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INFLUENCE OF PARTIAL REPLACEMENT OF CLOVER HAY BY AMMONIATED RICE STRAW IN BASAL DIETS OF LACTATING FRIESIAN COWS.
2- MILK YIELD, BLOOD PARAMETERS AND FEED EFFICIENCY OF LACTATING FRIESIAN COWS.

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ABSTRACT

The effect of including ammoniated rice straw (ARS) to partially replace clover hay (CH) in lactating cows rations on their performance, milk yield and composition as well as blood metabolites was investigated. Sixteen lactating Friesian cows with metabolic body size ($BW^{0.75}$, kg) ranging from of 103 to 121 kg were used in this study. All animals were in the 2nd to 4th lactation season. Cows were randomly distributed into four groups (four animals each) and were randomly assigned for the four experimental diets. The experimental rations were formulated as follows: R1: ration 1: 50% concentrate feed mixture (CFM) + 50 % Clover hay (CH), R 2 : ration 2 : 50 % CFM +10% CH+40 % ammoniated rice straw (ARS)., R 3 : ration 3: 50 % CFM +20% CH+30 % ARS., R 4 : ration 4 : 50 % CFM +50 % ARS. These proportions were chosen to achieve approximately isonitrogenous ration containing about 12-15% CP. The experimental period lasted for 140 days (20 weeks).

The obtained results showed that total protein concentration of blood serum was highest ($p<0.05$) 7.71 g/100ml with R1 while lowest value ($p<0.05$) was noticed with R2 (5.99 g/100ml), but the difference between R2 or R4 was not significant. Globulin concentration was highest ($p<0.05$) with R1, while the lowest value ($p<0.05$) was with R2 (4.86 and 2.8 g/100ml, respectively), but the difference between R2 or R4 was not significant. The average daily fat corrected milk (FCM) yield was the highest ($p<0.05$) with group fed R1 or R2 (16.77 and 18.47 kg/d, respectively) compared with the other rations. The total solids (TS%), fat, lactose, protein, solids non fat (SNF%) and the energy (NE_L Mcal/kg milk) were not significantly different among treatments. The production efficiency was improved with R2 (60.52%) compared with the other ones and the worst value was noticed with the R3 (52.7%). .The highest value of feed cost was recorded with R1, but the lowest value with the R4. The highest value of the total output as the price of (FCM) was recorded with feeding R2, but the lowest value was with the R3. The results of return (profit L.E) , showed that the highest return was obtained when R2 was fed followed by R4 and the lowest was with R1. Substitution of clover hay by ammoniated rice straw at a level of at least 10% (DM basis) would provide adequate fermentable N, as well as fermentable fiber, and above this level of clover hay may not be necessary. The increase in DM intake when feeding on CH alone might have affected fiber digestion because of an increase in the rate of passage of digesta. The eNDF was higher when feeding on 10% clover hay + 40% ARS than the other ones. Such substitution resulted in improving milk production, feed efficiency and economic efficiency.

Keywords: lactating cows, clover hay, ammoniated rice straw, milk yield

INTRODUCTION

Research during the past 20 years has clearly illustrated that supplementation of cattle on low quality forage based diets increases productivity through increasing efficiency of feed utilization (Leng 1990 b) A mixture of nutrients as can be supplied for instance in a molasses-urea multinutrient block in ensures an efficient microbial digestion in the rumen. A small amount of protein meal that is directly available to the animal (i.e. bypass protein) stimulates both productivity and efficiency of feed utilization (Preston and Leng, 1987).

For maximum protein utilization from a particular feed, it is necessary to ensure optimal rumen condition for microbial growth and adjust protein to energy ratio in the nutrients absorbed with a bypass protein to optimize efficiency of utilization of the absorbed nutrients (Leng, 1990 a).

New feeding strategies for animals fed on low quality forage (e. g. crop residues), coupled with better genotypes, improve management and disease control (Preston and Leng, 1991) should be applied. Large increases in the milk production can be achieved in the tropics without the use of " fossil-fuel-expensive" grain based concentrates, relying rather on by-protucts of agriculture (Leng, 1991). These will be the only truly available feed resource for the large ruminant populations in these countries into the foreseeable future.

One of the biggest challenges when feeding low quality forages to ruminants is to increase their intake (Ndlovu, 1991). Addition of higher quality feeds such as legume forage to a poor-quality basal diet is more practicable.

The present work was complementary to the first research in this series (Maklad, 2006)

The main objective of this study was to evaluate, the partially of substitution clover hay by ammoniated rice straw based-diets on some blood constituents, milk production and composition, feed utilization and economic efficiency with lactating Friesian cows.

MATERIALS AND METHODS

The experimental work of this study was a continuation of part 1 (Maklad, 2006) conducted at El-Karada Animal Production Research Station, Animal Production Research Institute, Agricultural Research Center, Ministry of Agriculture and Department of Animal Production, Fac. of Agric., Mansoura University during the years 2003-2005.

Sixteen lactating Friesian cows from the herd of the station with metabolic body size ($BW^{0.75}$, kg) ranging from of 103 to 121 kg were used in this study. All animals were in the 2^{nd} to 4^{th} lactation season. Cows were distributed into four similar groups (four for each group) according to body weight and their previous milk production. The four groups were assigned at random to receive one of the four experimental diets. All groups were individually fed according to Wheeler, (2003) recommendations, based on their live body weight and milk yield. He recommended that the maximum total DMI (from roughage and grain mixture) for milking cows with average body weight, 550 kg and milk yield between 20 to 30 kg/day can eat 4.2% of BW, while they can consume 1.8 to 2.2% of BW daily as DM from average quality dry roughage. Most cows increase in DMI gradually after calving and peak in DMI by 10 to 20 weeks of lactation season. The experimental period lasted for 140 days (20 weeks).

The four experimental rations were formulated as follows:

R 1: ration 1: 50 % concentrate feed mixture (CFM) + 50 % Clover hay (CH).

R 2: ration 2: 50 % CFM +10% CH+40 % ammoniated rice straw (ARS).

R 3: ration 3: 50 % CFM +20% CH+30 % ARS.
R 4 : ration 4 : 50 % CFM +50 % ARS .

The experimental rations were formulated to be almost iso-nitrogenous and contain about 12-15% crude protein as recommended by Ørskov *et al.* (1972) to ensure maximal rate of fermentation in the rumen.

The chemical composition, feeding value, and fermentation parameters in the rumen were previously determined in the first part (Maklad, 2006)

Management of feeding

The CFM fed was offered to animals firstly at morning , while clover hay or treated rice straw was given after consumption of the CFM. Drinking fresh and clean water was available at all times.

Blood parameters:

Twelve lactating Friesian cows from the experimental animals were used. Cows were randomly distributed into four similar groups (three each). For Blood samples were taken during the digestibility trials as described in the first part.

Blood samples were taken from the jugular vein of dairy tested cows at 3 hrs post-morning feeding. Blood samples were separated by centrifugation at 4000 r.p.m for 10 minutes. The serum samples were frozen at –20°C until analysis for total proteins, (Doumas *et al.*, 1981); albumin, (Hill and Wells, 1983); globulin, (Cloes, 1986); urea, (Freidman *et al.*, 1980); creatinine, (Ullmann, 1976); Glucose, (Teuscher and Richterich, 1971) and GOT and GPT, (Reitman and Frankel, 1957).

Milk yield and sampling :

Milk yield was recorded individually twice daily for each cow during the whole experimental period. About 0.5% of the total milk yield was taken for analysis from each animal individually during the experimental periods (proportionate sample from morning and evening milking) at the end of every four weeks. The analysis included fat, total proteins, lactose, total solids (TS) and solids non-fat (SNF) in milk. The chemical analysis of milk samples was carried out according to Ling (1963).

Economic evaluation:

Economic efficiency was calculated according to the following formula

$$\text{Economic efficiency} = \frac{\text{Price of daily milk yield} - \text{daily feed cost}}{\text{Daily feed cost}}$$

Statistical analysis:.

The statistical analysis was performed using the least squares method described by Likelihood programme of SAS (1994). Blood parameters, average monthly milk yield, chemical composition of milk and average monthly milk fat yield were composition of milk subjected to one way analysis of variance according to the following model:

$$Y_{ij} = \mu + T_i + e_{ij}$$

Where: Y = Observation of the tested factor

μ = Overall mean T_i = Treatment effect e_{ij} = Error

The differences among means were carried out according to Duncan's New Multiple Range Test (Duncan, 1955).

RESULTS AND DISCUSSION

Table (1) shows the average daily dry matter intake from each experimental ration which was similar reported by Pathirana and Ørskov (1995) who found that the unsupplemented or urea supplemented rice straw to sheep and supplemented with different increments of Glyricidia, a leguminous tree, there were large increases (48%) in intake of rice straw and of total diet as the amount of glyricida was raised to 15% of diet, both in presence and absence of urea, the degree of increase was slightly less when urea was added. In the latter experiment referred to, the authors concluded that in the absence of urea the response would be mediated both by relieving a N deficiency and providing a source of easily fermentable fiber while in the presence of urea the response would be mediated only by source of fermentable fiber. The reasons for such differences appear to be related to difference in the quality of the forage legume and the basal diet and other factors.

The rate of digestibility of straw depends on the rate and extent of colonization of fiber and the biomass of adherent organisms (Cheng *et al* 1991).

Leng (1990a) suggested that the beneficial effects of the incorporation of high digestibility forage to a low-digestibility forage diet could be that this exerts a large effect on digestibility by providing a highly colonized fiber source to "seed" bacteria onto the less digestible fiber. In addition to the nitrogen content, another important feature of legumes as valuable supplements to straw- based rations, is their lower content in fiber (Van Soest, 1987) and the total organic matter may more easily fermented.

The results of feed units based on the results of the first of this series (Maklad, 2006) by cows indicated that feed units intake as TDN %, CP%, DCP% and ME (Mcal /kg). Such values were recommended and sufficient for local dairy cows and generally for ruminants of medium production level (Ministry of Agriculture, Egypt, 1996).

Table (1): Average daily dry matter intake of concentrate feed mixture, clover hay and ammoniated rice straw by dairy cows.

Items	Ration 1	Ration 2	Ration 3	Ration 4
Average BW $^{0.75}$, kg	105	121	103	114
Roughage : concentrate	50.4:49.6	49:51	50.2:49.82	50:50
Daily dry matter intake				
Feed Mixture (CFM) g/kg BW $^{0.75}$ /d	107	93	90	87
Clover hay (CH) g/kg BW $^{0.75}$ /d	109	18	37	0
3%Ammoniated rice straw (ARS) g/kg BW $^{0.75}$ /d	0	71	54	87
Total roughage g/kg BW $^{0.75}$ /d	109	89	91	87
Total DMI g/kg BW $^{0.75}$ /d	216	182	181	174
TDNI kg/day	148	131	129	119
DCPI g/kg BW $^{0.75}$ /d	23.6	18.3	18.8	15.8

Concerning blood metabolites, data in table (2) show that the highest serum total protein concentration ($p<0.05$) 7.71 g/100 ml was recorded with R1, while the lowest value ($p< 0.05$) was noticed with R3 (5.99 g/100 ml), but the differences between rations R2 or R4 were not significant. Globulin concentration was highest ($p<0.05$) with R1, while the lowest value ($p< 0.05$) was with R3, (4.86 and 2.8 g/100 ml, respectively), but the differences between rations R2 or R4 were not significant.

Urea-N concentration ranged from 27.3 to 34.20 mg/100 ml in the serum, and its level was not significantly affected by feeding on experimental rations, while the highest value was with R1 and the lowest value was with R2. The concentration of urea in blood and milk is affected not only by dietary intake of digestible crude protein in the rumen but also by balance between energy and protein in the diet (Hoffman and Steinhofel 1990). Increasing the intake of digestible CP or digestible CP/MJ of metabolizable energy increases the urea content in blood and milk (Grings *et al.*, 1991). The results as reported in the first study by Maklad, (2006) on the same rations showed that the DCPI g/d was higher ($p<0.05$) when feeding on R1 than R4, while the TDN: CP ratios were higher ($p<0.05$) when feeding on R2 or R3 or R4 than feeding on R1, were reflected on the increase total protein, globulin and urea-N when feeding on R1 than the others rations.

The GOT and GPT concentration were higher ($p<0.05$) when feeding on R1 than R4. Harper et al, (1977) reported that the two transaminases are of clinical interest. Glutamic oxaloacietic transaminase (GOT) catalyes the transfer of the amino group of aspartic acid to ά-ketoglutaric acid, forming glutamic and oxaloacetic acids, glutamic pyruvic transaminase (GPT) transfers the amino group of alanine to ά-ketoglutaric acid, forming glutamic and pyruvic acids. Serum transaminase levels in normal subjects are low, but after extensive tissue destruction these enzymes are liberated into the serum. The presented data was in the normal range as described by Mohamed and Selim (1999) for GOT (60-150 IU/l) and GPT (15-27 IU/l).

Table (2): Effect of experimental rations on some blood parameters

Iems	Experimental rations			
	Ration 1	Ration 2	Ration 3	Ration 4
Total protein (t.p.) g/100ml	7.71[a]	6.73[b]	5.99[c]	6.65[b]
Albumin (a) g/100 ml	2.85	2.86	3.20	268.3
Globulin (g) g/100 ml	4.86[a]	3.87[b]	2.80[c]	3.97[b]
Creatinine (cr) mg/100 ml	1.67	1.81	1.77	1.94
Urea-n mg/100 ml	34.20	27.03	29.87	29.63
GOT IU/L	61.67[a]	62.00[a]	56.33[ab]	55.00[b]
GPT IU/L	25.67[a]	18.00b	17.33[b]	15.33[b]
GOT/GPT ratio	2.4	3.44	3.25	3.59
Glucose (MG/100 ML)	45.37	49.80	51.07	44.67

a, b, c and d : Means within the same raw with different superscripts are significantly different (P<0.05).

The glucose concentrations in the blood serum were not significantly affected by the treatments, but the presented data showed the high concentrations with R2 and R3 than R1 or R4. Fouad (2002) and Fouad *et al.* (2002) found that the increase in serum glucose may be attributed to the increase of carbohydrate metabolism and the increase in the rate of intestinal glucose absorption. The results obtained are in agreement with Oliveira *et al.* (1996).

Data concerning milk yield and its composition are presented in Table (3) and illustrated in Figures 1&2. The average daily fat corrected milk (FCM) yield was the highest ($p<0.05$) with group fed R1 or R2 (16.77 and 18.47 kg/d respectively), compared with the other rations, however improving of nutrients composition, its digestibility and the feeding value of R1 as RFV, RFQ and QI or of R2 as DDM% or TDN/CP as reported in the first study by Maklad (2006) on the same rations, were reflected on the more FCM produces by cows fed these rations than the others. Abou Hussein *et al.* (1992) suggested that milk yield was elevated with increasing glycogenic energy supply from the readily fermentable carbohydrates in the diet.

Table (3): Effect of feeding lactating cows on experimental rations on some chemical composition of milk.

Items	Experimental rations			
	Ration 1	Ration 2	Ration 3	Ration 4
T.S%	10.34	10.68	10.25	10.77
Fat%	3.22	3.68	3.17	3.52
Lactose%	4.17	4.18	4.25	4.26
Protein%	2.25	2.20	2.24	2.19
Protein / Fat	0.69	0.59	0.70	0.62
SNF%	7.12	7.07	7.20	7.09
NE_l (Mcal/kg)*	0.587	0.628	0.584	0.615
Milk yield kg/day	17.71	18.01	14.33	15.26
Fat yield kg/day	0.562^{ab}	0.659^{a}	0.448^{c}	0.533^{bc}
Protein yield kg/day	0.395	0.396	0.321	0.333
Lactose yield kg/day	0.738	0.752	0.611	0.647
FCM ** kg / day	16.77^{ab}	18.47^{a}	13.46^{c}	14.10^{bc}
DMI kg/kg FCM	1.35	1.20	1.39	1.42
TDNI Kg/kg FCM	0.913	0.857	0.986	0.966
DCPI g/ kg FCM	147.88	120.19	144.13	128.37

a, b and c : Means within the same raw with different superscripts are significantly different ($P<0.05$).

*NE (Mcal / kg) = (0.0929 x Fat%) + (0.0547 x Protein%) + (0.0395 x Lactose%) (NRC, 2001).

**FCM : Average of dairy production of calculated 3.5% fat corrected milk (Kg/day) = 0.432 x milk (kg) + 16.23 x fat (kg) (Britt *et al.*, 2003).

Increases in food digestibility and the intake of the basal diet arising from partially replacing forage legume by ammonia treated rice straw should lead to a significant increase in animal performance. However, according to Topps (1995) very few experiments have shown a marked improvement of production when tropical legumes are fed. The CP content is positively correlated with quality. Forage with high concentration of CP are considered high quality for two reasons. First if a high protein forage is fed , less supplemental protein will be needed. Secondly, CP is positively correlated to energy content of forages. High protein forages generally are more digestible and provide more energy per unit weigh than low-protein forages (Weiss *et al*, 1982). Concentration of fiber is negatively related to quality because forages with high concentrations of fiber content less available energy and are consumed in lesser amounts by cows than are forages with low amounts of fiber (Weiss *et al*, 1982)

Regarding the milk composition, (Table 3), milk TS , fat, lactose and protein, SNF% and NE (Mcal/kg) diet not significant effect by dietary treatments. The protein / fat ratio for R1, R2, R3 and R4 were 0.69, 0.59, 0.70 and 0.62, respectively.

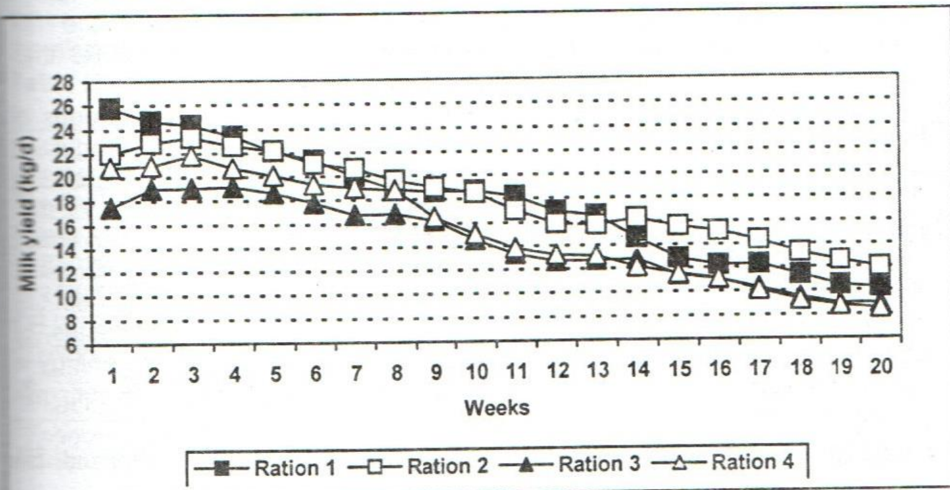

Fig (1) : Effect of feeding the experimental ration on the mean daily milk yield of the Friesian cows:

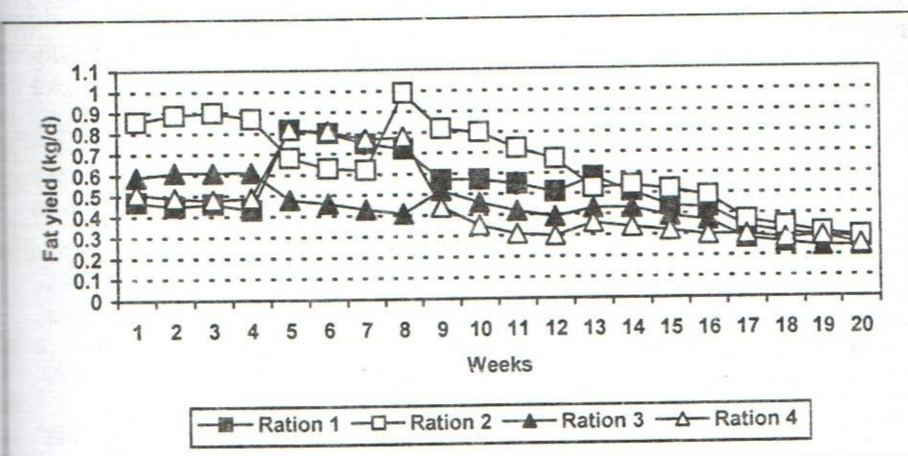

Fig. (2) : Effect of feeding the experimental rations on the mean daily fat yield of the Friesian cows

Schroeder (1996) suggested that to evaluate a herd, look at it is milk yield and compare to the breed average. If the ratio of protein / fat falls below 0.8 or above 0.9 for Holsteins, check the nutrient balance of the rations. A higher ratio indicates a opportunity to increase milk production.

Antinutritional factors in food are substances which either by themselves or through metabolic products in the system, interfere with food utilization and affect the health and production of animals (Makkar, 1991). Among the several antinutritional factors which cause losses in the livestock industry, tannins, mycoyoxin and nitrates. The main antinutritional effects of tannins present in forage, tree and shrub legumes are reduction in feed intake, diminished digestibilitys of nutrients, adverse effects upon rumen metabolism (Mehanson *et al* 1987). So as shown in the figure (1) the milk yield was decreased after twelve weeks when feeding on R1 or R3 than feeding on R2.

Data in Table (4) show the feed efficiency with the four groups of lactating cows fed the experimental rations. The best value of production efficiency was estimated with R2 but the worst value was with R3. the energy is the nutrient for which intake is most closely related to the level of milk production (Bath, 1985). About one third of ME is lost as the heat increment associated with the work of fermenting, digesting, and metabolizing nutrients. The remaining energy is known as net energy, the energy that directly supports maintenance functions or that is converted to milk, conceptus, or body tissues. In dairy cows, the efficiency of converting ME to net energy is about the same whether the ME is used for maintenance or for milk production (NRC, 1989).

Table (4): Feed efficiency with lactating cows fed the experimental rations.

Item	Ration 1	Ration 2	Ration 3	Ration 4
DOM%	67.30	70.40	70.60	67.30
MEI (Mj/d)	228.14	235.2	197.34	203.2
*ME $(Mj/d)_{increment}$	75.29	77.62	65.12	67.20
**ME_m (Mj/kg)	1.08	1.12	1.13	1.08
***ME_m (Mj/d)	24.5	24.8	21.08	21.5
****ME_p (Mcal/d)	30.69	31.75	26.58	27.3
*****NE_p (Mcal/d)	19.77	20.45	17.11	17.5
******Milk(FCM)kg/d (calculated)	29.5	30.52	25.54	26.1
*******Production efficiency	56.85	60.52	52.7	54.0

DOMD% Maklad (2006)
MEI (Mj/d) Maklad (2006)
*ME $(Mj/d)_{increment}$ = 33% of MEI VanDeHaar (1998)
**ME_m (Mj/kg) = 0.016 * DOM McDonald *et al* (1995)
***ME_m (Mj/d) = ME_m/kg*DMI
****ME_p (Mcal/d) = TME - $ME_{increment}$ - ME_m
*****NE_p (Mcal/d) = MEp * 0.644 Moe (1981)
****** Milk(FCM)kg/d (calculated)= NE_p (Mcal/d) / 0.67 NRC(1989)
******* Production efficiency% =FCM kg/d / FCM kg/d (calculated)

Data in Table (5) showed the highest value of feed cost was estimated with R1 but the lowest value was with the R4. The highest value of the total output as the price of fat corrected milk (FCM) was recorded with feeding R2 but the lowest value was with R3 .

The results of return (profit L.E), showed that the highest return was obtained when feeding on R2, followed by R4 and the lowest was with R1, because the production efficiency was the higher when feeding than the other rations.

Improved productivity and biological efficiency have significantly ($p<0.05$) increased the profitability of dairy enterprise in the past (Allaire and Thraen, 1985). Energetic efficiency is the measure of biological efficiency, because energy is most limiting nutrient, and because energy is the nutrient for which intake is most closely related to the level of milk production (Bath, 1985). Furthermore, protein is a form of feed energy and is accounted for in calculations of energetic efficiency. Profitability is defined as the financial return to labor and management, instead, profitability is calculated to show the relative economic value of changes in productivity and biological efficiency.

Table (5): Economic efficiency with lactating cows fed the experimental rations.

Item	Ration 1	Ration 2	Ration 3	Ration 4
Average daily feed consumption (as fed):				
Feed mixture, kg (CFM)	12.38	12.43	10.23	10.99
Clover hay	12.66	2.48	4.19	0
Ammoniated Rice straw, kg	0	9.38	6.07	10.87
Average daily milk production				
Fat corrected milk Kg FCM	16.77[ab]	18.47[a]	13.46[c]	14.10[bc]
Price of FCM(LE)	22.3	24.56	17.90	18.75
Cost of total feeds	19.63[a]	16.15[b]	14.00[c]	13.44[c]
Profit (LE) as total feed	2.67	8.41	3.90	5.31
Economic efficiency	36.01	52.07	27.80	39.50

a, b and c : Means within the same raw with different superscripts are significantly different ($P<0.05$).

Market price Pt./kg of : Concentrate feed mixture = 107.5 FCM = 133
Clover hay = 50 3% ammoniated RS = 15

Substitution of clover hay by ammoniated rice straw at a level of at least 10% (DM basis) would provide adequate fermentable N, as well as fermentable fiber, and above this level of clover hay may not be necessary. The increase in DM intake when feeding on CH alone might have affected fiber digestion because of an increase in the rate of passage of digesta. The eNDF was higher when feeding on R2 than the other ones. Such substitution resulted in improving milk production, feed efficiency and economic efficiency.

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تأثير احلال دريس البرسيم الى قش الأرز المعامل بالأمونيا فى علائق ابقار الفريزيان الحلابة: ٢- انتاج اللبن ، قياسات الدم والأستفادة الغذائية .

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اجرى هذا البحث بهدف دراسة تأثير احلال نسب مختلفة من دريس البرسيم (١٠ أو ٢٠%) من المادة الخشنة الفقيرة المأكولة بواسطة قش الأرز المعامل بالأمونيا بنسبة ٥٠% من المادة الجافة المأكولة الكلية على انتاج اللبن ومكوناته وبعض قياسات الدم والأستفادة الغذائية والكفاءة الأقتصادية

تم تكوين اربعة علائق على النحو التالى :
(عليقة اولى) ٥٠ % علف مصنع +٥٠% دريس برسيم.
(عليقة ثانية) ٥٠ % علف مصنع +٤٠% قش أرز معامل بـ ٣% أمونيا+١٠% دريس برسيم.
(عليقة ثالثة) ٥٠ % علف مصنع +٣٠% قش أرز معامل بـ ٣% أمونيا+٢٠% دريس برسيم.
(عليقة رابعة) ٥٠ % علف مصنع +٥٠% قش أرز معامل بـ ٣% أمونيا.

وتم تكوين الخلطات بحيث تكون نسبة البروتين الخام (١٢-١٥%) وهى النسبة التى تلبى احتياج الحيوانات الحلابة تحت الظروف المصرية وفقا لمقررات وزارة الزراعة المصرية (١٩٩٦). واستمرت التجربه لمدة ٢٠ اسبوعاً استخدم فيها ١٦ بقرة قسمت على اربع مجموعات من ابقار الفريزيان الحلابة (٤ حيوانات بكل مجموعة) وتم تسجيل اللبن مرتين يوميا مع أخذ عينة كل شهر للتحليل وكذلك أخذ عينة دم لاجراء القياسات المطلوبة وذلك عند اجراء تجارب الهضم وتخمرات الكرش كما بالبحث الاول وذلك بعد مرور حوالى اربعة اسابيع من بداية التجربة. وتم اخذ عينة الدم بعد التغذية على العلائق المختبرة بحوالى ثلاثة ساعات. وكانت اهم النتائج المتحصل عليها كما يلى :

١- تشير قياسات الدم إلى زيادة البروتين الكلى معنويا (٠,٠٥) ٧,٧١ جم /١٠٠مل سيرم دم عند التغذية على العليقة الأولى (٥٠ % علف مصنع+٥٠% دريس برسيم). بينما انخفض معنويا (٠,٠٥) ٥,٩٩ جم/١٠٠مل عند التغذية على العليقة الثالثة (٥٠ % علف مصنع +٣٠% قش أرز معامل بـ ٣% أمونيا+٢٠% دريس برسيم). كما زاد تركيز الجلوبيولين معنويا (٠,٠٥) عند التغذية على العليقة الأولى ٤,٨٦ جم/١٠٠مل سيرم دم وانخفض معنويا (٠,٠٥) عند التغذية على العليقة الثالثة.ولم يكن هناك اختلافات معنوية بالنسبة لقياسات الدم الاخرى.

٢- متوسط الإنتاج اليومي من اللبن المعدل إزداد معنويا (٠,٠٥) عند التغذية على العليقة الأولى (٥٠% علف مصنع + ٥٠% دريس برسيم) أو الثانية (٥٠ % علف مصنع +٤٠% قش أرز معامل بـ ٣% أمونيا+١٠% دريس برسيم.) بالمقارنة بباقى المجموعات الأخرى حيث كان متوسط انتاج اللبن المعدل هو (١٦,٧٧ ، ١٨,٤٧ كجم/اليوم على التوالى).

٣- لم تتأثر مكونات اللبن معنويا نتيجة المعاملات المختلفة وكذلك محتوى كجم اللبن من الطاقة الصافية.

٤- تحسن معدل الأستفادة الغذائية عند التغذية على العليقة الثانية حيث بلغت (٦٠,٥٢ %) كما لوحظ زيادة الربح ايضا بالتغذية على العليقة الثانية مقارنة بالعلائق الأخرى. .

وتوصى الدراسة إنه يمكن فى الظروف المماثلة لهذه التجربة تغذية أبقار الفريزيان الحلابه على علائق تحتوى على ٤٠ % قش أرز معامل بـ ٣% أمونيا، ١٠% دريس برسيم بجانب العلف المصنع حيث وجد أن هذه الخلطة هى الأفضل غذائيا" وإنتاجيا" وإقتصاديا" وبدون اى اثار سلبية على مكونات الدم أو صحة الحيوانات بصفة عامة.