UTILIZATION OF WATERMELON VINES IN FEEDING RUMINANTS

A- Evaluation of watermelon vine hay and its silage

BY

SALEH, M. S.; A. M. METWALLY; M. I. BASSIONI AND M. A. EL-SHORA
Animal Prod. Dept., Faculty of Agriculture, Kafr El-Sheikh, Tanta University, Egypt.

ABSTRACT

Fifteen Rahmany rams aged about three years old and weighed 50kg live body weight were used to evaluate five experimental rations as follows: R1- 100% berseem hay (BH); R2- 50% BH + 50% watermelon vine hay (BH + WMVH); R3- 100% watermelon vine hay (WMVH); R4- 100% watermelon vine silage without additives (WMVS); R5- 100% watermelon vine silage treated with 2% molasses (WMVST). Five digestibility trials were conducted using 3 rams for each. The animals were assigned randomly to feed one of the previous rations ad-libitum. The results indicated that, WMVH was higher of ash content than BH. However, BH was superior to the other feedstuffs concerning OM, CP, EE and CF contents. Substituting of 50% BH with WMVH improved most of the nutrient contents of ration as compared to WMVH. Conservation of watermelon vine with or without molasses as silage increased both CP and ash contents while decreased CF content compared with WMVH. However, silage was not fairly of good quality, since the animals were fed silage had the lowest dry matter intake comparing to those fed BH or WMVH ration. Moreover, substituting 50% BH with WMVH (R2) improved digestibility of DM, CF and EE but CP digestibility decreased ($P<0.05$) as compared to BH (R1). Otherwise, CP digestibility improved in R2 compared with R3. Digestibility of most nutrients as well as TDN values were increased for WMNH (R3) compared with the two silage rations (R4 and R5), while no significant differences of TDN values were observed among R3 and R5. Values of DCP were higher ($P<0.05$) in R1 than in both R2 and R3, but replacing 50% WMVH with BH in R2 increased ($P<0.05$) DCP comparing with WMVH (R3). Ruminal pH values were lower and VFA`s concentrations were higher for animals fed WMVH than those fed WMV silages. Nitrogen balance (NB) was higher ($P<0.05$) when the animals were fed rations containing BH or WMVH than those fed WMVS or WMVST ration. All blood parameters were unaffected by the different experimental rations and they were within the normal range of sheep.

***Key words**: Watermelon vine, hay, silage, digestibility, nitrogen balance, rumen and blood parameters.*

INTRODUCTION

In Egypt there is seasonal shortage of feedstuffs especially in the summer season. The big feed gap between the animal requirements and the available feed sources necessitates great efforts to realize the best use of the available agricultural wastes. The complete system would help in utilizing the locally available crop residues, agro-industrial by-products and wastes in animal nutrition as new sources of nontraditional feeds. Annual quantities of watermelon vine are about 190,000 tons produce from 80,000 feddans of watermelon crop (Agric. Economics, 1998). Few quantities of these residues are balled but the major part is usually burn or left in the fields causing environmental pollution problem in spite of it's high nutritive value. Watermelon vines hay (WMVH) had higher nutritive value than other by-products such as rice straw, wheat straw, corn cobs and corn stover (Bassiouni, 2001). He also reported that, WMVH had higher value of potential dry matter degradability and better utilized than wheat straw and rice straw by ruminants as well as it has nearly similar nutritive value of berseem hay, on the other hand the crude protein disappearance value of WMVH was intermediate between the highest value for berseem hay and the lowest value for rice straw. There are a few literatures on using watermelon vine hay or silage in ruminants feeding, thus more studies on using this residue in feeding ruminants are recommended.

The objective of the present study was to evaluate watermelon vines as well as to study the suitable method for conserving this residue as hay or silage form. Moreover, to study the effect of replacing these conserved by-products with berseem hay on digestibility, nutritive value, some rumen and blood parameters of sheep.

MATERIALS AND METHODS

This work was conducted at the Experimental Farm of the Department of Animal Production, Faculty of Agriculture, Kafr El-Sheikh, Tanta University.

Preparation of the experimental rations:

Berseem hay (BH) and watermelon vine hay (WMVH)

Berseem (Trifolium alexandrinium) hay (3rd cut) and WMVH were made by sun drying on the ground in layers and turned up side down until the dry matter reached to about 85%, then it was collected, stored as piles and covered by a layer of rice straw till it was used in feeding the experimental animals.

Watermelon vine silage (WMVS)

Watermelon vines (WMV) were taken directly after harvesting the main crop of WM, chopped about 15-20 cm. length and wilted until DM reached about 40%, then WMV was ensiled without or with 2% molasses.

Each kind of silage was ensiled in a small bunker silo. The amount of molasses was distributed fairly between the successive layers of the biomass (20cm. thickness/layer). Every layer was pressed by labor's feet and after filling the whole bunker the biomass was covered by plastic sheet and pressed hardly with soil and some blocks. The silos were opened after three months ensiling period. Samples were taken from silage materials after ensiling to estimate the silage quality parameters. Values of pH were determined directly using Beckman pH meter. Concentration of ammonia nitrogen (NH_3-N) was determined using magnesium oxide distillation (AOAC, 1990). Total volatile fatty acids (VFA's) concentrations were estimated using steam distillation methods (Warner, 1964).

Digestibility trials

Five digestibility trials were conducted to evaluate the experimental rations including R1. 100% berseem hay (BH); R2. 50% BH + 50% watermelon vine hay (BH+WMVH); R3. 100% WMVH; R4. 100% watermelon vine silage without additives (WMVS) and R5. 100% watermelon vine silage treated with 2% molasses (WMVST). Fifteen Rahmany rams aged about 3 years old and weighed 50 kg live body weight were divided into five similar groups (3 rams each), which were fed ad-libitum and kept in metabolic cages for 15 day as preliminary period. Feed consumption and feces were weighed and recorded daily during the collection period (6 days) and composite samples prepared and kept for proximate analysis according to AOAC (1990). Urine was also collected during the collection period to estimate the nitrogen balance. At the last day of collection period, rumen liquor samples were collected 3 hours after the morning feeding by a rubber stomach tube in each digestion trial. Values of rumen liquor pH were determined directly using Beckman pH meter, while 1 ml. saturated mercuric chloride was added to the rest of each sample for stopping the microbial activity, then filtered through a double layer of cheese cloth and stored in polyethylene bottles in the freezer (-20°C) until analysis. Concentration of VFA's and NH_3-N were estimated as described previously in estimation of silage quality.

Blood samples were withdrawn at the same time of rumen liquor collection from the jugular vein into two clean tubes. Ethylene diaminetetra acetate (EDTA) was added to one tube as anticoagulant to determine the total erythrocyte count (RBC_s), leukocyte count (WBC_s) and haemoglobin concentration. The another tube was allowed to coagulate and clear blood serum was separated by centrifuge at 3500 r.p.m. for 15 minutes. The serum was stored at –20°C until analysis for total proteins, albumin and cholesterol concentration according to the methods described by Varoley (1976). The

data were statistically analyzed using General Linear Models Procedure adapted by SPSS (1997) for one way analysis of variance and means were differentiated using Duncans's multiple range tests (Duncan, 1955).

RESULTS AND DISCUSSION

Chemical composition of different feedstuffs

The proximate chemical composition of experimental rations in Table (1) indicated that, berseem hay (BH) had higher values than the other feedstuffs concerning OM, CP. EE and CF, but it contained the lowest ash. Substituting 50% of BH with WMVH (R2) improved the most of nutrient contents compared with WMVH (R3). Chemical composition of WMVH is in agreement with results of Bassiouni (2001), who found that it contain 92.0, 82.15, 9.25, 1.91, 27.5, 34.49 and 17.85% for DM, OM, CP, EE, CF, NFE and ash content, respectively. Fonolla (1988) found that stalks and leaves of melon contain 90.3% DM, 71.0% OM, 15.1% CP, 2.5% EE and 21.4% CF. Moreover, Bassiouni (2000) indicated that OM, CP and EE contents were higher and NFE was lower in BH than in green bean hay.

Table 1. Chemical composition of the different experimental rations consumed by rams.

Rations	DM composition, %						
	DM	OM	CP	EE	CF	NFE	Ash
R1- BH	92.30	86.16	13 45	3.34	29.37	40.00	13.84
R2- BH + WMVH	92.20	82.56	10.56	3.12	28.43	40.45	17.44
R3- WMVH	92.10	80.61	9.85	2.90	27.50	40.36	19.39
R4- WMVS	34.44	77.20	10.79	2.82	24.31	39.28	22.80
R5- WMVST	38.94	79.80	12.03	2.25	24.42	40.10	21.20

R1- 100% Berseem hay R2- 50% Berseem hay + 50% watermelon vine hay
R3- 100% watermelon vine hay R4- 100% watermelon vine silage without additives
R5- 100% watermelon vine silage treated with 2% molasses.

Conservation of watermelon vine as silage with or without molasses supplements increased CP and ash contents while decreased CF content as compared to watermelon vine hay. These results were in accordance with the findings of Soliman (1997) who found that addition of molasses to watermelon vines during silage making increased both CP and NFE contents as compared to silage without additives. The present results are in agreement with Ghanem (1987), who found that broad bean vine was higher CF, EE and NFE contents than its silage,while silage was higher in CP and ash contents than its hay.

Silage quality

Observations concerning silage quality (Table, 2) indicated that untreated or treated silage (WMVS or WMVST) produced was not good quality. However, silage characterized by yellowish green color, good smell and NH_3-N concentration was within the normal value (8.6- 9.5% of total

nitrogen), while pH value was high (4.83-4.91). The present results are in agreement with the findings of Hellberg (1963). Soliman (1997) indicated that the addition of molasses to watermelon vine during silage process decreased pH value and NH_3-N concentration. In the present study, concentration of VFA`s was low for untreated silage (225.21mM/100g DM), while it was 279.52 mM/100g DM for treated silage. These results were cleared that, the addition of molasses to watermelon vine material caused an increase in VFA`s concentration. The present results were nearly similar with the findings reported by Hendrix (1980) and Johnson et al. (1984), who found that the supplementation of molasses to ensiled material led to enhance fermentation by increasing lactic acid content and lowering pH value.

Table 2. Values of pH, total volatile fatty acids (VFA`s), ammonia nitrogen (NH_3-N) concentrations and ammoina-N as % of total N in treated and untreated watermelon vine silage.

Item	pH	VFA`s MM/100g DM	NH_3-N mg/100g DM	NH_3-N as % of total N
WMVS*	4.91	225.21	199.85	9.5 %
WMVST**	4.83	279.52	185.65	8.6 %

* : Watermelon vine silage without additives

**: Watermelon vine silage treated with 2% molasses

Feed intake, digestibility and nutritive value

Data presented in Table (3) indicated that the average dry matter intake (DMI) for rams fed rations containing berseem or watermelon vine hay was nearly similar for the experimental animal groups. However, animals fed watermelon vine silages consumed the lowest DM comparing with those fed hay rations. The decrease of DMI for silage rations may be due to the lower palatability of silage than hay. Abdel-Moneim and Abd-Alla (1998) revealed that, no significant differences were observed between palatability (feed intake/one minute, g/min.) of both vegetative growth of watermelon (green stem and leaves) and fresh sugar can bagasse, whereas the first one was of lower palatability than colcasia, carrots and cabbage residues consumed by goats.

The average of digestion coefficient for the different experimental rations Table (3) indicated that no significant differences were observed among the digestibility of DM, OM and CF in the three groups fed hay rations (R1, R2 and R3), while CP and NFE digestibilities were higher ($P<0.05$) in BH (R1) than WMNH (R3). Substituting 50% BH with WMVH (R2) improved digestibility of DM, CF and EE but decreased CP digestibility compared to BH (R1). On the other hand, CP digestibility for R2 was higher than R3. The comparison between WMVH and WMVS digestibility indicated that, the digestion coefficients of most nutrients for

WMVH were significantly (P<0.05) higher than the two silage rations (WMVS and WMVST). These results were confirmed by the findings reported by Mohi-El-Din (1998), who found that the average digestion coefficients of DM, OM, CP, EE and NFE were higher in sugar beet tops hay than sugar beet tops silage. In the present study, the digestion coefficients of DM, OM, CF and NFE were higher (P<0.05) for WMVST than WMVS. These results are in harmony with those found by Soliman (1997) who revealed that DM, OM, CF, EE and NFE digestibility's were higher for watermelon vine silage treated with molasses than untreated silage. However, the most of nutrient digestibilities were lower than those reported by Fonolla. (1988) when the goats fed on stalks and leaves of melon. The differences in nutrient digestibilities may be due to the changes in DMI and chemical composition of feedstuffs and feces.

Table 3. The average of dry matter intake, digestion coefficients and nutritive value for the different experimental rations.

Item	Rations				
	R1- BH	R2- BH+WMVH	R3- WMVH	R4- WMVS	R5- WMVST
DMI kg/h/d	1.550	1.460	1.445	0.615	0.7770
Digestion coefficients, %					
DM	64.7±0.5^{ab}	65.6±0.2^{ab}	66.3±0.7^{a}	50.1±0.9^{c}	58.4±0.5^{b}
OM	64.4±0.6^{a}	63.2±0.3^{a}	66.8±0.4^{a}	49.4±1.3^{b}	59.8±1.6^{a}
CP	64.6±1.2^{a}	61.8±1.1^{ab}	58.8±0.2^{b}	42.1±0.4^{c}	49.1±3.7^{c}
CF	56.1±0.6^{ab}	58.9±0.3^{a}	60.0±0.4^{a}	43.2±1.0^{b}	52.5±0.4^{bc}
EE	75.6±0.4^{b}	78.1±0.1^{b}	81.6±0.5^{a}	50.2±4.8^{c}	47.7±1.6^{c}
NFE	66.6±1.3^{a}	64.7±0.5^{ab}	63.5±0.8^{b}	57.4±4.2^{c}	66.4±2.9^{ab}
Nutritive value, % (on DM basis)					
TDN	58.5±0.9^{a}	55.9±0.8^{ab}	54.2±0.3^{ab}	41.7±2.1^{c}	49.3±0.7^{b}
DCP	8.82±0.3^{a}	6.60±0.1^{b}	4.49±0.1^{c}	4.54±0.1^{c}	5.91 ±0.9^{b}

$^{a, b, c}$ Values within column with different superscripts significantly differ (P<0.05).

Data of nutritive value are presented in Table (3) indicated that, total digestible nutrients (TDN) was significantly (P<0.05) higher in WMVH than WMVS. However, no significant differences were detected between WMVH and silage rations in DCP values. These results are in accordance with those reported by Mohi El-Din (1998), who found that sugar beet tops hay had higher nutritive value than sugar beet tops silage. However, in the present study no significant differences were observed for TDN value between R1, R2 and R3. Otherwise, R1 had higher DCP than both R2 and R3. These differences may be due to the higher values of crude protein in berseem hay than in the watermelon vine hay. Moreover, addition of molasses to silage increased TDN and DCP values, which confirm the results obtained by Ghanem (1987) and Soliman (1997).

Fermentation in the rumen

Rumen fermentation parameters determined in the rumen liquor are shown in Table (4). No significant differences were observed among the experimental animal groups fed BH or WMVH ration in ruminal pH values. Values of pH were significantly ($P<0.05$) higher in rumen liquor of rams fed silage than those fed hay rations, it was associated with decreasing ruminal VFA`s concentrations which is a result of decrease DMI. In this connection, Briggs et al. (1957) indicated that the increase in ruminal VFA`s concentration causes a reduction in ruminal pH values. The present results of pH values showed that, there was no deleterious effect on digestion of the experimental roughages. Hungate (1966) and Mehrez et al. (1983) found that the activity of cellulytic bacteria during ruminal fermentation might be inhibited when pH value of rumen is below six. Also, Van Soest (1983) reported that the optimum pH value for growth of cellulytic microorganism was 6.7±0.5. Concerning ruminal VFA`s concentration, rams which were fed hay rations had higher ($P<0.05$) VFA`s concentration than those fed silage. The high level of VFA`s concentrations were associated with the high CF content in the hay than those in silage rations as shown in Table (1). The trend of VFA`s changes in different groups may be related to quality and quantity of the roughage consumed. Borhami et al. (1999) reported that rumen VFA`s was higher concentration for diet containing berseem fibrous residues than the other diets contain treated or untreated corn stalks with 3% ammonia.

Table 4. The average of pH, total VFA`s and NH_3-N concentrations in the rumen liquor of rams fed different experimental rations.

Rations	pH value	Total VFA`s, mM/100 ml	NH_3-N, mg/100ml
R1- BH	6.59 ± 0.05^{a}	12.40 ± 0.02^{ab}	27.90 ± 0.09^{a}
R2- BH+ WMVH	6.71 ± 0.05^{ab}	11.26 ± 0.09^{b}	26.72 ± 2.49^{a}
R3- WMVH	6.62 ± 0.02^{ab}	15.00 ± 1.01^{a}	25.45 ± 3.01^{a}
R4- WMVS	7.0 ± 0.04^{c}	5.20 ± 0.08^{c}	20.10 ± 3.86^{b}
R5- WMVST	6.95 ± 0.03^{c}	5.90 ± 0.41^{c}	22.38 ± 1.14^{b}

[a, b, c] Values within column with different superscripts significantly differ ($P<0.05$).

Regarding to the concentration of NH_3-N the results showed that, it was lower ($P<0.05$) in the groups, which were fed hay rations (R1, R2 and R3) than those fed silage rations (R4 and R5). This may be due to higher nitrogen intake for the animals were fed hay than those fed silage rations. Lewis (1957) found that the insignificant differences in ruminal NH_3-N level among different groups may be related to differences in nitrogen level, chemical and physical characteristics of the different rations and their effects on the activity of rumen microflora. Generally, NH_3-N concentrations in all different groups were within the normal range of the rumen liquor as described by Church (1976) who stated that the normal level of rumen NH_3-

N ranged between 10-45 mg/100 ml depending on composition of ration, time of sampling and method of analysis used.

Nitrogen balance

Data concerning nitrogen balance (NB) were presented in Table (5). The results indicated that NB values (g/day) were positive for all groups fed different experimental rations. Values of nitrogen balance were significantly ($P<0.05$) higher in the group fed rations containing BH and WMVH than those containing watermelon vine silage. This may be attributed to increase nitrogen intake, high protein digestibility and better utilization of digested nitrogen when rams were fed hay than those fed silage rations. Ghanem (1987) found that the nitrogen balance of sheep fed broad bean vine hay was higher than that fed broad vine silage treated with 3 or 5% molasses. In the present study, nitrogen balance in case of feeding silage treated with 2% molasses was slightly higher than that fed silage without additives. This may be due to higher crude protein intake and digestibility in silage treated with molasses than those of untreated. The present results are in agreement with finding reported by Soliman (1997) who found that NB of goats fed watermelon vine silage treated with 2% molasses was higher than those fed untreated watermelon vine silage.

Table 5. Nitrogen balance for rams fed the different experimental rations.

Rations	Av. Daily N. intake, g	Av. Daily N. in feces, g	Av. Daily N. exc. in urine, g	N. balance, g/day
R1- BH	33.36	9.93	20.95	2.48±0.03[a]
R2- BH+ WMVH	27.21	9.50	16.52	1.19±0.13[b]
R3- WMVH	22.77	9.09	12.64	1.04±0.88[b]
R4- WMVS	10.62	6.87	3.56	0.19±0.06[c]
R5- WMVST	14.82	7.68	6.52	0.62±0.13[c]

[a, b, c] Values within column with different superscripts significantly differ ($P<0.05$).

Blood parameters

Data of some blood parameters Table (6) indicated that no significant differences were observed among the different animal groups fed the experimental rations in all measured blood parameters. The present results are in harmony with those described by Bassiouni (2000) when sheep were fed berseem hay, substituting 50% berseem hay with 50% green bean vine hay and green vine hay. Generally, the values obtained were within the normal average of healthy sheep as observed by El-Zayat and Kassem (1976); Stanek et al. (1992) and Bassiouni et al. (1999) who indicated that blood plasma contains about 7.0-7.7 g% proteins, the latter composed of 3.7-4.0 g% albumin, 2.7-4.0% globulin and 0.3% g fibrinogen, also it contains 185-189 mg % cholesterol. Moreover, hemoglobin concentration was ranged from 12.8-13.4 g% in sheep blood.

Table 6. Level of some blood parameters for rams consumed the different experimental rations.

Rations	RBCs ($x10^6/cm^3$)	WBCs ($x10^3/cm^3$)	Hemoglobin (g%)	T. proteins (g%)	Albumin (g%)	Cholesterol (mg%)
R1- BH	10.03±2.11	6.37±1.20	12.34±0.11	7.39±0.09	3.66±0.04	188.95±5.36
R2- BH+WMVH	11.03±1.18	6.80±1.24	12.76±0.14	7.74±0.08	3.73±0.05	185.87±8.72
R3- WMVH	10.42±1.20	6.50±1.30	12.01±0.10	7.77±0.06	3.64±0.04	187.70±2.10
R4- WMVS	10.73±0.20	6.76±1.11	12.36±0.10	7.79±0.11	3.60±0.60	185.40±5.50
R5- WMVST	10.36±1.01	5.11±2.02	12.60±0.02	7.68±1.00	3.75±1.01	180.70±1.01

CONCLUSION

It could be concluded from the present study, the beneficial effect of using WMVH than WMVS as agricultural by product in feeding ruminants. However, more studies should be conducted for conserving WMVH as silage.

REFERENCES

A. O. A. C (1990). Association of Official Analytical Chemists Official Methods of Analysis. 4th ed. Washington, D.C.

Abd EL-Moneim, A. y. and M. S. Abd-Alla (1998). Ingestive behaviour baladi goats as measured by palatability of common and uncommon feedstuffs. Egyptian J. Anim. Pord., 27: 109.

Agriculture Economics (1998). Institute of Agric. Economics. Ministry of Agric., Egypt.

Bassiouni. M. I.; N. M. Eweedah and M. K. Mohsen (1999). Nutritional value of carrot tops in ruminant rations. Egyptian J. nutrition and feeds (Special Issue) 2:131.

Bassiouni. M. I (2000). Substitution of berseem hay by green bean vines hay in sheep ration. J. Agric. Res. Tanta Univ., 26: 4.

Bassiouni. M. I (2001). Using quick methods for evaluation of some traditional and nontraditional Egyptian roughages as feedstuffs for ruminants. J. Agric. Sci. Mansoura Univ.,26: 265.

Borhami, B. E. A.; A. Z. M. Salem; W. G. Fahmy and M. H. M. Yacout (1999). Effect of berseem and ammoniated corn stalks residues supplementation on performance of lactating goats. Proceeding of an International Conference on Odder, Water quality, Nutrient management, and Socioeconomic Issues. Iowa State Univ. of Sci & Tech. July 19-22, 11: 531.

Briggs, P. K.; J. P. Hogan and R. L. Reid (1957). The effect of volatile fatty acids, lactic acid and ammonia on rumen pH in sheep. Aust. J. Agric. Res., 8: 674.

Church, D. C. (1976). Digestive physiology and nutrition of ruminants. 1- Digestive physiology, P. 145, 2nd Ed. O, B. Books, Corvallis, Oregano.

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

El-Zayat, A. F. and R. M. Kassem (1976). Blood and Circulation. First ed. University Book House, Cairo.

Fonolla, J. H. Silva (1988). Study on the nutritive value of some by-products of intensive agricultural cultivation. Avances-en-Alimentaction-y- Mejora - Animal 28: 107.

Ghanem, G. H. (1987, Utilization of farm by-products in animal feeding. M. Sc. Thesis, Fac.of Agric., Tanta Univ.

Hellberg, A. (1963). Improved silage, Medd, 300 Jorbrukstek, inst uppsala chem. Abst; 61:1670 (C.F. Ghanem, G. H. (1987); M.Sc. Thesis Fac. Agric. Tanta Univ).

Hendrix, K. S. (1980). Silage additives. A Review. Indian Beef Cattle Day, Purdue University, layette, IN, PP, 49.

Hungate, E. R. (1966). The rumen and its microbes (Text Book) Academic press, New York and London.

Johnson, T. O; R. W. Harvey; L. Goodand; R. G. Crickenberger (1984). Effect of stage of maturity and addition of molasses on nutrients value of maize stover silage. Anim. Feed Sci. Technol., 12: 65.

Lewis, D. (1957). Blood urea concentration in relation to protein utilization in ruminant. J. Agric. Sci., 48: 438.

Mehrez, A. Z.; M. M. EL-Shinnawy; M. A. EL-Ashry and H. M. E. Ead (1983). Assessment of the associative effect of roughage and concentrates. Diamond Jubillee of Am-Soc. Anim. Sci. Pulman, Washington State Univ.

Mohi-EL-Din.; A. H. M. (1998). Studies on cattle production "Nutritional studies on the use of sugar beet by-products in feeding lactating cow" Ph. D. Thesis, Fac. of Agric., Mansoura Univ. Egypt.

Soliman, A. M. A (1997). Ensiling some farm by-products in feeding ruminants. M. Sc. Thesis, Fac.of Agric., Tanta Univ.

SPSS (1997). Spss Base 7.5 for windows, Users Guide; Spss Inc.

Stanek, M.; S. Florek; W. Rydzik and I. Rusiccka (1992). Effect of energy feeds in diets for sheep on nutrient digestibility and rumen digestion process. Acta Academiae agriculturae ac Technicae Olstenensis Zootechnica, 37: 3.

Van Soest, P. J. (1983). Nutritional ecology of the ruminant. O & B Books, Corvallis OR.

Varoley, V. (1976). Practical clinical Biochemistry. 4th Edition, New Delhi, India.

Warner, A. C. I. (1964). Production of volatile fatty acids in the rumen methods of measurement. Nutr. Absre. and Rev., 34:339.

الاستفادة من عرش البطيخ في تغذية المجترات
١- القيمة الغذائية لعرش البطيخ في علائق الأغنام

محمد سعيد صالح، عبد السلام موسى متولي، محمد إبراهيم بسيوني، محمد احمد الشورة
قسم الإنتاج الحيواني- كلية الزراعة بكفر الشيخ- جامعة طنطا

استخدم في هذه الدراسة ١٥ كبش رحماني وزنها ٥٠كجم وعمرها ٣ سنوات وذلك لإجراء خمس تجارب هضم حيث قسمت الحيوانات عشوائيا إلى ٥ مجموعات بكل مجموعة ٣ حيوانات وغذيت حتى الشبع على العلائق الآتية: ١- ١٠٠% دريس البرسيم. ٢- ٥٠% دريس البرسيم + ٥٠% دريس عرش بطيخ. ٣- ١٠٠% دريس عرش بطيخ. ٤- ١٠٠% سيلاج عرش بطيخ بدون إضافات. ٥- ١٠٠% سيلاج عرش بطيخ المعامل بـ٢% مولاس. وقد أظهرت الدراسة النتائج الآتية:

١- تفوق دريس البرسيم على بقية العلائق التجريبية الأخرى في محتواة من المادة العضوية والمستخلص الأثيري والألياف الخام بينما ازداد محتوي دريس عرش بطيخ من الرماد بالمقارنة بدريس البرسيم. أدى إحلال ٥٠% من دريس البرسيم محل ٥٠% من دريس عرش البطيخ إلي تحسين معظم مكونات العليقة من المركبات الغذائية مقارنة بدريس عرش البطيخ.

٢- حفظ عرش البطيخ في صورة سيلاج أدى إلي زيادة محتواة من البروتين الخام والرماد بينما قلل محتواة من الألياف الخام مقارنة بدريس عرش البطيخ كما أن المادة الجافة المأكولة في حالة السيلاج كانت اقل منها في حالة الدريس.

٣- أزداد معامل هضم البروتين في دريس البرسيم مقارنة بدريس عرش البطيخ. كما أدي إحلال ٥٠% من دريس البطيخ محل ٥٠% من دريس عرش البرسيم إلى تحسين معامل هضم المادة الجافة والألياف الخام والمستخلص الأثيري بينما أدى إلى انخفاض معامل هضم البروتين مقارنة بدريس البرسيم

٤- ازدادت معاملات هضم معظم المركبات الغذائية وكذلك مجموع المركبات الغذائية المهضومة في دريس عرش البطيخ عن سيلاجه بنوعية ومن ناحية أخرى لم توجد أي اختلافات معنوية في مجموع المركبات الغذائية المهضومة بين علائق الدريس. كما ازدادت قيم البروتين الخام المهضوم معنويا (٥%) بالنسبة لدريس البرسيم مقارنة ببقية العلائق الأخرى بالإضافة إلى أن إحلال ٥٠% من دريس البرسيم محل ٥٠% من دريس عرش البطيخ أدى إلى زيادة البروتين الخام المهضوم معنويا (٥%) مقارنة بدريس عرش البطيخ.

٥- انخفضت درجة حموضة الكرش بينما ازداد كل من تركيز الأحماض الدهنية الطيارة الكلية وقيم ميزان الأزوت زيادة معنوية (٥%) بالنسبة للحيوانات المغذاة علي علائق الدريس عن تلك المغذاة علي السيلاج، بينما لم تتأثر قياسات الدم المختلفة بأي من العلائق التجريبية وكانت في الحدود الطبيعية لدم الأغنام.

*مما سبق فأنة ينصح بإدخال عرش البطيخ في علائق المجترات في صورة دريس وليس فى صورة سيلاج حيث أننا نحتاج إلى مزيد من الأبحاث في مجال عمل السيلاج من هذا المخلف.