



RESPONSE OF LOCAL KARADI LAMBS FOR FEEDING BY ADDING MOLASSES AND DATE TO UREA TREATED STRAW

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Abstract

This experiment was conducted to study the response of local lambs for feeding by adding molasses and dates to urea treated straw on its daily intake, live weight gain and feed conversion ratio, by using twelve individually penned intact local male lambs, with initial weight (25.61 ± 2.51) kg and 6-7 months old assigned to three treatments. The results indicated significant ($P < 0.05$) enhance of (FCR) of group lambs fed urea date treated straw, the results also indicated significant ($P < 0.05$) increasing of roughage feed intake of group lambs fed urea treated straw and group of lambs feed urea date treated straw for all nutrients (DM, OM, Ash, EE, CF, NFE and ME) than lambs feed urea molasses treated straw except CP was not significant difference between treatments however total intake (concentrate + roughage) was similar between all treatments in all nutrients (DM, OM, Ash, EE, Cp, NFE and ME) except CF was significantly difference ($P < 0.05$) between treatments lambs group were feed urea treated straw and group lambs feed urea date treated straw was higher than lambs group feed urea molasses treated straw.

Keywords: Urea, Molasses, date, Wheat Straw, Lambs

Introduction

The deficiency of roughage feed especially green roughage during summer season and winter led farmer to use his crops by product in ruminant nutrition but it has low quality and it doesn't satisfy animal's requirements because of low nutritive value and digestibility because of lignin bounded with cellulose and hemicellulose and of microorganism in the rumen will not digest and utilize the nutrients (Hassan and Mohamad, 2012). Straw is the main agriculture by which product that usually stored for use as ruminant nutrition in Kurdistan region, Iraq. However, it has low nutritive value and low protein content, fiber digestibility, vitamin and mineral (Akinfemi, 2010). Many studies have been conducted with efforts towards a attaining most of the potential nutritive value of this abundant agriculture by product (Sheikh *et al.*, 2017). Deferent treatment methods have been used to enhance nutritive value of straw including physical, biological and chemical treatment (Wanapat *et al.*, 1996). Also, urea treatment is a conventional technique for improving the quality of straw to increasing nitrogen content (Shen and Ni, 1998; Sheikh *et al.*, 2014), digestibility (Trach *et al.*, 2001). Use of molasses to improve palatability and energy content for ruminal micro flora for better utilization of ammonia nitrogen for protein synthesis, so using a mixture of urea and molasses has the advantage ammonium or ammonium carbonate and treatment time (Shekh *et al.*, 2017). Many study indicated that using molasses with urea together led to increase intake of low quality roughage (Freeman *et al.*, 1992). By enhancing microorganisms efficiency (Qrskov, 1992). And unsuitable scrap date for human use can be used in the treatment of straw, such as molasses, and it is even better in nutritional value, as compared with molasses it contains all of its nutritional contents, and it has been tested by sheep owners in the Kurdistan Region, and observed an improvement in animal performance. The aim of this research is to investigate the use of urea treated straw, urea-molasses treated straw and

urea-date treated straw on lamb's intake, body weight gain and feed conversion ratio.

Materials and Methods

Study Area: This study was conducted at the animal farm in Grdarash, Department of Animal Resources, College of Agriculture Engineering Sciences, Salahaddin University, Erbil, Iraq.

Animals and Management: This study was used twelve male of local lambs with the initial weight of (25.61 ± 2.51) kg and 6-7 months old were randomly assigned to three treatments, each treatment involves four lambs. The Lambs were numbered and housed on a concrete floor in individual pens ($1.5 \times 1 \times 1$) meter for two weeks to adapt the environment and diet were gradually introduced to the lambs during this period and to determine the health status during this time; the animals were treated for internal and external parasites and vaccinated against common diseases before the actual commencement of kept the experiment. Growth trail were 85 days, concentrated was fed at 2.5% of live body weight.

Feeds and diets: All animals were individually housed in separate pens and fed twice a day (morning and evening). Feed offered was weighed and recorded daily during experimental period to estimate daily intake, lambs were weighted weekly, at the morning before feeding at the same time throughout the experiment. Amount of the diet offered was adjusted weekly according to live body weight; all treatments were fed the same concentrate ration mixture which include barley, soy bean, wheat bran, yellow corn and mineral and salt (Table 1). But the difference were in roughage feed intake that include three different treated straw first group of lamb (T1) fed on urea treated straw +basal diet (2.5% of body weight concentrate), second group (T2) fed on urea-molasses treated straw+ basal diet (2.5% of body weight concentrate), third group (T3) fed on urea-date treated straw + basal diet(2.5% of body weight concentrate), treated straw was offered ad libitum in all treatments ,and daily offered

straw and refusal was weighted to calculate daily intake. Drinking water was freely available to the animals.

Table 1 : Ingredients of concentrate diet %.

Ingredient	%
barley	60
soy bean	15
wheat bran	14
corn	10
mineral and salt	1

Preparation of wheat straw treatments

Wheat straw was obtained from experimental field in Grdarash, College of Agriculture Engineering Science, Salahaddin University, Erbil, Iraq. To prepare urea treated wheat straw 5 kg of urea was used for 100 liters of water to make a solution and urea-water solution was used to treat 100 kg of wheat straw as fed bases (4.85% urea as dry matter) and blended very well until the urea disappeared from the solution this solution was uniformly distributed and thoroughly mixed with wheat straw. The treated straw was well compacted then covered by using a plastic sheet and placing stone on the top to make it airtight, It remained for three weeks as incubation period ,then opened to drying and evaporate ammonia and saved to feeding experimental lambs (Muhammad, 2006; Hassan and Muhamad, 2009).

To prepare urea-molasses treated wheat straw, 5 kg of urea were added to 100 liters of water and mixed very well, then 13.85 liter of molasses (sugar beet molasses) was added into urea solution being excited until the molasses and the urea solution was mixed up (Zaman, 1994). This solution was uniformly distributed and thoroughly mixed with wheat straw. The treated straw was well compacted then covered by using a plastic sheet and placing stone on the top to make it airtight, then it was remained for three weeks as incubation period (NRC, 1985). Then opened to dry and evaporate ammonia before feeding to the experimental lambs. Also to prepare urea-date treated wheat straw, 5 kg of urea were added to 100 liters of water and 6.92% of date was added into urea solution and mixed up well (Zaman, 1994). This solution was uniformly distributed and thoroughly mixed with wheat straw and incubated as other two treatments (NRC, 1985).

Chemical analysis

Sample of each feedstuff, ration and treated straw was dried in a forced-draught oven set at 60°C for 48 h, ground to pass 1 mm screen using a Willey mill and stored for pending chemical analysis. Standard methods as described in AOAC (2000) were used for the determination of dry matter (DM), organic matter (OM) and ash. Crude protein was assayed by the Kjeldahl method. Ether extract were assayed by Soxhlet method. Nitrogen free extract (NFE) and Metabolizable Energy (ME) were founded by calculation (Table 2).

Table 2 : Chemical composition of ingredients, concentrate, urea treated straw, urea molasses treated straw, urea date treated straw during the experimental period (on DM basis).

Ingredients	DM%	Ash%	OM%	Fat%	CF%	CP%	NFE%	*ME MJ/Kg DM
concentrate	97.541	3.670	96.330	3.418	7.000	17.850	68.062	13.080
wheat bran	95.915	4.704	95.296	4.943	11.300	11.413	67.640	12.936
soy bean	96.853	6.453	93.547	2.216	4.300	43.058	43.973	12.225
Barley	96.502	3.009	96.991	3.311	7.300	9.450	76.931	13.296
corn	96.173	1.621	98.379	5.928	2.000	9.064	81.388	14.419
urea treated straw	96.463	11.600	88.400	2.692	46.400	7.118	32.190	8.515
Urea molasses treated straw	98.043	10.860	89.140	2.899	43.100	9.975	33.166	8.894
Urea date treated straw	97.985	9.577	90.423	3.480	45.000	9.990	31.953	9.001

*ME (MJ/Kg DM) = 0.012 C.P + 0.031 E.E + 0.005 C.F + 0.014 NFE (MAFF, 1975)

Statistical analysis: Data in this study were analyzed by using a model for completely randomized design (CRD) using statistical package for the social sciences (SPSS) procedure. And treatment means were compared using Duncan's multiple range tests (Steel and Torrie, 1980).

Results and Discussion

All lambs completed the experiment and no health problem was found. Chemical compositions of feeds are in table 2. showed that urea date treated straw contained higher OM%, EE%, CP%, ME than urea treated straw and urea molasses treated straw ,may be due to content of this compositions in date as compared with molasses but the higher DM % and NFE% were in urea molasses treated straw and the Ash% was higher in urea treated straw. Initial, final body weight, total weight gain (kg), daily weight gain (gm/day/lambs) and feed conversion ratio are presented in table 3. Lambs fed with all dietary treatments did not showed significant differences between treatments in initial weight, final weight total weight gain and daily weight gain, total weight gain was (4.8, 4.7 and 11.16) kg and reflected that on daily weight gain (56.47, 56.07 and 131.37) gm./day/head of

T1, T2 and T3 respectively the difference did not reach the level of statistical significance ($P < 0.05$), but this difference could be indicative of enhance of chemical composition of straw after treated by urea and date. Because dates contain approximately 78.5% dry matter, 2.2% crude protein, 0.5% crude fat, 2.3% fiber, 72.9% carbohydrate and 1.9% ash, dates can supply 87% of the digestible energy provided by the same quantity of traditional feed grain (Al khateeb and Ali-Dinar, 2001). The positive effects of diets containing dates on the weight gain of animals must be attributed to the presence of growth-promoting compounds in dates (Ismail, 2000) and better efficiency utilization for energy and protein releasing to good synchronization between energy release (VFA) and protein degradation (NH₃-N) in the rumen than more microbial protein yield (Al-Jassim, 1996).

Feed conversion ratio was significantly ($P < 0.05$) differences between treatments it was (16.92, 13.60 and 4.91) for T1, T2 and T3 respectively ,T3 that fed on urea date treated straw was better significantly ($P < 0.05$) than T1 (urea treated straw) however there were no significant difference between T2 and T3 ,also no significant differences were found between T1 and T2.

Effect of urea treated straw, urea molasses treated straw and urea date treated straw on nutrient intake of roughage was shown in table 4. and there were significant differences between treatments whereas lambs were fed urea treated straw showed significant ($P < 0.05$) higher intake of all nutrient (DM, OM, Ash, EE, CF, NFE and ME mj) than lambs feed urea molasses treated straw except CP. was not significant difference between treatments. may be due The urea chemically break the ester bonds between hemicelluloses, cellulose and lignin and physically make structural fibers swollen, enable rumen microbes to attack the structural carbohydrates more easily and higher intake (Wanapat *et al.*, 2009).

However there was no significant difference between group lambs that fed on urea treated straw with group lambs feed on urea date treated straw. Also there was no significant difference between group lambs that fed on urea date treated straw with group lambs feed on urea molasses treated straw. The similar results were obtained in (Muhamad, 2006) study on urea treated and untreated straw with high and low degradable protein and sheep's were fed on urea treated straw

with high degradable protein or low degradable protein were higher intake than untreated straw.

Effect of urea treated straw, urea molasses treated straw and urea date treated straw on total (concentrate+ roughage) nutrient intake was shown in table 5. and there were no significant differences between treatments in all nutrients (DM, OM, Ash, EE, CP, NFE and ME mj) except CF was significantly difference ($P < 0.05$) between treatments it was (198.83, 127.21 and 156.10) gm/head/day of T1, T2 and T3 respectively lambs group were feed urea treated straw was higher than lambs group were feed urea molasses treated straw while was similar with lambs group were feed urea date treated straw and lambs group were feed urea molasses treated straw was similar with lambs group were feed urea date treated straw. this results disagreed with the result of (Abera *et al.*, 2018) which studied on sheep assigned to four treatments were: untreated maize stover with 300g concentrate mixture (CM), 4% urea treated maize stover with 300g CM, 4% urea- 10 lit/100kg molasses treated maize stover with 300g CM and 4% urea-10 lit/100kg molasses treated maize stover alone, the results showed total DM intake was higher for T2 and T3 than sheep fed T1 and T4.

Table 3 : Effect of urea treated straw, urea molasses treated straw ,urea date treated straw on initial weight, final weight, Total weight gain (kg), daily weight gain(gm /day/head) \pm SE and feed conversion ratio of lambs.

Intake	T1	T2	T3	P-value
Initial weight	26 \pm 5.033	25.166 \pm 5.629	25.666 \pm 4.333	NS
Final weight	30.8 \pm 4.194	29.933 \pm 4.537	36.833 \pm 2.088	NS
Total weight gain(kg)	4.800 \pm 8.50	4.766 \pm 1.105	11.166 \pm 3.609	NS
Daily weight gain(gm/day/head)	56.470 \pm 10.005	56.078 \pm 13.000	131.372 \pm 42.463	NS
*Feed conversion ratio(gm DM/gm weight gain)	16.436 \pm 4.236 ^a	13.601 \pm 2.266 ^{ab}	4.915 \pm 1.074 ^b	0.05

a, b Means in the same row with different superscripts differ significantly for treatment effect.

NS: no significant

T1: concentrate feed+ urea treated straw, T2: concentrate feed+ (urea molasses treated straw), T3: concentrate feed+ (urea date treated straw)

Table 4 : Effect of urea treated straw, urea molasses treated straw, and urea date treated straw on nutrients intake of roughage (gm/head/day) \pm SE.

Intake	T1	T2	T3	P-value
Dry matter	339.762 \pm 17.173 ^a	203.167 \pm 21.725 ^b	256.394 \pm 43.708 ^{ab}	0.05
Organic matter	300.351 \pm 15.181 ^a	181.102 \pm 19.366 ^b	231.838 \pm 39.522 ^{ab}	0.05
Ash intake	39.411 \pm 1.992 ^a	22.064 \pm 2.359 ^b	24.556 \pm 4.186 ^{ab}	0.05
Ether extract	9.146 \pm 0.462 ^a	5.888 \pm 0.629 ^b	8.922 \pm 1.520 ^{ab}	0.05
Crude fiber	157.650 \pm 7.968 ^a	87.565 \pm 9.364 ^b	115.377 \pm 19.668 ^{ab}	0.05
Crude protein	24.184 \pm 1.222	20.266 \pm 2.167	25.614 \pm 4.366	NS
Nitrogen free extract	109.371 \pm 5.528 ^a	67.382 \pm 7.205 ^b	81.924 \pm 13.966 ^{ab}	0.05
ME mj/kg DM	28.931 \pm 1.462 ^a	18.069 \pm 1.932 ^b	23.077 \pm 3.934 ^{ab}	0.05

a, b Means in the same row with different superscripts differ significantly for treatment effect.

NS: no significant

T1: concentrate feed+ urea treated straw, T2: concentrate feed+ (urea molasses treated straw), T3: concentrate feed+ (urea date treated straw)

Table 5 : Effect of urea treated straw, urea molasses treated straw and urea date treated straw on total nutrients intake (gm/head/day) \pm SE.

Intake	T1	T2	T3	P-value
Dry matter	928.147 \pm 104.364	762.761 \pm 105.947	645.508 \pm 213.516	NS
Organic matter	867.142 \pm 100.195	726.779 \pm 108.848	792.365 \pm 134.989	NS
Ash	61.005 \pm 4.379	42.853 \pm 4.093	45.911 \pm 7.730	NS
Ether extract	29.255 \pm 3.537	25.249 \pm 3.875	28.809 \pm 4.901	NS
Crude fiber	198.837 \pm 11.150 ^a	127.217 \pm 9.854 ^b	156.109 \pm 26.281 ^{ab}	0.05
Crude protein	129.211 \pm 18.247	121.380 \pm 20.541	129.480 \pm 22.230	NS
Nitrogen free extract	509.838 \pm 69.719	452.932 \pm 78.640	477.966 \pm 82.264	NS
MEmj/kg DM	105.894 \pm 13.473	92.164 \pm 14.954	99.189 \pm 16.977	NS

a, b Means in the same row with different superscripts differ significantly for treatment effect. NS: no significant

T1: concentrate feed+ urea treated straw, T2: concentrate feed+ (urea molasses treated straw), T3: concentrate feed+ (urea date treated straw)

Conclusion

The present finding supported that urea date treated straw with concentrate feed had appositive impact on daily weight gain and feed conversion ratio.

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