly different at P < 0 .05 .

Economical efficiency :

This study cleared that using sugar beet tops silages treated chemically or biologically in ruminant feeding up to 50% of their requirements decreased feed costs by 23 % , 24.4 % and 28.5 % for USBTS , CSBTS and BSBTS respectively compared with control group . These decreases in cost may be due to that sugar beet tops silage are cheap by products . these data are in agreement with Murdoch (1962) .

Table (9) . Economical efficiency of experimental rations fed rams (LE)

ITEMS	Control	USBTS	CSBTS	BSBTS
Price of DM (LE)	1150a ± 64	113.00 b ± 6.5	89.54 c± 4.8	105.6b±2.7
Price of TDN (LE)	1470a ±23	183.40b ± 8.3	207.9b ± 7.2	234.1b±6.3
Price of DCP (LE)	2110a ± 76	791.66 b ± 19	858.34b 34	912.0a±14.7
Total coast(LE)	1576.6a	362.7c	385.3c	419.5b
Revenue %	00.0	23.0	24.4	28.5

means having different superscripts within the same row are significantly different at P<0 .05 .

CONCLUSION

From this study it could be concluded that sugar beet tops can be used in ruminant feeding , particularly in form of biological and chemical silages.

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سيلاج عروش بنجر السكر المعامله كيماويا وحيويا لتغذية ا لمجترات:

١ – التركيب الكيماوى وجودة السيلاج والقيمه الغذائيه

مصطفى راشد محمد صالح و جمال ابراهيم الامام و محمد مصطفى رفاعى .

معهد بحوث الإنتاج الحيواني – مركز البحوث الزراعية – دقي – مصر .

أجريت هذه الدراسة بمحطة بحوث الانتاج الحيوانى بالسرو – مركز البحوث الزراعية – يونيه ٢٠٠٧ إستهدفت الدراسة تقييم ثلاث انواع من السيلاج لعروش بنجر السكر المرتفعة فى محتواها من حمض الأوكساليك على تقليل المحتوى من هذا الحامض العضوى الضار وأثـره على الكباش الرحمانى . إستخدم فى هذه الدراسة عدد ١٢ كبش رحمانى عمر ٣ سـنوات تقريبـا بمتوسط وزن ٦٧,٢ كجم قسمت عشوائيا إلى أربعة مجاميع متساوية (٣حيوانات بكل معاملة) . وقد غذيت الحيوانات حسب الاحتياج وفقا لمقررات NRC (1990) ٥٠ % مركـز + ٥٠ % دريس للمقارنه أو سيلاج غير معامل أو معامل للعلائق التجريبيه. وقد أوضحت النتائج أن المعامله الكيميائيه قللت من المحتوى الطبيعي لحمض الأوكساليك فى السيلاج النـاتج مقارنـه بـالانواع الاخرى , كما أوضح التحليل الكيماوى لكل أنواع السيلاج غيرالمعامل أو المعامـل أن السـيلاج المعامل بيولوجيا كان مرتفع معنويا فى محتواه من المادة الجافه , البروتين الخام , المسـتخلص ا لإثيرى و المستخلص خالى الأزوت مقارنة بباقى المعاملات , بينما انخفض محتواها من الألياف الخام و الرما د . كما أشارت النتائج أن السيلاج المعامل بيولوجيا كان منخفضا فى محتواه من ,

ADL ADF , NDF والهيميسيللوز و السيللوز مقارنة با لسيلاج غير المعامل او المعامل كيميائيا . وقد أظهرت نتيجة تحليل الأحماض الأمينيه أن السيلاج المعامل بيولوجيا أعطى قيم مرتفعه لجميع الأحماض الأمينيه بالنسبه للمعاملات الأخرى . أما الأملاح المعدنيه فقد كانت المعاملة الحيويه مرتفعه فى كل الأملاح المعدنيه ما عدا الكالسيوم , وبقياس جودة السيلاج المعامل حيويا أعطى أعلى قيم لكل من ال (pH , حمض الأكتيك) , بينما إنخفض المحتوى من الأحماض الدهنية الطياره , أزوت الأمونيا . وكانت الخواص الطبيعيه للسيلاج جيده مع كل من السيلاج المعامل كيماويا وحيويا دون الانواع الاخرى , وكان محتوى السيلاج غير المعامل من حمض الأوكساليك مرتفعا بينما إنخفض بشدة مع المعامله الكيميائيه . من ناحية اخرى فإن السموم الفطريه تم التخلص منها مع المعامله الكيماويه سواء للافلاتوكسين او للاوكراتوكسين وارتفعت مع غير المعامله ثم المعامل حيويا. ومن نتائج معاملات الهضم أن السيلاج غير المعامل أعطى أعلى قيمه للمأكول ألكلى بالنسبه للمعاملات الأاخرى فى حين أن معاملة المقارنه كانت أقل قيمه للمأكول الكلى . وقد أ ظهرت نتائج التحليل الكيماوى للغذاء المهضوم أن هناك فرق معنوى على مستوى ٠,٥ للسيلاج المعامل كيماويا فى كل من OM , CP , CF , EE and NFE كما أن السيلاج المعامل حيويا كان يأخذ نفس الأتجاه , فى حين أن السيلاج المعامل حيويا كان أعلى قيمه فى DCP , TDN بالنسبه للمعاملات الأخرى . أما ميزان الأزوت فقد أوضحت النتائج أن النيتروجين المأكول والخارج فى الروث كان أفضل ما يكون مع المعامله الحيويه إذا قورنت بالمعاملات الاخرى .

أوضحت هذه الدراسة أن استخدام الأنواع المختلفه من سيلاج عروش البنجر المعامل كيميائيا أو بيولوجيا قد قللت التكاليف عند إضافته بنسبة ٥٠ % من ا لإحتياجات الغذائية مقارنة بالتغذيه على عليقة المقارنه . من هذه الدراسة يوصى بإستخدام هذه المخلفات على صورة سيلاج للمساهمة فى التغلب على مشكلة نقص الأعلاف المستخدمة فى تغذية الحيوانات المجتره فى مصر .