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Nutritional Studies to Evaluate the Productivity and Quality of Preserved New Variety of Hybride Maize Silage on :
1- Milk Production and Its Composition,Some Rumen and Blood Parameters, Feed Utilization and Economical Efficiency in Lactating Zaribi Goats .

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ABSTRACT

This experiment was carried out to study the effect of a new variety of hybrid El-Ryanah maize x El-Shamia maize as silage alone or mixture with berseem (1:1) on milk production ,milk constituents, rumen microorganisms , hematological parameters and economic efficiency by lactating zaribi goats .Twenty four lactating zaribi goats 30 month old and weighed 40.93±0.36 kg were divided into three similar groups and randomly assigned to three experimental diets. Animals in all groups were fed a concentrate feed mixtures(CFM) to cover 50 % of protein diet according to (NRC,1989) requirement. Addition to *ad libitum* supplement of hybrid maize silage alone or mixtures with berseem , where 100 % berseem silage was offered to group$_1$ (T_1) ,100 % hybrid maize silage for group $_2$ (T_2) and 50 % berseem silage+50% hybrid maize silage for group$_3$ (T_3). The experiment lasted for 120 days (Lactating period).The results obtained indicated that (T2) characterized by high OM , CP and NFE % and low of DM , EE , CF and Ash % than those of T1 and T3 rations .While ,mixture of hybrid maize and berseem silage (T3) generally had higher values of DM and Ash . At the same time, T1 ration recorded higher values of EE and CF and lower values of NFE % than those of T2 ration .However, data of fiber fractions clearly showed that T_1 ration had higher values of NDF, ADF, celluloses and ADL (31.5 , 23.7 , 8.20 and 15.50 % respectively). Moreover, the concentration of fiber and fiber fractions were negatively related to quality because forages had higher fiber and less available energy and are consumed with a few amounts by goats than that with low fiber content. Meanwhile , the average DM as g/kg BW or $w^{0.75}$ decreased with T_2 (38.2.and 97.1) compared with T_1 (39.9 and 101.5) and T_3 (4.16 and 105.3 respectively) .Feed conversion as DM and CP(intake / kg milk yield) were better with T_2 (1.14 and 237) and T_1(1.43 and 245) compared with T_3 (1.34 and 239 respectively).Whereas, digestion coefficients of T_2 ration recorded significantly ($p<0.05$) the highest digestibility coefficients of CP , CF , EE , NFE and GE (76.94 , 64.91 ,74.82 ,74.13 and 66.25 respectively) while , T_3 had higher values of DM , OM and lower of CP, EE, CF and GE (70.62 ,74.32, 74.91, 61.88, 72.94 , 72.24 and 64.17 respectively) and the lowest values had detected with T_1 ration (68.97,71.37 , 75.28 , 63.17 , 72.56 , 71.61and 63.31 respectively) . As milk yield , the results showed that the higher actual daily milk yield (ADMY) and 4% fat corrected milk yield (FCMY)were obtained with of dairy zaribi goats fed tested rations T2 (1.390 , 1.350 kg /d respectively) than of those fed T1(1.168,1.119 kg/d ,respectively) and the lowest values were recorded with T3 ration (1.274 and 1.206 respectively). Moreover,T2 ration were significantly ($p<0.05$) increase of fat , total solid, total nitrogen, lactose and Net Energy (3.81 ,13.40 , 7.30 ,5.31 and 1.60 respectively), but it recorded the lowest values with % protein and solid nonfat (3.38 and 9.59 respectively) than those of other experimental treatments . Blood hematology explain that T3 ration had the lowest values of RBC, hemoglobin, MCV, MCH , MCHC , total protein , globulin , serum glucose and urea-N comparison of T1 and T2 rations. In addition, the results of economic efficiency were clearly that goats fed T2 ration had the highest value (12.03 %) and T3 ration (6.65) , whereas T1 ration had the lowest value.

Keywords : dairy zaribi goats , hybrid maize silage , milk yield and milk constitutes . some hematological parameters , rumen ctivity .

INTRODUCTION

In Egypt Animals are suffering from shortage of feeds especially during summer season. Animal feeding this period depend on grains, concentrate feed mixtures and agriculture residues .The rising costs of feed in particularly, grains and protein supplemented have led to significant increase in animal feed cost during recent years. Forages are usually the cheapest ingredients in animal ration .small ruminants as well as sheep and goats are important domestic animals all over the world , because of their adaptability to different environmental conditions and utilizing poor quality forages and feed stuffs . Maize in Egypt is considered the main summer forage in the sheep and goats diets so that occupies large area of available cultivated lands. Maize plant silage is a well digestible and palatable high quality forage crop and mainly used as silage high contain of energy for dairy animals particularly with small dairy animals . Different starch sources, optimizes the growth of rumen microbial and influences the rate population of microbial protein synthesis, nitrogen utilization and production of volatile fatty acids (Jalce *et al*., 2009). Preserving green forages on the form of silage for minimal loss of nutritive value due to anaerobic fermentation of soluble carbohydrates to organic acids. (Adogla and Aganga , 2000) found that supplying the right amount of corn silage had the higher improved production of herds. Corn silage can be an economic source of nutrients for dairy animals, particularly on large farms where feeding can be mechanized (Olker *et al*., 2009) and (Wrobel, 2009) explained that microorganisms gas play important roll in silage to improve fermentation which evident by a rapid decline in pH. increase of lactic acid and decreased ammonia nitrogen content . Also they reported that, silage fermentation has a major effect on feed intake, nutrients utilization and milk production of ruminants. (Huhtanen *et al*., 2003) , registration that changes in milk composition will be reflected on the nutritional and economic values of sheep and goat's milk of other dairy products . Constructively, (Nkosia *et al*., 2011) observed that intake and digestibility of organic matter, crude protein , dry matter and fiber in addition to nitrogen retention were improved when small ruminant fed bacterial inoculated corn silage.

MATERIALS AND METHODS

Twenty four lactating Zaribi goats averaging 40.93±0.36 kg LBW with nearly 30 months as age were randomly chosen and divided into three similar groups (8 in each) according to their body weight .The aim of the trial was to assess the effect of feeding a new hybrid variety of hybrid El-Raianah x El-Shamia maize on the form of silage on feed consumption ,milk production and milk constituents , and some blood parameters, rumen microorganisms , and economic efficiency by lactating zaribi goats. All does were of good productive and performance, the animals were housed in separated pens under nearly similar environmental condition.

Animals feeding

All animals groups were fed a concentrate feed mixtures (CFM) to cover fifty % of protein requirement. Addition to *ad libitum* supplement of hybrid maize silage alone or with berseem mixture where,100 % berseem silage offered to group$_1$(T_1),100% hybrid maize silage group 2 (T_2) and 50 % berseem silage+50% hybrid maize silage for group$_3$ (T_3).Rations were offered twice daily at 8 a.m. and 4 p.m. while water was offered freely. The CFM and feedstuffs were analyzed according to (AOAC , 2005).Contents of neutral detergent fiber (ADF) and acid detergent fiber were analyzed using Goering and (Van Soest ,1991) method . The chemical compositions of experimental diets are recorded in Table (1).The quantity of offered feed and the residual diet was measured to determine feed intake during lactation periods. Milk production was assessed individually by-weekly. Concentrate feed mixture (CFM) consisted of 25% undecortecated cottonseed meal , 38.5% yellow corn, 10 % soybean meal , 20 % wheat bran, 3% molasses, 2.5% limestone and 1.0% common salt. Gross energy (GE) was calculated according to (Blaxter ,1966).

Digestion trials

Animals of digestion trials were feeding individual. three digestion trials were conducted(3 animals in each).The digestion stages were two weeks considered as preliminary period followed by seven days collection period .Urine and feces samples were collected daily .Solution of 20% H_2so_4 was added to representative urine samples .Samples of tested feedstuffs were taken at the beginning , middle and collection end period .The samples were analyzed according to (AOAC , 2005).Body weights of all animals were recorded fortnightly during experimental period.

Milk yield

New-born lambs were kept with their mothers till weaning , except during time of milk yield recording. During suckling period, milk yield was recorded by weekly for all does while separating kids from mothers . Samples were taken when udder was milked and yield was corrected for 4% fat correction milk (FCM) using the next formula=0.265 x milk yield (kg)+10.5 x fat yield x milk yield (kg) as stated by (Rafat and Saleh ,1962).Milk samples from consecutive evening and morning milking were taken and mixed in proportion to yield .

Milk samples and composition

Does in all tested groups and during suckling their kids the milk samples were composed and analyzed for chemical composition according to Bradley *et al.(*1992).Yield of 4% FCM were computed .Fat , protein, lactose and total solid of milk were determined .

Rumen fermentation study

Three trials of digestion (3 animal in each) were used to determine of change in the pH and total volatile fatty acid (TVFAs) and nitrogenous constituents of rumen liquor at 0 , 3 and 6 hr. samples were studied by collecting 250 ml of rumen liquor from each animal, using a stomach tube(Gastric tube) employing suction(Lane *et al.*,1968).The rumen liquor was immediately brought to the laboratory and strained through three layers of cheese cloth .The pH was determined immediately using a digital pH analyzer (ELICO LI 614).sample of rumen liquor were analyzed for total nitrogen(TN),NH3-N concentration according to (AOAC, 2000), while the VFAS concentration was determined according to (Eadie *et al.* ,1967).

Blood biochemical and hematology profile

At the end of experiment 10 ml blood was collected before feeding in hepatized test tubes through the jugular vein of lactating goats in each group .Whole blood was immediately used for hematological estimation .Plasma was separated from an others blood samples by centrifugation at 3500 rpm for 20 minutes whereas a part was used for enzyme determination, the other part was kept frozen at -20°C until other biochemical analysis as well as red blood cells (RBC), hemoglobin, hematocrit, mean cell volume (MCV) , mean cell hemoglobin concentration (MCHC), platelets (PLT) and white blood cells (WBC) , total protein , albumin, globulin , glucose and creatinine were determined according to (Weichselbaum ,1989) and (Drupt ,1974) .

Feed conversion

Feed intake were recorded biweekly , the experiment lasted for 120 days. The feed conversion was calculated as the amounts of dry matter (DM), total digestible nutrients (TDN) or digestible crud protein (DCP) required to produce1 kg 4% fat correction milk (FCM).

Minerals contained

The aching and minerals of rations as well as , calcium (Ca) , phosphorus (P) , magnesium (Mg) , sodium (Na), potassium (K) , Zinc (Zn), ferrous (Fe), manganese (Mn), and copper (Cu) were determined according to work (Hoek *et al*.,1988) .

Economic efficiency

Economic efficiency for gain production expressed as the daily price of kg milk , feed cost of kg milk and cost of feed consumed , Whereas, price of ton concentrate feed mixture = 3000 LE/ ton, kg milk = 4 LE , hybrid maize (HSRS)=180 LE/ ton ,berseem silage = 240 LE/ton , mixture of hybrid maize x berseem silage =210 LE/ ton and rice straw =100 LE/ ton (according to price of 2015) .

Statistical analysis

All numerical data obtained were statistical analyzed by SAS (2009) procedures for personal computer. When F-test was positive , least significant differences Duncan (1955) within program SPSS was done to determine the degree of significance between means .

Results and Discussion

Chemical compositions of concentrate mixture and silages

Chemical compositions of berseem silage (BS),hybrid Ryanah x Shamia(HRS) and Ryanah x Shamia + berseem silage (HRSXBS) were calculated for composition of different rations and the data are presented in Table (1). Data clearly showed that , HRS (T2) characterized by higher values of OM CP and NFE % and lower of DM , EE , CF and ash% than T1 and T3 rations .These agreement with those reported by (Mahmoud *et al* .,1992), (Khinizy *et al*. ,1997), and(El-Sayes *et al*.,1997).Moreover,T3 ration had higher values of DM and ash but ,it lower of OM and CP than other tested groups .This data were within the normal ranges reported by (Mostafa *et al*.,1999). (Mohammad *et al*., 1999) and (Moawad *et al*.,2001). On the other hand ,T_1 ration had the higher values of NDF, ADF, Hemicelluloses ,Celluloses , and ADL and the values were (31.5 , 23.7, 7.8 , 8.2 and 15.50 respectively) compared to T_2 and T_3 rations. Meanwhile , T_2 ration had lower values(30.8 , 20.2 ,10.6 , 7.7 and 12.5 for NDF, ADF, Hemicelluloses , Celluloses and ADL respectively .(Wheeler ,2003) recommended the concentrations of non-fiber carbohydrate (NFC) in lactation rations (% of diet DM) should not bellow than 20-25%and not more 40-45% (NRC, 2001).Rations should never exceed 44 % NFC or contained less than 15% for age NDF. In addition to ,the concentration of fiber and fiber fractions were negatively related to quality because forages higher fiber had less available energy and are consumed with a few amounts by goats than the forages with low contain of fiber (Weiss *el al*.,1982). Moreover,T2 ration had higher values with NDS and ANDF(69.20 and 21.56) and lower of UNDF(9.24)in compassion to T1 and T3 ration.

Table 1. Chemical analysis and cell wall constituents content of the Feedstuffs (on % DM bases) .

Items	ingredients					Experimental Rations		
	CFM	BS	RS	HRSS	HRSXBS	T_1	T_2	T_3
DM	91,53	87.17	89.13	88.63	86.72	88.32	87.79	90.46
OM	90.27	87.41	87.35	88.91	88.62	90.69	90.87	89.83
CP	14.39	14.12	1.36	14.25	14.17	14.67	14.89	14.03
EE	3.27	2.31	1.45	2.76	2.27	2.94	2.54	2.79
CF	12.63	22.93	28.31	22.73	22.77	21.45	17.02	20.78
NFE	59.98	49.05	56.23	49.17	49.41	51.63	56.42	52.23
Ash	9.73	12.59	12.65	11.09	11.38	9.31	9.13	10.17
NDF	38.57	38.73	40.88	40.75	39.53	31.50 ^{A}	30.80 ^{B}	31.40 ^{A}
ADF	20.76	21.55	22.16	19.79	18.92	23.70 ^{A}	20.20 ^{B}	19.70 ^{B}
Hemic.	17.81	17.18	18.72	20.96	20.61	7.80 ^{A}	10.60 ^{B}	11.70 ^{B}
Cellulo.	12.42	13.16	14.33	12.17	10.07	8.20	7.70 ^{B}	5.10 ^{B}
ADL	8.34	8.39	7.83	7.62	8.85	15.50	12.50	14.60
NFC *	34.04	32.25	43.66	31.15	32.65	41.58	42.64	41.61
NDS**	61.43	61.27	59.12	59.25	60.47	68.50	69.2	68.60
UNDF***	7.72	7.80	7.68	7.45	8.40	11.72	9.24	11.00
ANDF****	30.85	30.93	33.20	33.30	31.13	19.78	21.56	20.40

A and B Means in the same row with different superscripts differ significantly at P< 0.05 .
*** Non fibrous carbohydrate % (NFC) = 100 - (CP%+EE%+Ash%+NDF%) , (Calsamiglia *et al.*,1995).**
**** NDS : Neutral detergent soluble =100 – NDF. ***UNDF: Unavailable NDF= NDF X 0.01X ADLX 2.4 (Fox *et al* ., 2000) .**
****** ANDF Available NDF = NDF – UNDF .**
CFM = concentrate feed mixture , BS= berseem silage , HRSS = hybrid El-Raianah x El-Shamia maize silage, HRSXBS= hybrid El-Raianah x El-Shamia maize silage x berseem silage) .

Minerals as macro and trace elements

Data of minerals are presented in Table(2) .Obtained results showed macro elements of T1 ration were recorded the lowest values of calcium, phosphorus , magnesium and sodium (0.46 , 0.41 , 0.16 and 0.21 respectively) except of potassium (K) was higher than T3 ration ,At same time,T2 ration had recorded the highest values of calcium, phosphorus , magnesium , sodium and potassium (0.84 ,0.71, 0.25, 0.33 and 1.47 respectively). As a general rule if maize silage makes up 25 % or more of a lactating goats diet it must be supplementing with trace minerals .This result is consistent agreement with (Tovar *et al*. ,2010). On the other hand , trace elements as well as(Fe, Zn and Cu) recorded the highest values with T3 (78.52, 27.38, 21.63and 9.32 respectively)than other tested rations .The minerals may play an important role on milk production ,This is corresponding to (Bawala *et al*., 2006) who reported that milk yield increased with increasing level of minerals as calcium, Phosphorus, Magnesium, Sodium and Potassium in diets .In addition to **Iron ,** (78.52,27.38,21.63 and 9.32 respectively) than T1 ration (69.81, 22.44 , 15.94 and 8.87 respectively) and T1 ration (60.05, 27.38, 21.63 and 6.15 respectively). On the other side , Zinc and Cupper were significantly higher with T3 ration at same time manganese had lower value .

Average feed intake

The daily DM intake of dairy goats are presented in Table (3).The total DM intake as g / kg BW or g / kg $w^{0.75}$ were significantly ($p<0.05$) decreased with T_2 ration (38.2 and 97.1) in compaction

with T_1 (39.9 and 101.5) and T_3 (41.7 and 105.3 respectively).This increase in DMI with rations T_1 and T_3 was observed also by (Ibrahim *et al.* , 2012) , using mixture of silages in dairy Zaraibi goats and Rahmany sheep.

Table 2. Mineral of experimental rations fed by dairy zaribi goats .

Items	Experimental groups T_1	T_2	T_3
Minerals for experimental rations (CFM + silages)			
Macro elements			
Calcium , (Ca)	0.46	0.84	0.67
Phosphorus , (P)	0.41	0.71^{A}	0.55
Magnesium , (Mg)	0.16	0.25	0.19
Sodium , (Na)	0.21	0.33	0.23
Potassium ,(K)	1. 34	1.47	1.18
Trace elements			
Iron (Fe)	69.81^{A}	60.05	78.52
Zinc (Zn)	22.44^{B}	23.97	27.38
Manganese (Mn)	15.94^{B}	34.62	21.63
Cupper (Cu)	8.87^{A}	6.15	9.32

A and B Means in the same row with different superscripts differ significantly at P < 0.05 .

Table 3. Average feed intake feed efficiency of dairy Zaraibi goats fed the Experimental rations.

Items	Experimental groups T_1	T_2	T_3
Duration of trial (day)	120	120	120
Average body weight, kg	41.80	41.58	40.91
Metabolic body size, $w^{0.75}$	16.44	16.37	16.18
Dry matter intake (DMI g / h / d)			
Concentrate feed mixture(CFM)	665	636	688
Silages	1004	953	1015
Total DMI g / h /d	1669^{A}	1589^{B}	1703^{A}
Total DMI g kg BW	39.9	38.2	41.6
kg DMI / kg milk	1.43	1.14	1.34
kg DMI / kg FCM	1.49^{A}	1.18^{B}	1.41^{A}
g CP / kg milk	245	237	239
TDN (kg /day)	1.11^{A}	1.09^{B}	1.12^{A}
TDN g/kg milk	988	807	949
DCP g / day	184.26^{A}	182.01^{A}	178.99^{B}
CP g / kg milk	158	131	141
NFC g / day	41.58	41.84	40.60
Daily water consumption			
L / h /day	4.06^{A}	3.41^{B}	3.78^{A}
Ml / kg BW	97.13	82.00	92.40
Ml / kg $W^{0.82}$	247.0	208.0	233.6
Ml/ g DM intake	2.43	2.15	2.22
Feed efficiency			
NE (MJ / kg) **	0.359	0.373	0.356
NED(Mcal /kg)***	1.50	1.56	1.49
NEL (M cal / kg) ****	o.659	0.756	0.736
NEL / NED(%)	43.93^{A}	48.46^{B}	49.40^{B}

A and B Means in the same row with different superscripts differ significantly at P< 0.05 .

*** DDM : Digestion dry matter % of DM = 88.9 - 0.779 X(ADF % OF DM) Schroeder , 1996)**

**** NE : Net energy (M J /kg) = TDN % X 0.0245) - 0.12/ 4.184 (NRC, 2001)**

*****NED (Mcal /kg) = (TDN%) X (0.0245) – 0.12 (NRC 2001) .**

******NEL (Mcal /kg) = (0.0929X fat %)+(0.0547x protein %)+ (0.0395 x lactose %).(NRC. 2001).**

In addition , water consumption recorded the lowest values with T2 ration (3.41 L/h/d) whereas the higher value with T1 ration (4.06 L/h/d) and T3 ration had moderate value. Generally , the quantity of daily water consumption in present study is nearly similar to those obtained by (Soliman *et al.* ,2010) on growing Zaraibi goats .In addition to , the feed efficiency as well as (NE,NED and NEL) were higher with T_2 ration (0.373,1.56 and o.756 respectively) in comparison of T_1 (0.359,1.50 and 0.669 respectively) and T_3 ration (0.356 ,1.49 and 0.736 respectively) .While (NEL / NED %) was higher with T_3 (49.40%) than those of T_2 (48.46%) and T_3 (43.93 %) .

Digestion coefficients and nutritive values

Results in Table (4) showed that T_2 was significantly ($p<0.05$) highest digestibility coefficients of CP, CF, EE , NFE and GE(76.94,64.91,74.82 , 74.13 and 66.25 % respectively) while DM had lower value (69.39) than of those T_1(71.37, 75.28, 63.17, 72.56 ,71.61 and 63.31 respectively) and T_3 (74.32,74.91,61.88 , 72.94, 72.24 and 64.17 % respectively).

Table 4. igestion coefficients and nutritive values of experimental fed by zaribi goats .

Items	Experimental groups T_1	T_2	T_3
Nutritive digestibility , %			
DM	68.97	69.37	70.62
OM	71.37^{B}	73.69^{A}	74.32^{A}
CP	75.28^{B}	76.94^{A}	74.91^{B}
CF	63.17^{A}	64.91^{A}	61.88^{B}
EE	72.56^{B}	74.82^{A}	72.94^{B}
NFE	71.61^{A}	74.13^{A}	72.24^{B}
GE	63.31^{B}	66.25^{A}	64.17^{B}
TDN %	66.34^{A}	68.61^{A}	65.68^{B}
TDN g / kg milk	949	807	988
DCP %	11.04^{A}	11.46^{A}	10.51^{B}
DCP g / kg milk	141	131	158
Fiber fractions , %			
NDF	68.40^{A}	61.90^{B}	$66..28^{A}$
ADF	64.30	63.80	63.93
ADL	35.90^{A}	32.69^{B}	34.81^{A}
Hemicelluloses	64.80^{A}	64.02^{A}	60.13^{B}
Celluloses	70.90^{A}	65.32^{B}	64.77^{B}
Metabolizability %			
ME(kcal. / kg)	36.27^{B}	38.15^{A}	37.78^{A}
ME/ GE	59. 67	57.58	56.52

A and B Means in the same row with different superscripts differ significantly at P< 0.05 .

Moreover, the feed conversion as TDN and DCP for milk yield were significantly ($p<0.05$) higher with milk yield of T_3 ration (988 and 158 respectively) followed by T2 (949 and 141 respectively) and , while the lowest values were showed with T2 (807 and 131 respectively) and fat corrected milk at same trend . At the same time , the ratio of roughage to concentrate were similar for all treatments (60:40).Generally, the increased silage intake gave positive evidence that silage was good quality as reported by Ahmed *et al.* (2001) with lactating goats . DMI for kg milk and FCM had recorded reflected values of DMI % of BW and $W^{0.75}$ for all experimental treatments. Subsequent, improvement in digestion coefficients could be due to the high energy value of maize silage. In this respect , (Zeid and Shakweer ,2011) reported that high inclusion of maize silage in ration improved digestibility coefficients .However, the results of fiber fractions as well as(NDF, ADF, ADL , hemicelluloses

and celluloses %) showed that T1 ration had the highest values (68.40, 64.30, 35.90 , 64.80 and 70.90 respectively) whereas, the lowest values were detected with T2 ration except of cellulose and hemicellulose digestibility were higher. On the other hand metabolisable energy (kcal / kg)was higher with T2 ration (38.15) followed by T3 (37.78) and the lowest value had detected with T1(36.27) . In addition ME/ GE was recorded the highest value with T1 (59.67) and T3 ration had lowest value(56.52) .T2 ration was moderately (57.58).

Nitrogen utilization and minerals utilization

Data in Table (5) showed that nitrogen intake(NI),feces nitrogen (FN), urine nitrogen (UN) and nitrogen excretion (NE) of T1 ration were higher values(39.18 , 12.04,15.48 and 27.42 g / h / d respectively) followed by T3 ration (38.23,11.76,13.58 and 25.34 respectively) while T2 was moderate valued (37.86 ,11.49,14.81 and 26.30 g/h/d respectively) and T3 (38.23 ,11.76,13.58 and 25.34 g /h/d respectively). Moreover, nitrogen balance (NB) and (NB/NI%) had recorded the highest values with T1 (11.66 and 29.76 respectively) than those of T2 ration (11.56,30.53 respectively) and T3 (12.89 and 33.72 g / h/d respectively).This may be a related to the higher CP digestibility in ration T1 and T2 thanT3 ration . Nitrogen balance obtained in this study were closed to that reported by (Yacout and El- Badawi , 2001) and (Mohsen *et al*.,2006) who found that N balance of goats fed rations contained 12%CP was 41.4 g/h /d **).**

Table 5. Nitrogen retention of tested rations fed by dairy zaribi goats .

Items	Experimental groups		
	T_1	T_2	T_3
Nitrogen balance %			
Nitrogen intake(NI)g/h/ d	39.18 ^{A}	37.86^{B}	38.23^{A}
Fecal nitrogen(FN)g /h/ d	12.04^{A}	11.49^{B}	11.76^{B}
Urinary nitrogen(UN) g / h / d	15.48^{A}	14.81^{A}	13.58^{B}
Nitrogen excretion (FU + UN)	27.42^{A}	26.30^{A}	25.34^{B}
Nitrogen balance (NB) g / h / d)	11.66^{B}	11.56^{B}	12.89^{A}
NB / NI , %	29.76 ^{B}	30.53 ^{B}	33.72 ^{A}

A and B Means in the same row with different superscripts differ significantly at P < 0.05 .

Average daily milk yield

New-born kids were kept with mothers till weaning , except during time of milk yield recording. During suckling period , milk yield was recorded by weekly for all does while separating kids from mothers. Results in Table (6) revealed that actual milk yield (AMY) and 4% FCM yield of dairy zaribi goats fed tested rations T2 were the highest being (1.390 and 1.350 kg/d) than those fed T3 (1.274 and1.206) ,T1 (1.168 and 1.119) respectively. The higher milk yield recorded by goats fed T2 ration .This results indicated that using hybrid of El-Ryanah x El-Shamia maize and berseem silage as source of roughage made of the increasing milk yield and agreed with those obtained by (Mahmoud *et al* .,1992) who reported that milk yield of lactation animals increased with corn silage in the ration .

As milk composition of goats as affected by feeding rations containing hybrid El-Ryanah x El-Shamia maize silage and berseem silage and obtained data illustrated that there significant differences ($p < 0.05$) in milk composition among the different groups .The percentage of fat, total solid, total nitrogen , lactose and net energy of T2 ration were significantly ($p<0.05$) higher (3.81,13.40 , 7.30 , 5.31 and 1.60 respectively), while percentage of protein , solid nonfat and Ash had detected lower values(3.38, 9.59 and 0.88) than those of T1 and T3 rations , these results may be due to the higher fermentation of fibers into volatile fatty acid (17.91, 20.55 and 18,62) for T1,T2 and T3 respectively these results agreement with those obtained by (Ahmed *et al*., 2013).The present results were related to rumen fermentation , blood metabolism and microorganisms convert much of the dietary carbohydrate to VFAs which are absorbed into the blood steam and became the primary source of energy for the goats .The VFAs also serve as important building blocks for milk fat as well as lactose .On the other hand, (Vatandoost *et al*.,2011) found that lactating dairy goats increased in milk production when using hybrid maize which affect through changes in feed intake .

Table 6. Effect of feeding experimental rations on milk production ,milk constituents of dairy zaribi goats .

Items	Experimental groups		
	T_1	T_2	T_3
Total Milk yield (kg / h / period)	**140.16^{B}**	**166.80^{A}**	**149.64^{A}**
Daily Milk yield(kg/h/ d)	1.168^{B}	1.390^{A}	1.274^{A}
FCM (kg / h / d)	1.119^{B}	1.350^{A}	1.205^{B}
Fat %	3.72	3.81	3.64
Fat Yield (g / h / d)	41.62	51.44	43.86
Protein %	3.65	3.38	3.47
Protein Yield (g / h / d)	40.84^{B}	45.63^{A}	41.85^{B}
Protein : Fat (kg / h / d)	1:1.05	1:1.13	1:1.05
Total solid %	13.38	13.40	13.14
Total Nitrogen (TN)	6.53^{B}	7.30^{A}	6.70^{B}
Solid Non Fat (SNF)	9.66	9.59	9.50
Lactose %	4.89^{B}	5.31^{A}	5.27^{A}
Ash %	0.91	0.88	0.76
Net Energy(Mcal/Kg milk)	1.54	1.60	1.52

A and B Means in the same row with different superscripts differ significantly at P < 0.05 .

Rumen microorganisms

Results in Table (7) showed that pH values T3 ration at 3 and 6 hr. were significantly ($p<0.05$) higher (6.24and 6.35 respectively) than those of T1 ration (6.22and 6.33 respectively) and higher values recorded with T2 ration(6.19 and 6.31 respectively) . Meanwhile , TVFAS of T1 ration was significantly($p<0.05$) lower at 0 , 3 and 6 hr. (21.45, 23.91 and 20.47 respectively) than T3 ration (23.18, 24.62 and 21.89 respectively) but the highest values were recorded with T2 ration (24.72 , 26.55 and 23.18 respectively)

On the other hand NH3-N of T3 ration was significantly($p<0.05$) lower at 0 , 3 and 6 hr. (21.83, 27.14 and 24.78 respectively) than T1 ration (24.38, 28.47 and 26.89 respectively) , on the other side the

highest values were recorded with T2 ration (27.15, 31.29 and 29.61 respectively). As rumen microbial count and classification as well as(Total bacterial count , Cellulolytic bacterial and Cellulolytic bacterial) . As Total bacterial count showed T2 ration recorded the highest values (42.45, 43.547 and 44.39) at 0, 3 and 6 hr. respectively post feeding followed by T1 (40.69, 36.18 and 38 77) whereas T3 ration had detected the lowest values (38.45 , 35 .76 and 33.27) at 0 , 3 and 6 hr. respectively. The results are in harmony with those of (Kurihara *et al*.,1998) they observed that the peak of bacterial counts was between 3 and 6 hrs after feeding. Moreover , Cellulolytic bacterial of T1 ration was significantly ($p<0.05$) hugher (3.84, 4.16 and 3.96) at 0 , 3 and 6 hr. respectively , and the lowest values detected with T3 ration (3.37 , 3.64 and 3.24) at 0 , 3 and 6 hr. respectively , but T2 ration was moderate values .On the other side, Protozoa was higher with T3 ration (4.06, 4.27 and 4.38) than those of T1 ration , but T2 ration had the lowest values .These results agreement with (Khampa and Wanapat ,2007) and (Behraka *et al*.,1991) reported that rumen have a large and more active bacterial population, it may help to increase the rate of digestion. In the other studies, (Nour *et al*., 1989) found that feeding animals on concentrate with high roughages increased the total protozoa count in the rumen . Also the results were in Harmony with those obtained

Table 7. Effect of experimental rations fed by lactating Zaribi goats on rumen microorganisms.

Items	Time	Experimental groups T_1	T_2	T_3
pH value	0	6.44	6.37	6.43
	3	6.22^{B}	6.19^{B}	6.24^{A}
	6	6.33^{B}	6.31^{B}	6.35^{A}
TVFAS (MEQ/ 100 ml)	0	21.45^{B}	24.72^{A}	23.18^{A}
	3	23.91^{B}	26.55^{A}	24.62^{B}
	6	20.47^{B}	23.18^{A}	2189^{B}
NH3-N(mg / 100 ml)	0	24.38^{B}	27.15^{A}	21.83^{B}
	3	28.47^{B}	31.29^{A}	27.14^{B}
	6	26.89^{B}	29.61^{A}	24.78^{B}
Total bacterial count (10/ ml)	0	34.69^{B}	42.17^{A}	38.45^{A}
after 3 hrs.	3	3818^{B}	43.46^{A}	35.76^{C}
	6	36.77^{B}	44.39^{A}	33.27^{B}
Cellulolytic bacterial(10^4/ ml) af	0	3.84	3.45	3.37
	3	4.15^{A}	3.72^{B}	3.64^{B}
	6	3.96^{A}	3.66^{A}	3.24^{B}
Total protozoa count(10^4/ /m	0	3.47^{A}	2.88^{B}	4.06^{A}
after 3 hrs.	3	2.97^{B}	3.11^{B}	4.27^{A}
	6	2.91^{B}	3.24^{B}	4.38^{BA}

A ,B and C Means in the same row with different superscripts differ significantly at P < 0.05 .

Blood profile

Data in Table (8) explain that T3 had significantly decrease of RBC and hemoglobin (11.31 and 9.22) than T1 (11.92 and 9.67) and T3 rations (12.24 and 10.45) , At same time , MCV , MCH MCHC were higher with T1 comparison of T2 and T3 rations. HCT % was recorded the the higher value with T3(28.73) and the lower value had detected with T2 (16.14%) Meanwhile, the quantitative and qualitative parameters of milk production of dairy goats depend on nutritional supply and blood constituents. (Cupta *et al.* ,2007) found that cells of lactating mammary glands utilize as much as 80 % of available nutrients for synthesis of milk from blood .In addition to serum biochemical data are presented in Table (7).Showed that total protein, albumen, globulin, glucose ,Urea-N and Cholesterol of T2 ration had increased 7.52, .81,4. 1,72.45 and 62.18 respectively) but creatinine, AST and ALT concentrations were decreased (0.49,13.87 and123.17 respectively) than other tested rations. The obtained values are within normal range reported by (Jain,1986) for hematological parameters and (Kaneko,1986)

Table 8. Effect of feeding experimental rations e on hematology parameters .

Items	Experimental groups T_1	T_2	T_3
RBC x^{10} /µL	11.92^{A}	12.24^{A}	11.31^{B}
HB g/Dl	9.67^{B}	10.45^{A}	9.22^{B}
HCT %	24.18^{A}	16.14^{B}	28.73^{A}
MCV, FL	32.81^{A}	32.61^{A}	24.66^{B}
MCH, Pg	11.54^{A}	10.67^{A}	8.02^{B}
MCHC %	33.49^{A}	30.11^{A}	26.55^{B}
Serum Biochemical			
Total protein g /dL	7.23^{B}	7.52^{A}	7.16^{B}
Albumin g//dL	2.71	2.81	2.78
Globulin	4.52^{B}	4.71^{A}	4.38^{B}
Creatinine	0.68^{A}	0.49^{B}	0.74^{A}
Glucose mg/dl	$66,48^{B}$	72.45^{A}	64.24^{B}
Urea-N mg/ dL	55.20^{A}	62.18^{A}	49.91^{B}
AST µ/L	18.11^{A}	13.87^{B}	16.53^{A}
ALT µ/L	142.09^{A}	123.17^{B}	136.23^{A}
ALT / AST	9.44	8.59	8.85
Cholesterol, mg/dl	113.35^{A}	115.11^{A}	104.36^{B}

A and B Means having different superscripts within the same row are significantly different at (P<0.05) .

Feed utilization

Data of average feed intake and milk yield during experimental period as well as feed conversion efficiency of the dairy Zaraibi goats are summarized in Table (9).The data indicated that the average milk yield recorded significantly the highest value with T_2 ration (1.390 kg/h/d) followed by T_3 ration (1.274 kg / h / d) and lastly, T_1 ration had detected the lowest value (1.168 kg/h/d).Thus ,the feed conversion calculated as DM and CP (intake / milk yield) was better with T_2 ration (1.14 and 236.60) and T_1 ration(1.43 and 244.70) compared with T_3 ration (1.34 and 238.93) respectively. Similar results were observed by (Ahmed *et al*.,2013) using mixture of silages for dairy Zaraibi goats. In recent study, Ibrahim *et al.* (2012) observed that feed conversion efficiency based on DM and TDN was better with Rahmany sheep fed mixed silage (legume x grass silage) than those fed cowpea or millet x napier grass hybrid alone. Generally, the obtained values of feed conversion are within the normal range given by(Ibrahim *et al*., 2008) .

Table 9 . Feed conversion of lactating Zaraibi does fed experimental rations.

Item	Groups		
	T_1	T_2	T_3
No . of Zaraibi goats	8	8	8
Average body weight, kg	41.80	41.58	40.91
Metabolic body size, $w^{0.75}$	16.44	16.37	16.18
Total DM intake, g/h/d	1669 ^{A}	1589 ^{B}	1703 ^{A}
CP intake, g / h /d	244.70	236..60	238.93
Daily Milk yield (kg / h / d)	1.168 ^{B}	1.390 ^{A}	1.274 ^{A}
FCM (kg / h / d)	1.119 ^{B}	1.350 ^{A}	1.206 ^{B}
Feed conversion :			
Kg DM / kg milk	1.43	1.14	1.34
Kg DM / kg fat correction milk (FCM)	1.49	1.24	1.41
g TDN / kg milk	950	784	879
g TDN / kg fat correction milk (FCM)	990 ^{A}	807^{B}	929 ^{A}
g CP / kg milk	210	170	188
g CP / kg FCM	219	175	140

A and B Means having different superscripts within the same row are significantly different at (P<0.05) .

Economic efficiency

Data of economic milk efficiency Table (10) showed that differences among treatment rations. Dairy zaribi goats fed T3 ration showed the highest average daily feed cost (2.27 LE) and the lowest with T2 (2.08 LE), whereas T1 had moderately (2.24 LE). Meanwhile , price of milk yield of T1 ration was the lowest (4.67 LE) and T2 ration the highest value (5.56 LE) .These results may be due saving higher amount of high expensive feed concentrate mixture(CFM) and also replacing low expensive silage was increasing milk yield with feeding ration containing 100% hybrid Ryanah x Shamia maize silage(T2).

Table 10. Economical efficiency (LE) of tested rations on productivity of dairy zaribi goats .

Items	Experimental groups		
Feed efficiency :	***T_1**	****T_2**	*****T_3**
Av. feed intake g/h/d			
CFM intake , g /h/d	665	636	688
Silage intake , g /h/d	1004	953	1015
Total DM intake , g /h/d	1669 ^{A}	1589 ^{B}	1703 ^{A}
Cost of total daily feed intake (LE)	2.24	2.08	2.27
Average milk production (kg/h/ d)	1.168 ^{B}	1.390 ^{A}	1.274 ^{A}
Price of milk (LE)	4.67^{B}	5.56 ^{A}	5.10 ^{B}
Return , LE	2.43 ^{B}	3.48 ^{A}	2.83 ^{B}
Net revenue %	52.03^{B}	62.59 ^{A}	55.49 ^{B}
Economic efficiency (%)	-	12.03 ^{A}	6.65 ^{B}

A and B Means having different superscripts within the same row are significantly different at (P<0.05) .

These results are in accordance with those obtained by (Saleh *et al.* ,2007) who found that goats feed maize silage along with concentrate was the most economic milk production . Feeding of lactating goats on ration containing corn silage reduced daily feed cost and improved milk yield , milk composition and feed conversion (Mahmoud *et al.*,1992).Also economic efficiency expressed as the ratio between the price of daily milk and daily feed cost ,the results indicated that the highest economic efficiency for goats fed T2 ration (12.03), while the lowest economic was in T1 ration .

- Market price of CFM = 3000 LE / ton , kg milk = 4 LE. - Price of HSRS = 180 LE / ton ,

- Price of Egyptian berseem silage = 240 LE / ton - Price of Egyptian berseem silage x HSRS = 210 LE / ton - Net revenue = {(Selling income of milk - coast of feed intake (LE)} 100 LE for rice straw

* Egyptian berseem silage (100%) ** Hybrid Shamia x raianah maize silage (HSRS 100%) silage .

*** Hybrid Shamia x raianah maize (HSRS)+Egyptian berseem silage (1:1).

CONCLUSION

In conclusion, replacement berseem as(100% or 50%)by hybrid El-Ryanah x El-Shamia maize created changes of small magnitude in the concentrations of milk fat and milk protein in the present work. According to the literature, maize silage often had similar effects on yield and composition of milk, in spite of the large differences in their carbohydrate fraction. These effects include a lesser quantity but more concentrated milk when hybrid El- Ryanah x El--Shamia maize is replaced, but a constant milk yield and higher concentrations of fat and protein .

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دراسات غذائيـة لتقييم الانتاجيـة وجودة صنف جديد من هجن الأذرة المحفوظـة على ١- انتاج اللبن وتركيبه وبعض مقاييس الكرش والدم والكفاءة الاقتصادية فى الماعز الزرايبى الحلابـة.

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إستهدفت الدراسة تقييم صنف جديد من هجن الأذرة الريانة بالشامية سواء بمفرده أو مختلطا مع البرسيم فى صورة سيلاج على انتاج اللبن وتركيبه وحركة الكرش وبعض مقاييس الدم والكفاءة الغذائية الاقتصادية فى الماعز الزرايبى الحلابة. استخدم فيها عدد ٢٤ رأس من الماعز الزرايبى الحلابة بمتوسط وزن ٩٣و ٤٠ كجم وعمر ٣٠ شهرا تقريبا . قسمت الحيوانات الى ثلاث مجاميع متماثلة بكل مجموعة ٨ حيوانات واستمرت التجربة ١٢٠ يوما . وغذيت جميع الحيوانات على علف مركز يغطى ٥٠ % من الاحتياجات البروتينية بينما اعطى السيلاج حتى الشبع وكانت المجاميع التجريبية تتغذى كالأتى : أ- المجموعة الأولى تناولت (١٠٠%) سيلاج البرسيم (كنترول) للشبع .ب- المجموعة الثانية تناولت (١٠٠%) سيلاج هجن اللأذرة الريانة بالشامية للشبع .ج- المجموعة الثالثة تناولت (٥٠% سيلاج هجن اللأذرة الريانة بالشامية + ٥٠% سيلاج برسيم) للشبع . أظهرت النتائج المتحصل عليها مايلى :١- ارتفاع محتوى المجوعة الثانية (مج٢) من المادة العضوية ، البروتين الخام ، المستخلص الخالى مـــن الأزوت . بينما انخفضت المادة الجافة ، المستخلص الاثيرى والألياف الخام لهذه المجموعة مقارنة بالمجموعتين الاولى والثالثة (مج١ & مج٣). بينما أظهرت المجموعة الثالثة (مج٣) ارتفاعا فى المادة الجافة والرماد ، فى نفس الوقت سجلت المجموعة الأولى (مج١) أعلى قيم لكل من المستخلص الاثيرى والالياف الخام وانخفاض المستخلص خالى ازوت والرماد . ٢- اوضحت النتائج أن (مج١) كانت الأعلى فى الـ ان دى اف ، الـ ايه دى اف ، ، السيللوز ، الـ ايه دى اف ، ، السيللوز ، الـ ايه دى (٣١.٥، ٢٣.٧، ٨.٢ ، ١٥,٥، ٤١,٥٨ %على التوالى ، بينما انخفض السيللوز ال والكربوهيدرات الخالية من الألياف ليسجل اقل القيم بالنسبة للمجاميع الأخرى (٧.٨ و ٤١.٥٨%) ، انخفضت نفس القيم مع الـ مج٢ (٣٠,٨ ، ٢٠,٢٠، ١٠,٦٠، ٧,٧٠، ١٢,٥٠، ٤٢,٦٤، %على التوالى) وبفارق معنوى (٠٥و ٠) ، كما سجلت المج ٣ (٣١,٤٠ ، ١١,٧٠، ١٩,٧٠، ٥,١٠، ١٤.٦٠، ٤١,٦١ %على التوالى) . ٣- سجلت (مج٣) أعلى قيمة للمادة الجافة المأكولة يوميا كنسبة مئوية (%) من وزن الجسم أو حيز الجسم التمثيلى(٤١,٦٣ ، ١٠٥,٢٥ على التوالى) مقارنة بالمج١ (٣٩,٩٠، ١٠١,٤٦على التوالى) والمج (٣٨,٢ ، ٩٧,٠٧ على التوالى). ٤- الكفاءة الغذائية بالنسبه الى كجم من المادة الجافة المأكولة والبروتين المهضوم لكل كيلو جرام لبن أوضحت النتائج ان حيوانات الـ مج٢ كانت الأفضل (١,١٤ و ٢٣٧ على التوالى) ثم تبعتها الـ مج٣ (١,٣٤ و ٢٣٩ على التوالى) مقارنة بالـ مج١ (١,٤٣ و ٢٤٥ على التوالى) .٥- أ ما معاملات الهضم فقد سجلت الـ مج ٣ أعلى معاملات للهضم (المادة الجافة ، المادة العضوية (٧٠.٦٢ ، ٧٤.٣٢ على التوالى) مقارنة بالمجموعات التجريبية الأخرى ، اما باقى المكونات (البروتين الخام ، الألياف الخام ، المستخلص الاثيرى ، المستخلص خالى الأزوت والطاقة الصافية فقد سجلت هذه المجموعة قيم أقل من تلك التى جاءت مع الـمجاميع الأخرى (٧٤.٩١ ، ٦١.٨٨، ٧٢.٩٤ . ٧٢.٢٤ ، ٦٤.١٧ على التوالى). بينما سجلت الـ مج١ القيم الآتية لنفس المكونات الغذائية (٧٥.٢٨، ٦٣,١٧ ، ٦٣.٣١,٧١,٦١,٧٢.٥٦ على التوالى) فى حين اعطت المجموعة الثانية قيم متوسطة بين المج ١و المج ٣ (٧٦.٩٤، ٦٤.٩١، ٧٤.٨٢، ٧٤.١٣، ٦٦.٢٥ على التوالى) . ٦- اوضحت النتائج المتحصل عليها ان مج ٢ حققت أعلى انتاجية لمحصول اللبن و اللبن المعدل الدهن ٤% (١.٣٩٠، ١.٣٥٠ كجم/ اليوم على التوالى) مقارنة بتلك المتحصل عليها من الـ مج١ (١,١٦٨ ، ١,١١٩ كجم / اليوم على التوالى) والـ مج٣ (١.٢٧٤ ، ١.٢٠٦ كجم / اليوم على التوالى) . ٧- سجل الدهن والمواد الصلبة الدهنية و النيتروجين الكلى والأكتوز و الطاقة الصافية للـ مج ٢ أعلى قيم (٣.٨١ ، ١٣.٤٠ ، ٧.٣٠ ، ٥.٣١ ، ١,٦على التوالى) بفرق معنوى (٠,٠٥) عن باقى المجاميع التجريبية بينما انخفض كلا من المواد الصلبة اللادهنية مع زيادة هجن الأذرة الريانة بالشامية فى العليقة مج٢ (٣.٣٨، ٩.٥٩) ومقارنة بالمجموعات التجريبيتين الآخرى (مج ١ و مج٣) . ٨- اوضحت نتائج تحاليل الدم ان هناك انخفاض فى كرات الدم الحمراء ، الهيموجلوبين ، البروتين الكلى والألبيومين ، الجلوبيولين وجلوكوز الدم للـ مج ٣ (١٢.٢٤، ١٠.٤٥، ٧.٥٢ ، ٢.٨١، ٤.٧١، ٧٢.٤٥على التوالى) مقارنة بالـ مج ١ (١١.٩٢، ٦٧. ٩، ٧.٢٣ ، ٢.٧١، ٤.٥٢، ٦٦.٤٨على التوالى) . ٩- الكفاءة الاقتصادية سجلت الـ مج٣ اقل اقتصادية (٦,٦٥ %) بينما اعطت الـ مج٢ أعلى قيمة (١٢.٠٣%) مقارنة بمجموعة الكنترول .