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Effect of Urea Treated Wheat Straw in a Pelleted Total Mixed Ration on Performance and Carcass Characteristics of Lori-Bakhtiari Ram Lambs

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Abstract: The study was carried out to investigate the effect of urea treated straw in a pelleted total mix ration on the carcass and growth characteristics of lambs, an experiment was conducted over sixteen Lori-Bakhtiari weaned lambs with average weight 37.51±0.62, divided into four groups (4 animals each) fed on different percents of treated straw in pelleted diet (0, 10, 20, 30 %) offered *adlibitum* for 75 days. Lambs were fed individually, weighted every 20 days after12-hours fasting. All lambs were slaughtered at the end of the trial. The carcass characteristics were recorded. The right half of carcasses was analyzed. Data were statistically computed. Results showed that feed conversion ratio (FCR) was 7.95±0.31, 6.32 ± 0.3, 6.15 ± 0.62 and 6.52±0.27 in 0, 10, 20 and 30 % treated straw groups respectively. The group which received 20% treated straw showed the highest mean value of lean meat, 51.22±2.04 if compared to other treatments 50.30±3.87, 51.02±3.89, 46.95±1.51, respectively. The total percent of carcass fat were 15.27± 0.25, 12.77± 0.28, 14.2± 3.38 and 14.55± 1.1 in experimental treatments and the lowest value obtained in treatment 10% treated straw. In conclusion supplementation urea treated wheat straw in a pelleted total mixed ration had positive effects on performance and carcass characteristics of Lori-Bakhtiari fattening lamb.

Key words: Urea · Peleted · Wheat Straw · Performance · Carcass Characteristics · Meat

INTRODUCTION

Use of straw for fattening of cow, sheep and goat is little as it is has high in lignin, low in nitrogen and low bioavailability [1]. Nowadays, in order to improve the nutritious value of poor roughage physical, chemical and biological treatments as well as adding supplement has been tried were done. UIA Alkalies and non protein nitrogenous materials (NPN) such as urea and ammonia are mostly used in the industrial systems for straw treatment. These components not only improve roughages digestibility, but also increase the consumption rate and crud protein synthesis by ruminal microflora [2, 3, 4]. The conversion of NPN material to consumable protein by microorganisms present in rumen and synthesis of microbial protein (MP) with high biological value, highly fermentable energetic component should be added to animals' feed [5]. The molasses is one of the secondary products of cane and beet industries and one of the sources of inexpensive easily-attained carbohydrate work as a carrier for urea and an enhancer of diet appetitive. The combination of both molasses and NPN can simultaneously give energy and fermentable N charge of Animal [4, 6]. Some researcher reported urea treated wheat straw to improve nutritive value, carcass composition and growth performance of fattening lamb [7-12]. So, the purpose of present study was to detection of effect of urea treated wheat straw in a pelleted total mixed ration on performance and carcass characteristics in Lori-Bakhtiari ram lambs.

MATERIALS AND METHODS

In this experiment 16 Lori-Bakhtiari fattening lambs were randomly selected with weighting average of 37.5±0.62 and divided into four treatments with four

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Table 1: The components of experiment diet

Food	Control	10%	20%	30%
Barley	38.00	21.00	5.00	4.0
Corn	4.00	17.50	35.00	43.0
Wheat	4.00	14.00	14.00	2.5
Soybean meal	3.50	7.50	11.00	13.0
Sugar beet molasses	4.00	4.00	4.00	4.0
Cottonseed meal	4.00	3.50	2.50	3.0
Wheat bran	40.00	20.00	5.00	0.0
Straw treated	0.00	10.00	20.00	30.0
Fat meal	0.00	0.00	1.00	2.0
Calcium carbonate	1.00	1.00	1.00	1.0
Animal Supplements	1.00	1.00	1.00	1.0
Salt	0.50	0.50	0.50	0.5
Energy metabolism	2.69	2.67	2.66	2.6
Crude protein (CP)	14.80	14.50	14.20	14.1

repeats and fattened for 75 days. These lambs, before putting in individual boxes, were conserved without water and feed for 12 hours. The experimental diet was regulated basis of common diets in order to supply the requirements on the NRC 1998 standard tables. In order to the process of wheat straw, each 100 kg of wheat straw were mixed with 100 liter water and 5 kg of urea manure, maintained into silage for eight week and after aeration is used for drying. The used diet is provided as pellet included of diagonal 5 mm with metabolizable energy (ME) 2.7 Mcal/kg/ DM and CP 4.5%. The animal were fed with diets include of 40% forage and 60% concentrate. The components of experimental diet have been showed in Table 1. The adaptation period was conducted for 10 day post-transition of lambs to individual boxes and with initiation of period; the nutritious diets of experimental different groups after preparation were given to lambs as Asfed in tree periods AM, midday and PM. The leftover feed was weighted in each time post-collection. The lambs were weighted in order to determinate their average daily gain by considering of 12 hours fasting in each 20 days. After finishing the fattening period, in order to investigate the effect of different nutritious diets on the carcass characteristics, all lambs were slaughtered according to Islamic slaughtering method and their carcass were analyzed similar to Farid method [13]. After skinning the animals, alimentary system was detached and then were weighted the contents of rumen and alimentary system and the empty weight of body was calculated. Thereafter, skin, head and feet, alimentary system, liver, lung, heart, spleen, kidney, testis, abdominal fat and fresh carcass were separately weighted and all non-carcass components were transferred to fridge as plastic packages inside specific box following the specify of the animal number. The collected data were analyzed by SAS statistical software [14] and their means difference was compared with level 5% Duncan multi-ranges test and also t-test.

RESULTS AND DISCUSSION

The least square means (LSM) of traits such as end weight, gain and daily gain, are shown in Table 2. The LSM of considered treats were significantly different in treated straw with control ($p \leq 0.05$). By increasing of treated straw in ration, the performance amounts of these traits were increased and reach to maximum values for treatment received of 20% treated wheat straw and then showed a little decrease in rest treatment. Although there was not any significant different among the performance of these traits for the use of the different percents of treated wheat straw, anyway, the performance maximum was related to received treatment of 20% treated wheat straw. These results were compatible with the results of some of the researchers [1, 15, 16].

The reason of gain (over weight) can relate to the nitrogen retention, palatability of pelleted diet, remove of lignocellolitic bands of cellulosic membrane of straw due to addition of urea to straw and enhance of daily dry matter intake (DMI). The highest and lowest of initial weight average were showed in group that received 30 and 20% treated wheat straw. In according to obtained results of Table 2, it can be resulted that the use of 20% wheat straw processed with urea in pelleted diets has best influence on the overweight of the lambs. According to results of Table 2, the most feed intake and best feed conversion ratio (FCR) was showed in group with 20% treated wheat straw. These results were accordance with the results of some researchers [17-24].

The experiment results did not show any significant difference over the percent of the bone, fat, hand, femur and semi-rump in right carcass half of experimental treatments, but the maximum performance for traits such as hand, femur and neck is related to group with 10% treated wheat straw, for greases is related to control treatment, for % bone is related to received 20% treated wheat straw and lastly the most performance for half rump is related to received treatment of 30% treated wheat straw. The obtained results of this table show that 20% treated straw leads to increase the percent weight of lean meat, Longistimus dorsal muscle, breast in right half of carcass and had a significant difference with control group ($p \leq 0.05$).

Table 2: The average comparison of growth traits affected by experiment treatments

Treatments	Total	The initial weight (kg)	The final weight (kg)	Weight gain (kg)	Daily weight gain (g)	Feed intake	FCR
Control	4	37.5±0.898^{ab}	55.1±1.63^{b}	17.6±0.73^{b}	235±2.06^{b}	139.25±2.06^{b}	7.95±0.31^{a}
Straw treated 10%	4	37.7±0.391^{ab}	61.8±1.93^{a}	24.1±1.66^{a}	321.5±22.09^{a}	152.5±8.81^{a}	6.32±0.298^{b}
Straw treated 20%	4	36.92±0.32^{b}	62.1±3.27^{a}	24.97±2.86^{a}	333.25±38^{a}	155.75±5.58^{a}	6.15±0.619^{b}
Straw treated 30%	4	37.9±0.374^{a}	61.65±0.74^{a}	23.8±0.08^{a}	317.25±1.25^{a}	153±6.58^{a}	6.52±0.275^{b}

In each column, the numbers without same letters have significant difference ($p \leq 0.05$)

Table 3: The weight average compassion of carcass segments

Treatments	Total	Lean%	Bone%	Fat%
Control	4	50.3±3.87^{a}	15.9±1.39^{a}	15.37±0.25^{a}
Straw treated 10%	4	51.02±3.89^{a}	15.75±0.838^{a}	12.77±0.287^{a}
Straw treated 20%	4	51.22±2.04^{a}	15.75±0.45^{a}	14.2±3.38^{a}
Straw treated 30%	4	46.95±1.51^{b}	14.92±1.48^{a}	14.55±1.1^{a}

In each column, the numbers without same letters have significant difference ($p \leq 0.05$)

CONCLUSION

In conclusion, supplementation of pelleted urea treated wheat straw in a pelleted total mixed ration had positive effects on performance and carcass characteristics of Lori-Bakhtiari fattening lambs. According to these observations, it is concluded that the use of treated wheat straw in a pelleted total mixed ration as much as 20% in pelleted diet leads to increase percent of lean meat, the final weight and feed intake and improve of FCR.

REFERENCES

1. Celik, K., I.E. Ersoy and F. Savran, 2003. Feeding of urea treated wheat straw in sanan goat male kids. Pakistan J. Nutrition, 2(4): 258-261.
2. Aitchison, E.M., G.S. Rix and J.B. Rowe, 1988. The effect of Urea treatment of straw and lupin supplementation on intake, live weight change and wool growth im sheep. Proceeding of the Australian Society of Animal Production, 17: 134-137.
3. Colnbrander, V.F., W.P. Weiss, D.L. Hill and N.J. Moeller, 1983. Ammonia and Urea in corn silage based complete mixed diets for dairy cow. Journal Animal Sci., 56: 525-528.
4. Tiwari, S.P., U.B. Singh and U.R. Mehra, 1990. Urea molasses mineral blocks as feed supplement: Effect on growth and nutrient utilization in buffalo calves. Animal Feed Science and Technol., 29: 333-347.
5. Morales, J.L., H.H. Van Horn and J.E. Moore, 1989. Dietary interaction of cane molasses with source of roughage: Intake and lactation effects. Journal Dairy Sci., 72: 2331-2338.
6. Sansoucy, R., 1986. Manufacture of molasses-Urea-blocks. World Animal Production, 27: 40-48.
7. Zia, U.H., M. Aasif Shahzad, M. Nisa and M. Sarwar, 2011. Nutrient utilization and milk yield response of early lactating Nili-Ravi buffaloes fed on urea-molasses treated wheat straw fermented with cattle manure. Livestock Sci., 139: 271-276.
8. Nurfeta, A., A. Tolera, L.O. Eik and F. Sundstol, 2009. Effect of enset (Ensete ventricosum) leaf supplementation on feed intake, digestibility, nitrogen utilization and body weight gain of sheep fed untreated or urea and calcium oxide-treated wheat straw. Livestock Sci., 122: 134-142.
9. Haddad, S.G. and M.A. Ata, 2009. Growth performance of lambs fed on diets varying in concentrate and wheat straw. Small Ruminant, 81: 96-99.
10. Wang, W.J., S.P. Wang, Y.S. Gong, J.Q. Wang and Z.L. Tan, 2007. Effects of vitamin A supplementation on growth performance, carcass characteristics and meat quality in limosin x luxi crossbreed steers fed a wheat straw-based diet. Meat Sci., pp: 450-458.
11. Fimbres, H., G. Hernandez-Vidal, J.F. Picon-Rubio, J.R. Kawas and C.D. Lu, 2002. Productive performance and carcass characteristics of lambs fed finishing ration containing various forage levels. Small Ruminant Res., 43: 283-288.
12. Scerra, V., P.C. Aparra, F. Foti, M. Lanza and A. Priolo, 2001. Citrus pulp and wheat straw silage as an ingredient in lamb diets: effects on growth and carcass and meat quality. Small Ruminant Res., 40: 51-56.
13. Farid, A., 1991. Slaughter and carcass characteristics of three fat-tailed sheep breed and their crosses with corriedal and Targhee Rams. Small Ruminant Res., 5: 25-71.
14. SAS institute, 2002. SAS/Stat users guide. SAS institute Inc.

15. Favchon, C.J., R. Seoane and J.F. Bernier, 1995. Effects of dietary cation-anion concentrations on performance and acid-base balance in growing lambs. Journal Animal Sci., 75: 145.
16. Garcia, R. and A. Elias, 1990. Anode on saccharine inclusion in feed for lambs under commercial conditions. Journal Agriculture Sci., 24: 287-289.
17. Aronen, I., 1990. The effect of Urea treatment and ammunition on the nutritive value of oat straw. Annales Agriculture Fenniae, 29: 107-112.
18. Alhassan, W.S. and S.U. Aliyu, 1991. Studies on Urea-ammonia treatment of maize straw: treatment method and potential for dry season feeding og cattle in Northern Nigeria. Animal Feed Science and Technol., 33: 289-295.
19. Abdouli, H., T. Khorchani., K. Kraiem, 1988. Urea treatment of straw effects on the growth of young bulls snd on digestibility. Fourrages, 114: 167-176.
20. Buettner, M.R., V.L. Lechtenberg, K.S. Hendrix and J.M. Hettel, 1982. Composition and digestion of ammoniated tall fescue (festuca arundinacea schreb). Journal Anim Sci., 54: 173-178.
21. Jayasuriya, M.C.N., 1985. Potential for the better utilization crop residues agro-industrial by products in animal feeding in Indian subcontinent. FAO. Animal Production and Health, 50: 37-50.
22. Khanal, R.C., D.B. Gurung and R.K. Kadariya, 1999. Effect of feeding urea treated rice and wheat straw on intake and milk yield of lactating buffaloes under farmers conditions. Asian Australasioan J. Animal Sci., 12: 1200-1204.
23. Rahman, S.M., C.S. Barsaul and I.A. Siddiqui, 1987. Improvemwnt in the palatability and nutritive value of wheat straw by urea treatment. Indian J. Animal Nutrition, 4: 209-211.
24. Zaman, M.S. and E. Owen, 1990. Effect of calcium hydroxide or urea treatment of barley straw on intake and digestibility in sheep. Small Ruminant Res., 3: 237-248.