Assiut Journal of Agricultural Sciences 55 (2) 2024 (41-54)
ISSN: 1110-0486 / EISSN: 2356-9840
Website: http://ajas.journals.ekb.eg/
E-mail: ajas@aun.edu.eg

(Original Article)

Some Nutrition Studies on Using Ureated Sugar Beat Leaves and its Effects on Sheep Performance

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DOI: 10.21608/AJAS.2024.269374.1335

Abstract

This study was conducted to investigate the chemical composition, digestibility, nutritive value, nitrogen retention, growth performance, economical efficiency and blood constituents of lambs fed SBLS treated as compared with different urea levels with CFM plus WS. Eighteen growing Frafra male lambs with 20.730 ± 0.29 kg average LBW and six months of age were used in the feeding experiment. TI, lambs were fed CFM +WS as control, T2, lambs were fed CFM + SBLS supplemented with 0.3% urea, T3, lambs were fed CFM + SBLS supplemented with 0.6% urea. Digestibility and nutritive values of compared with ureated SBLS. Ureated diets showed significantly higher (P<0.00l) values for nitrogen retention compared with control group (TI). Growth performance was shored significantly (p<0.001) by increasing levels of treated SBLS in diets. Feed consumption and feed conversion ratio decreased significantly (p<0.001), lambs fed T2 and T3 showed the best feed conversion ratio as kg DM and kg TDN kg/kg gain compared with those fed control. Consequently, lamb's fed ureated SBLS recorded lowest feed cost (LE), (better efficiency) compared with those fed the control diet. Results of blood constituents as GL, TP, T3 and T4 were increased by adding SBLS in sheep diets and differences were significant (p<0.001) while the rest of constituents such as (AL, Gb, urea, cholesterol, Tr, ALT and AST) were not differ significantly by (P<0.05).

Keywords: *Performance, Digestibility, Nutritive value, sugar beet leaves, Silage.*

Introduction

Go Egypt the total area planted of sugar beet increased from 504 thousand Fadden's (Agriculture Economics, 2015) to 597923 Fadden's (Agriculture Economics, 2022) which produces about 20.964 ton/Fadden's. Sugar beet and sugar cane are produced in the hot climate and is a rich source of sucrose (Springer, 2012). Sugar beet pulp (SBP) is obtained from sugar beet industries as livestock fodder. SBP contains high levels of fiber and energy. Gr contains 6% sucrose, 9% CP, 3% insoluble ash, 0.5% EE, 4% soluble ash and it has 6% DM (Talha *et al*., 2002). Papadomichelakis *et al*., (2004) reported that SBP contained low crude

Received: 14 February 2024/ Accepted: 1 April 2024/ Published online: 15 April 2024

protein (CP) and high crude fiber (CF) concentrations. while digestibly of nutrients for SBP is high because it contains low level of lignin (Ashry *et al*., 2000).

Rustam *et al*., (2023) and Abdel–Magid., (2013) concluded that SBP is an energy source because it includes insoluble and soluble NDF, which have better digestion and growth the consumed of feed on daily basis, also. Sugar beet pulp treated with 2% or 4% urea increased daily feed intake, body weight, daily gain and feed conversion ratio (FCR). Concentration of 4% urea with SBP showed more increase in body weight, high profitable, best economic and high consumption as compared with those fed untreated SBP. Suliman *et al*., (2013) concluded that silage of sugar cane tops recorded best values among all silages in digestibility coefficient, nutritive values, nitrogen balance, nitrogen absorption, total weight gain (kg), daily weight gain (gm), feed conversion ratio as kg DM, TDN and DCP/kg gain, economical revenue and economic efficiency %, while the lowest values were recorded by silage of green maize steams. However, the intermediate values were observed by diets containing sugar beet leaves silage.

In other studies, Deraz *et al*., (2016) worked on sugar beet leaves silages treated with urea in two levels (0.25 and 0.50% urea SBLS) with mechanical treatment (unchopped and chopped). The results showed that diets containing urea with mechanical treatments recorded a better digestibility coefficient as DM, OM and NFE, but low digestibility coefficient as CP, CF, EE and nutritive values as TDN while those containing SBLS showed better nutritive value compared with control one. The same observation was reported by Ahmed *et al*, (2003) and Gaafer *et al*, (2011). Results of nitrogen balance and nitrogen absorption for lambs fed diets containing SBLS treated with urea and mechanical treatments were highest compared with the control one. These data are in accordance with Gunter *et al*., (1998) and Ghanem *et al*., (2000) results. Lambs fed diets containing SBLS with urea and mechanical treatments showed improvements in daily gain, feed conversion as TDN and feed efficiency, best return and better best efficiency compared with these fed control diet (Gaafer *et al*., 2011 and EL-Nahas, 2009), weight gain in performance of lambs fed diets containing sugar beet leaves silage with urea and mechanical treatments were highest compared with control.

Materials and Methods

The current research was run out at Mallawi of Animal. Production Research station, belonging to Animal Production Research Institute, Agriculture Research Center, Ministry of Agriculture Egypt, during the period from April to August 2023. Digestibility trials were carried out to estimate digestion coefficient, feeding values, nitrogen retention, while the nutritional experiments were conducted to estimate growth performance, economic efficiency and blood constituents for Frafra lambs fed SBLS treated with different levels of urea SBLS.

1. Making Silage

Sugar beet leaves (SBL) was harvested from sugar beet fields at the harvesting time and wilted for 48 h to lessen the humidity content to 65% - 70% before ensiling, the plant was chopped (1-2 cm length) and ensiled in hall with

diameters of 2×2×1.5 meters. In addition, 5% molasses, 1.4% limestone and 1% minerals were added. Urea was applied at a level of 0.3% or 0.6% of silage DM, Deraz *et al*., (2016). Silages compressed by an employee's feet, hard pressed with 25-30 cm of soil stratum and ensiled for 3 months.

2. Nutritional experiment

Eighteen growing Frafra male lambs, with an average of 20.73 ± 0.29 kg LBW and six months of age were divided into three groups (six animals each). Treatments were:

- Control group (TI) lambs were fed 3% concentrate feed mixture (CFM) + 1% of live body weight (LBW) wheat straw (WS)
- Treatment group (T2) = lambs were fed 3% CFM + chopped SBLS with 0.3% urea/100 Kg DM SBLS adlibtum.
- Treatment group (T3) = lambs were fed 3% CFM + chopped SBLS with 0.6% urea/100 kg DM SBLS adlibtum.

Feeds were offered twice daily in two equal parts at 8:00 am and 3:00 pm water was available freely for lambs. Bloch minerals and vitamins were available during the experimental period for lambs, lambs were weighed every two weeks in the morning before nutrition and drinking during the empirical period (120 days).

3. Digestibility trial

A nine of mature rams with 48 kg average LBW were used in digestion trails as a Latin square design (3x3), three animals for each treatment. Each animal was fed one of the pervious treatments. Each trail continued for 21 days, the first 14 days as preliminary period and seven days as treated period. Feeds were offered twice daily into two equal quantities at 9:00 am and 4:0 pm, water and block minerals and vitamins were freely available for rams. Faeces and urine were collected and weighted daily, then 10% fecal residual were taken for dehydration at 60^{o} C for 24 hours. Dried sample were for analysis. Also 10 ml of acidified urine daily were also taken, and subsamples were taken for urine analysis.

4. Economical evaluation

Economical valuation for the tested rations was calculated assuming that the price of one kg LBW of the lambs was 150 Egyptian Pound (LE), the price of one kg dry matter intake from CFM was 9.70, 9.64 and 9.64 for T1, T2 and T3 while for roughage DMI was 0.62, 0.59 and 0.62 LE for T1, T2 and T3 respectively. But prices of total gain were 2937, 3225 and 3252 LE for T1, T2 and T3 respectively. The trail was terminated when lambs achieved marketable weight (45-50 LBwt).

5. Blood Samples

On the last day of the experiment blood samples were taken before and 3 hours after morning nutrition. Every sample was withdrawn from the jugular vein into heparinized tube, sample was then centrifuged at 3000 rpm/10 min to separate blood was kept in a dried clean glazier and stocked at -18°c until analysis.

Biochemical analysis of blood Plasma

Plasma glucose (g/dl) was determined calorimetrically according to Siest *et al*. (1981), total protein (g/dl) was determined as described by Armstrong and Carr, (1964), also albumin (g/dl) was determined as described by Doumas *et al*., (1971), globulin (g/dl) was calculated by subset action while A/G ratio was calculated, urea (mg/dl) was determined by the method of Curtius and Marce, (1972), alanine aminotransferase (ALT) (units/dl) of plasma and aspartate aminotransferase (AST) as (units/dl) of plasma were determined calorimetrically according to Reitman and Frankel (1957), Also cholesterol and triglyceride were determined according to Young, (2001).

6. Laboratory Analysis

Analysis of ration, faeces and urine-N samples were run out as with A.O.A.C. (1999).

7. **Statistical Analysis**

Statistical analysis was run out using one-way ANOVA. Data were expressed as mean ± SE. The general linear model was carried out to test the differences among the three feed test. P-values less than 0.05 were deemed to be statistically significant (SAS Institute, 2003). Duncan's test was used to research the significance grade among means (Duncan's, 1955).

Analytical analysis was calculated using the following equation.

$$Yij = \mu + Ti + Eij$$

Where:

Yij = Experiment observations; μ = the overall mean; Ti = the effect of dietary treatment; i= 1= Control, 2=CFM+0.3% ureated SBLS; 3=CFM+0.6% ureated SBLS; Eij = The experimental error.

Results and Discussion

1. Chemical Composition

Approximate analysis (on dry matter basis) of the experimental rations is presented in Table (1). Data showed that CP content was higher in ureated SBL as compared with CFM (15.20 and 15.38 vs 14.08). While OM and NFE in CFM recorded higher values compared with ureated sugar beet leaves, (88.0 & 57.43% vs 69.70 & 37.6% vs 69.90 & 37.90%) respectively. But crude fiber was nearly the same among the experimental diets except for WS which recorded the highest value, (40%). The SBLS contains the highest ash % content compared with the CFM, (30.3 & 30.1% vs 11.99 %), it's quite accepted that leaves are manufacturers of plant nutrition and therefore contain high portions of CP and lesser portions of CF % in addition to 0.3 and 0.6 %, urea treated SBLS (Suliman., 2001). Although silage of SBLS is characterized by lower NFE and CP % which is due to the loss of energy in fermentation but higher CF % as a source of structural carbohydrate than CFM (MARSS, 1997). These results are within those shown by Suliman *et*

al., (2004). Higher Ash % of chopping ureated SBLS is characterized for SBL these findings are in accidence with those showed by Suliman *et al*., (2013).

Table 1. Chemical analysis of tested feed ingredients containing ureated sugar beet leaves fed to lambs.

Item	DM%	Chemical Composition of the ingredients on DM basis (%)						
		OM	CP	CF	EE	NFE	Ash	GE,MJ/kg
CFM	93	88.01	14	14.08	2.5	57.43	11.99	1.71
W.S	88.90	89.01	2.45	40	1.5	45.06	10.99	1.68
SBLS(0.3) U	28.09	69.70	15.2	14.70	2.2	37.6	30.3	1.38
SBLS (0.6) U	29.95	69.90	15.38	14.30	2.32	37.9	30.1	1.39
Rations								
T1		88.81	11.50	20	2.31	55	11.19	1.71
T2		84.76	14.45	14.3	2.36	53.65	15.24	1.65
T3		84.81	14.65	14.09	2.28	53.79	15.19	1.65

concentrate feed mixture (CFM) 38% wheat bran. 39% corn, 17% sun flower meal solvent extract, 3% molasses, 2% lime stone powder and 1% common salt, wheat straw (WS), Sugar beet leaves silage (SBLS) and urea (U).

2. Nutrients Digestibility

The digestibility coefficient of DM, OM, CP, CF, EE and NFE and feeding values as TDN, DCP, DE and ME are presented in Table (2). Highly significant ($p<0.0001$) differences in digestibility coefficients among experimental rations were recorded in all nutrients (DM, OM, CP, CF, EE and NFE). Control group (T1) exhibited the lowest values in all nutrients digestibility compared with ureated SBLS treatments (T2 and T3). However, T3 (0.6% ureated SBLS) recorded the best digestibility values in all nutrients (71.30, 77.10, 72.00, 68.50, 81.50 and 79.30% for DM, OM, CP, CE, EE and NFE respectively).

Table 2. Digestibility coefficients and feeding values for rams fed SBLS treated with different levels of urea

Items / Groups	Digestibility Coefficient (%)						Feeding Values			
	DM	OM	CP	CF	EE	NFE	TDN kg	DCP gm	DE kcal	ME kcal
T 1	61.70^{c}	69.20^{c}	60.50^{c}	59.50^{c}	73.50^{c}	67.40^{c}	59.8^{c}	8.3^{c}	1167.54^{c}	957.385^{c}
T 2	69.38^{b}	75.20^{b}	68.77^{b}	64.01^{b}	78.10^{b}	74.48^{b}	63.19^{b}	9.81^{b}	1214.48^{b}	995.874^{b}
T 3	71.30^{a}	77.10^{a}	72.00^{a}	68.50^{a}	81.50^{a}	79.30^{a}	67.02^{a}	10.5^{a}	1245.17^{a}	1021.04^{a}
MSE	0.38	0.21	0.24	0.53	0.63	0.56	0.45	0.19	3.40	2.79
P-Value	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

a, b and c means demounted with the same column with different superscripts are significantly differ at p<0,001.

The intermediate values shown by the T2 showed better digestibility than the control. Digestion coefficients of all nutrients were increased significantly ($p<0.001$) by increasing urea level, this may be due to the addition of molasses which improved palatability and increased digestibility coefficient as well as minerals additives will make silage more nutritionally complete (Weiss and Underwood, 2009). The addition of urea and ammonia can improve the aerobic stability of silage (McDonald *et al*., 1991 and Glewen and Young, 1982). These

results are an agreement with the finding reported by Suliman *et al*. (2004); Derazet (2016) and Suliman *et al*. (2013).

3. Nutritive Values

Data of nutritive values presented in Table (2) recorded the same trend of nutrient digestibility, differences among treatments were highly significant (p <0.0001), so as TDN, DCP, DE and ME, which mainly related to the increase in digestibility of CP and other nutrients Suliman *et al*., (2004) and Abd-EL-Baki *et al*., (1997). Results obtained from this study in nutritive values so as TDN, DCP, DE and ME can be explained in light of proximity chemical analysis, portions of silage intake to CFM and digestibility (Tables 1 and 2). These findings are with those reported by Ahmed *et al*. (2003); Suliman *et al*. (2004); Gaafer *et al*. (2011) and Suliman *et al*, (2016).

4. Nitrogen Retention

Data of total nitrogen intake (TNI), faecal nitrogen (FN), urinary nitrogen (UN), total nitrogen excretion (TNE), nitrogen absorbed (NAB), nitrogen retention (NR), NB/NAB and NB/TNI are presented in Table (3).

Table 3. Nitrogen retention, nitrogen absorbed for rams fed on SBLS treated with different

Items / Groups	TNI	FN	UN	TNE	NAR	NR	NR/NAR%	NR/TNI%
T 1	22.00^{b}	6.10^{c}	3.37^{b}	9.47^{c}	15.90^{c}	12.53^{b}	78.79	56.97^{a}
T 2	28.30^{a}	7.90^{b}	4.57^{a}	12.47^{b}	20.40^{a}	15.83^{a}	77.54	55.92^{a}
T 3	28.50^{a}	9.95^{a}	3.90^{b}	13.85^{a}	18.55^{b}	14.65^{a}	78.93	51.37^{b}
MSE	0.29	0.25	0.17	0.31	0.34	0.43	1.12	1.34
P-Value	<.0001	<.0001	<.0024	<.0001	<.0001	<.0018	0.6472	<.0408

a, b and c means demounted with the same column with different superscripts are significantly differ at p<0,001.

The differences among treatments were highly significant (P<0.001) in all previous traits except NR/NA. The figures of TNI, FN, UN, TNE, NR, NA and NB/TNI were lowest in control group (T1) than other treatments (T2 and T3). However, treatment T2 (0.3% urea SBLS) recorded the intermediate values, while treatment (T3) showed higher figures for the previous traits compared with T1 and T2 the valve of NR was higher for T2 (15.831 N/day) but T3 showed less values (14.65N/day). Nitrogen absorbed (NAR) and nitrogen retention (NR) results are related to digestible crude protein (DCP) (Table 2). Crude protein of ureated sugar beet leaves silages (0.3% and 0.6% urea) DM SBLS, was more efficiently utilized than the control ration. These results may be attributed to more efficient utilization of non-protein nitrogenous (NPN) and microbial protein (Tables 1 and 2). These results are in accordance with the findings of Ghanem *et al*., (2000); Suliman *et al*., (2004); Suliman *et al*., (2013) and Deraz *et al.,* (2016).

5. Feeding Trial

Average daily gain

Data presented in (Table 4) showed highly significant ($p<0.001$) differences among experimental groups in final body weight (FBW kg), total gain (TG kg) and daily gain (DG kg). Diets contained ureated SBLS (T3 and T2) recorded significant ($p <0.001$) higher values for FBW, TG and DG compared with control diets (T1), the figures were 43.2, 22.2/kg and 0.185 kg for T3 and 42.20, 21.5 kg and 0.179 kg for T2 vs 40.08, 19.58 kg and 0.163 kg for T1 respectively.

Table 4. Performance and feed efficiency for lambs fed on SBLS treated with different levels of urea

Items / Groups	IBW/kg	FBW/kg	TG/kg	DG/kg	Feed Consumption/ kg			feed efficiency (kg/kg gain)		
					DM	TDN	DCP	DM	TDN	DCP
T 1	20.5	40.08^{b}	19.58^{c}	0.163^{c}	135.43^{a}	80.99^{c}	11.24^{c}	6.92^{a}	4.14^{a}	0.57409
T 2	20.7	42.20^{a}	21.5^{b}	0.179^{b}	124.5^{b}	81.59^{b}	12.2^{b}	5.79^{b}	3.80^{b}	0.56746
T 3	21	43.2^{a}	22.2^{a}	0.185^{a}	121.2^{c}	82.43^{a}	12.73^{a}	5.46^{c}	3.71^{c}	0.57353
MSE	0.29	0.32	0.09	0.001	0.00	0.00	0.00	0.03	0.02	0.002
P-Value	0.5040	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.1911

a, b and c means demounted with the same column with different superscripts are significantly differ at p<0,001, initial body weight (IBW kg), final body weight (FBW kg), total gain (TG kg) and daily gain (DG kg).

These results may be due to the integration between the ingredients of diets as CFM + SBLS with 0.3% or 0.6% urea DM SBLS plus 5% molasses + 1.5% lime stone and 1% minerals and subsequently palatability and intake which improve digestibility, nutritive value, intake of TDN, DCP, DE and ME, and more efficient of fermentation production of volatile fatty acids, and microbial endproduct. These results are in accordance with those findings reported by El-Nahas *et al*., (2009); Suliman *et al*., (2004) and Suliman *et al*., (2013). There is a positive relationship among silage protein solubility and body gain (Charmeley, 200l).

Feed intake and feed conversion ratio

Data of feed intake and feed efficiency or feed conversion ratio are found in Table 4. Highly significant differences ($p<0.001$) were noticed between treatments concerning feed intake as DM, TDN and DCP. Lambs fed T2 and T3 consumed lower DM intake than those fed control ration (T1), by about 8% and 12% respectively. Also, lambs fed control ration (T1), control group (T1) consumed a lower quantity of TDN & DCP kg (80.99 and 11.24 kg) (81.59& 12.20 for T2 and 82.43& 12.73 for T3 respectively). These results are in agreement with those observed by Suliman *et al*., (2004) and Gaafar *et al*., (2011) who showed that DCP intake increased ($p>0.05$) with increasing ureated SBLS in the rations.

Data of feed conversion expressed as kg DM, TDN and DCP/kg gain are presented in (Table 4). Highly significant differences ($P<0.001$) were detected among treatments except for DCP which were not significant ($P>0.05$). Therefore, lambs fed rations containing ureated SBLS (0.3 % and 0.6 % DM SBLS) recorded

the best conversion as compared with the control. These results exhibited that feed consumption was the effective factor affecting feed conversion. Also, when gain was high for lamb fed ureated SBLS it could be attributed to feed conversion. These results can be explained in light of approximate chemical analysis, higher digestibility, nutritive value and intake as DM, TDN and DCP. The improvement of daily gain could be attributed to (1) more efficient utilization of rumen fermentation products volatile fatty acids, NH3 and microbial protein (El-Bedawy, 1994), therefore lambs received CFM+ ureated SBLS *ad libitum* recorded highest (P<0.001) FBW, total gain kg and daily gain gm compared with those received control treatment T1. These results were in accordance with the finding by Suliman *et al*., (2004); Suliman *et al*., (2013); Suliman *et al*., (2016) and Rustion *et al*., (2023), and /or (2) reeducate of oxalate content as reported by Abd El Tawab, *et al*., (2017) who mentioned that nutrients digestibility and nutritive values for treated sugar beet leaves silage were enhanced due to the reduction of oxalate contents which exposed to degradation by microbiological treatment for SBLS and inversing in rumen microorganism activity.

6. Economical Efficiency

The economic efficiency of the study values is illustrated in Table (5). The higher cost of feeding was recorded by T1 was, due to the price of CFM and WS (Table 5). The figures were 1389.75 LE for T1 compared with those fed ureated SBLS T2 & T3 being 1272.04 and 1244.24 LE, respectively. The higher daily gain is achieved by using rations containing ureated SBLS. DM intake for T2 and T3 was lower than that of T1 because silage contain high level of moisture (Table 1). Also, the return was improved due to the low cost of silage as compared with WS.

Table 5. Economic efficiency of the experimental treatments

Items	Experimental treatments		
	T1	T2	T3
Total DMI kg	135.43	124.5	121.2
Coast of CFM intake, LE	1314.75	1201.04	1169.50
Coast of rough, LE	75	71	74.75
Total feed coast (B)	1389.75	1272.04	1244.24
Total gain (k)	19.50	21.50	21.68
Price of kg gain, LE	150	150	150
Price of total gain (A)	2937	3225	3252
Return of gain, LE	1547.25	1952.96	2007.75
Economic efficiency % Y = A – B / B	111.33	153.53	161.36

dry matter intake (DMI), concentrate feed mixture (CFM), Egyptian Pound (LE).

Consequently, better return back by LE as recoded by lambs fed ureated SBLS 1952.96 T2 and 2007.5 LE T3 vs 1547.25 LE for control diet (T1). These results are in agreement with the findings reported by Suliman *et al*., (2004); Sulinan *et al*. (2016) and Deraz *et al*. (2016). Similar trend was observed by Suliman and MarZouk, (2006). Also, Soliman *et al*., (2007), Mousa, (2011) and Rustam *et al*., (2023) found that best economic efficiency was recorded for lambs fed on ureated corn feed silage than that of control one.

7. Bio Chemical Constituents of Blood

Results in Table (6) indicated that highly significant difference (P<0.00l) among treatments in some traits such as Glucose (Gl), total protein (TP), triiodothyronine (T3) and thyroxine (T4) While the other traits such as Albumin (AL), Globulin (GL), urea (Ur), cholesterol (Ch), triglyceride (Tr), alanine aminotransferase (ALT) and aspartate aminotransferase (AST) were not different significant by (p>0.05).

Results in Table (6) illustrate that ureated SBLS had a significant influence on glucose (g/dl) concentration compared with control (CFM+WS) and may be relevant to the negative impact of oxalate on sheep. The figures were 94.00 and 96.67 g/dL for T2 & T3 vs 81.00 g/dl for T1. This amelioration in glucose concentration with ureated SBLS may be due to the parallel evolution in TVFA's of rumen fluids as reported by Khalif, (1999) and Abd El Tawab *et al*., (2017), who found a positive connection between ruminal TVFA's and Glucose concentricity (g/dL).

Table 6. Blood constitutes for lambs fed SBLS treated with different levels of urea.

Items / Groups	Gl	TP	Al	Gb	Ur	Ch	Tr	ALT	AST	T3	T4
T 1	81.00^{b}	6.73^{b}	3.50^{b}	3.23	38.67	78.00	116.33	20.67	104.67	116.67^{c}	5.5^{c}
T 2	94.00^{a}	7.80^{a}	4.07^{a}	3.73	38.33	78.67	113.33	20.33	104.67	155.8^{b}	7.3^{b}
T 3	96.67^{a}	8.10^{a}	4.07^{a}	4.03	39.00	77.33	114.00	20.67	102.33	167.27^{a}	8.23^{a}
MSE	1.38	0.16	0.15	0.22	1.16	1.29	1.87	1.26	9.44	1.87	0.12
P-Value	0.0007	0.003	0.065	0.159	0.925	0.783	0.558	0.978	0.980	<.0001	<.0001

a, b and c means denoted within the same column with different superscripts are significantly differ at p<0,001, Glucose (Gl), total protein (TP), Albumin (AL), Globulin (GL), urea (Ur), cholesterol (Ch), triglyceride (Tr), alanine aminotransferase (ALT), aspartate aminotransferase (AST), triiodothyronine (T3) and thyroxine (T4).

The same trend was observed in total protein concentration (g/dL), the differences among treatments were significant (p<0.003). The increase of total protein concentration in blood plasma by increasing ureated sugar beet leaves. (T2 and T3) compared with T1 may be related to the enhancement in metabolic process particularly digestible crude protein and nutritive value (Table 2) and higher energy intake for ureated SBLS, than control group consequently the higher microbial protein mas which raised ruminant TPN concentration, which leads to more absorbed amino acids by papilla's in small intestine to blood stream (Mansour and Al-Zahar, 2018) and (Bendary *et al*., 2000).

Albumin (AL), Globulin (Gb) and urea (Ur) concentrations were mat (Table 6) significant (P>0.05) difference were detected among treatments, the figures, were 4.07 & 4.07 vs 3.5 g/dL for AL, trait, 3.73& 4.03 vs 3.23 g/dL respectively for Gb trait while urea were 38.33 & 39.00 38.67 g/dL res. The increase in concentrations for T2 and T3 vs T1 may be related to increased oxalate contents in diet (Oke, 1969; McIntosh, 1972 and El-Bassiony, 2013). Nevertheless, all values of blood constituents are at the normal level.

Data in Table (6) showed also no significant (P>0.05) difference amidst groups and the values were within the normal range for blood plasma cholesterol & triglyceride. while liver function as alanine aminotransferase (ALT) and aspartate aminotransferase (AST) enzymes. The thyroid gland which excreted the triiodothyronine and thyroxine hormone may be affected by increasing urea levels in SBLS as 0,3% and 0.6% urea, therefore blood plasma hormones increased compared with those fed CFM +WS which recorded the lower values of blood plasma hormones. The differences among treatments were highly significant (p <0.001). These finding may be explained in light of higher purloin digestion and high energy consumed which led to higher microbial synthesis an which protein represented 85% of total protein mass achieved by glandular stomach then enhance ruminal TPN concentration which led to more soak up amino acids from small intestine. Also growing in serum glucose which may be due to higher NFE content, low fiber content and to the parallel augmentation in nutrients digestion and nutritive values as TDN & DCP for ration containing ureated sugar beet laves silage (Eriksson, 2003 and Mansour and AL-Zahar, 2018).

Conclusion and Recommendations

Can be concluded that ureated SBLS improves silage quality which affects digestibility coefficient nutritive values, nitrogen retention, total gain, daily gain, feed consumption, feed efficiency and economic efficiency. As will a lower feed cost, higher revenue and better economic efficiency, better biochemical constituents of blood which enhance animal performance without any adverse effect on lambs' health, therefore it can be recommended that chapped silage treated with 0.3% and 0.6% can be useful for sheep.

References

A.O.A.C. (1999). Association of Official Analytical Chemists. Official Methods of Analysis, 16th Ed. Published by the A.O.A.C. International Gaithersburg, MD., p. 111.

Abd-EL-Baki, S. M., Ghanem, H. M., EL-Gendy, K. M., Rammah, A. M., Matter, Badr. B. and Moawd, R.I. (1997). Nutrition studies on some green forage in Egypt. Digestibility and nutritive values of sudan grass sorghum hybrid-102, Pearl millet and teostinte as local varicties. J. Agric. Sci. Mansoura Univ., 22: 1057- 064.

Abdel-Magid, El-Badawi, A.Y., Ibrahim, M., Awadalla, M., Mohamed, I., and Mona, S.Z. (2013). Nutritional impact for the whole replacement of concentrate feed mixture by dried sugar beet pulp on growth performance and carcass characteristics of Ossimi sheep. Life Sci. J., 10, 1987-1999.

Abd El Tawab, A. M., Hassan, A. A., Khattab, M. S. A., Matloup, O. H., Farahat, E. S. A., Khalel, M.S. Morsy, T.A. and Fouad, M.T. (2017). Productive performance of lactating Frisian cows fed sugar beet leaves silage treated with lactic acid bacteria. Int. J. Zool. Res., 13: 74-82.

Agriculture Economics (2015). Agriculture Economics, part 1 pull. By Agric. Res. Center, Ministry of Agriculture, Egypt.

Agriculture Economics (2022). Agriculture Economics, part 1 pull. By Agric. Res. Center, Ministry of Agriculture, Egypt.

Ahmed, B.M., Taie, H.T., Bendary, M.M. and Abd El-Lateif, K.F. (2003). Influence of dietary corn silage on digestibility, performance and economic efficiency of dairy cattle. Egyptian J. Nutr. and Feeds (Special Issue) 6: 587- 594.

Alhan, R. and Can, A. (2017). Determining effect of straw and inoculant addition on silage quality of sugar beet leaves silage. Bulg. J. Agric. Sci., 23: 639–643.

Armstrong, W.D. and Carr, C.W. (1964). Physiological chemistry; Directions, 3rd ed. p.75, Burges Publishing Co. Minneapolis, Minnesota.

Ashry, M.A., Motaghally, Z.A. and Maareck, Y.A. (2000). Effect of dried sugar beet pulp as a feedstuff for ruminants, Final Technical Report, National Research Center, Cairo, Egypt.

Bendary, M.M., El-Ayouty, S.A., Farrage, F.H.H., Mohiel-Din, A.M.A. and Khalil, F.F.M., (2000). Productive performance of lactating cows fed rations containing different forms of sugar beet tops and berseem silage. Proceedings of the Conference of Animal Production in the 21th Century, April 18-20, 2000, Sakha, Egypt, pp: 255-265.

Charmley (2001). Towards improved silage quality –Areview, Can. J. Anim. Sci., 81:157-168.

Curtius, H. Ch. and Marce, R., (1972). Clinical Biochemistry Principles and Methods, l l, P. 1132.

Denek, N., Can, A., Avci, M., Aksu, T. and Durmaz, H. (2011). The effect of molasses-based pre-fermented juice on the fermentation quality of first-cut lucerne silage. Grass and Forage Sci., 66: 243-250.

Deraz, T.A.A., Khir, A.A., Suliman, A.I.A., Abdel-Salam, O. and Elashhab, A.O., (2016). Feeding Sugar Beet Tops Silage For Sheep: 1 - In Summer. Egyptian J. Nutrition and Feeds, 19: 47-54.

Doumas, B., Wabson, W. and Biggs, H. (1971). Albumin standards and measurement of serum with bromocresol green. Clin. Chem. Acta, 31:87.

Duncan, D.B., (1955). Multiple rang and Multiple F test. Biometrics, 11:1-2.

El-Bassiony, M.F., (2013). Productive and reproductive responses of growing Shami goat kids to prolonged saline conditions in South Sinai. Ph.D. Thesis, Faculty of Agriculture, Cairo University, Giza, Egypt.

El-Bedawy, A. Y. (1994). Effect of dietary roughage levels on the lactation, performance of Egyptian goats. Egypt. J. Animal Prod., 31: 111-124.

El-Nahas, H.M., Shakweer, I.M.E., Gaafar, H.M.A., and Abou-Aiana, R.M. (2009). Productive performance and semen physical characteristics of Friesian calves fed different proportions of sugar beet tops and corn stover silages. Egyptian. J. Nutrition and Feeds, 12: Special Issue: 193-204.

Eriksson, T. (2003). Milk production from leguminous forage, roots and potatoes: Effects on microbial protein supply and nitrogen efficiency. Doctoral diss. Dept.of Animal Nutrition and Management, SLU. Acta Universitatis agriculturae Sueciae vol. 42.

Gaafaar, H.M.A., Abdel-Rouf, E.M., Bendary, M.M., Ghanem, G.H. and El-Rridy, K.F. (2011). Productive performance of lactating buffaloes fed ration containing sugar beet tops and corn silages. Iranian J. Applied Animal Science, 1: 117-123.

Ghanem, G.H.A., Amer, E.A., and EL-Zeer, F.A. (2000). Evaluation of using Maize Stover silage by sheep. Journal Agriculture Tanta University, 591:603.

Glewen, M.J., and Young, A.W. (1982). Effect of Ammoniation on the Refermentation of Corn Silage. Journal of Animal Sciences, 54:713-718.

Gunter, S.A., Galyean, M.I., and Malcolmcallis. K.J. (1998). Factors influencing the performance of lot steers limit–feed high concentrate diet. Prod. Anim. Sci., 12; 167-175.

Kenilworth and Warwickshire (2012). Silage Additives. Dairy Co. Agriculture and Horticulture Development Board, Stoneleigh Park.

Kholif, A.M. (1999). Effect of number and stage of lactation on blood serum parameters of lactating buffaloes. Egypt. J. Dairy Sci., 27: 37-52.

Mansour, A.M. and Al-Zahar, H. (2018). Feeding Fodder Beet Roots Suplemented With Urea For Lactating Buffalo. Egyptian J. Nutrition and Feeds (2018), 21: 1-13.

MARSS (1997). Ministry of Agriculture and Reclaimed Sand Soil; Agriculture Research Center; Animal Production Research Institute. Book of Application and Scientific Animal Nutrition, 1st Edition, 1997.

McDonald, P., Henderson, A.R., and Heron, S.J.E., (1991). The Biochemistry of Silage. 2nd Edition. Chalcombe Publi- cations, Marlow, Bucks.

McIntosh, G.H., (1972). Chronic oxalate poisoning in sheep. Aust. Vet. J., 48: 535-535.

Mousa, M.R.M. (2011). Effect of partial replacement of dietary concentrate feed mixture by fodder beet roots on productive performance of ewes and doe goats under the conditions of North Sinai. Asian J. Anim. Sci., 5: 228-242. https://doi.org/10.3923/ajas.2011.228.242.

Oke, D.L. (1969). Oxalic acid in plants and nutrition. World. Rev.Nutr. Diet., 10: 262-302.

Papadomichelakis, G., Fegeros, K., and Papadopoulos, G. (2004). Digestibility and nutritive value of sugar beet pulp, soybean hulls, wheat bran and citrus pulp in rabbits. Epitheorese Zootehnikes Epistemes., 32: 15- 27.

Reitman, S. and Frankel, S. (1957). Calorimetric method for the determination of serum glutamic- oxaloaceticandglutamic-pyruvatetranseaminase. An.Cin.Path.28:56.

Rustam, S.A., Afridi. S.S., Malik, M.I., Ullah, S., Shah, S.M.K., Ramzan, F., Khan, A., Din, I., Wasimullah and Raza, H.A. (2023). Effects of urea treated sugar beet (Beta vulgaris) pulp feeding on weight gain of Bulkhi sheep. Punjab Univ. J. Zool., 38(1): 75-80. https://dx.doi.org/10.17582/journal. pujz/2023.38.1.75.80.

SAS Institute, (2003). SAS Users Guide. Version 9.1 SAS Institute Inc., carry, NC.

Siest, G., Henny, J., and Schiele, F. (1981). Interpretation des exams de labortoire. Karger ed.206.

Soliman, A. A., Suliman, A.I.A., and Biomy, A.A. (2007). Productive performance of growing lambs fed on ureated silage and concentrate. J. of Agric. Sci. Mansoura Univ., 32: 5213 -5223.

Springer (2012). The ancestor of all the cultivated beets. The wild plant, growing mainly on the shore of the Mediterranean Sea, remains very important as source of useful traits for beet breeding. ISBN, 978- 1-4614-0841-3.

Suliman, A.I.A. (2001). Studies on using some green forage in sheep feeding. Ph.D. Sci., Fac. Agric. Anim. Prod. Dept. Minia Univ.

Suliman, A.I.A., Moustafa, S.M.S., and Marzouk, K.M., (2004). Effect of feeding silage of berseem mixed with some agriculture by-products on digestibility and performance of sheep. Minia J. Agric. Res. & Development, 24: 737–752.

Suliman, A. I. A. and Marzouk, K. M. (2006). Nutritional value and economic efficiency of whole maize silage for fattening lambs and carcass Characteristics. J. Agric. Sci. Mansoura Univ., 31: 6207-6215.

Suliman, A.I.A., Baiomy, A.A., and Awad-Allha, M.A.A. (2013). Productive performance of growing lambs fed silages of sugar cane tops, sugar beet leaves and green maize stem. Egypt. J. Anim. Prod. 50: 59-67.

Suliman, A.I.A., Azza M.M. Badr and Ebtehag, I.M. (2016). Performance of Lambs Fed on Biologically Treated Silages. International Journal of ChemTech Research, 9, pp 151 160.

Talha, M.H., Mourad, R.I., Zaza, G.H. and Ragheb, E.E. (2002). Effect of partial substitution of corn grains by dried sugar beet pulp in growing lambs rations on their productive performance. J. Agric. Sci. Mansoura Univ., 27: 5193–5199. https://doi. org/10.21608/jappmu.256756.

Weiss, B. and Underwood, J. (2009). Silage Additives. Ohio State University Extension Department of Horticulture and Crop Science, Columbus.

Young, D.S. (2001). Effects of disease on clinical lab. Tests,4th ed.

بعض الدراسات الغذائية على استخدام أوراق بنجر السكر المعاملة باليوريا وتأثيرها على أداء الأغنام

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الملخص

اجري هذا البحث لدراسة التركيب الكيميائي والهضم وميزان الازوت والنمو والكفاءة الاقتصادية ومكونات الدم والمرتبطة بالمستويات المختلفة لليوريا المضافة بمستوي 0.3 %، 0.6 % يوريا في سيلاج أوراق بنجر السكر بالإضافة إلى العلف المركز مع تبن القمح، 18 ذكر فرافرة بمتوسط وزن 20.73 ± 0.29 كجم عمر 6 شهور

استخدمت في تجربة نمو غذيت كالاتي

T1= علف مركز+ تبن القمح، T2 = علف مركز + سيلاج معامل باليوريا 0.3 % مقطع حتى الشبع و T3= علف مركز + سيلاج معامل باليوريا 0.6 % مقطع حتى الشبع.

سجل الكنترول اقل مستوي مقارنة بباقي المعاملات لمعاملات الهضم في جميع العناصر الغذائية والقيمة الغذائية مقارنة بالعلائق المختبرة والتي ازداد معنويا عند (0.0001) للعلائق المحتوية علي يوريا والأغذية المحتوي على يوريا أظهرت معنوية عالية عند (0.001) للنتروجين المحتجز مقارنة بالكنترول.

كان معدل الزيادة اليومية مرتفعة معنويا (0.001) في معاملات المختبرة مقارنة بالكنترول وكانت نتائج الغذاء المستهلك والقيمة الغذائية والكفاءة التحويلية اقل معنويا (0.001) في المعاملات مقارنة بالكنترول. الحملان المغذة على المعاملة الثانية والثالثة أوضحت أفضل كفاءة تحويلية مقارنته بالكنترول. وبالتالي الحملان المغذة على السيلاج المعامل باليوريا سجلت اقل تكلفة اقتصادية مقارنة بالكنترول. إما نتائج مكونات الدم كانت معنوية في الجلوكوز والبروتين الكلي وهرمونات الغدة الدرقية في المعاملات مقارنة بالكنترول عند (0.001) بينما باقي مكونات الدم الالبيومين والجلوبيولين واليوريا والكلوليسترول والدهون الثلاثية وانزيمات الكبد لا توجد فيهم معنوية.

***الكلمات المفتاحية**: الأداء الإنتاجي، معاملات الهضم ، القيمة الغذائية ، اوراق بنجر السكر ، السيلاج .*