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COMPARITIVE STUDY ON DIFFERENT MIXTURES OF SILAGES ON MILK PRODUCTION , RUMEN AVTIVITY AND PERFORMANCE OF BORN KIDS IN DAIRY ZARIBI GOATS .

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ABSTRACT

The aim of this study was to investigate milk yield, milk composition and rumen activity of Zaribi does and performance of their newly born kids when were fed different silage mixtures.Eighteen Zaribi dairy goats showing healthy were divided into three similar groups (6 animal each) with average body weight 39.87kg and nearly 30-36 months of age, every kids with their dams (average BW 3.60 kg). All animals were fed concentrate feed mixture (CFM) to cover 40 % of requirements recommended by *NRC* (1981). Besides *ad libitum* berseem silage offered to R_1, silage of berseem x Raygrass for R_2 and silage of berseem x Rodgrass for R_3.The experiment lasted for 120 day.Nutrient digestibility and nutritive value were determined by digestibility trials.The obtained results of saponine residues in rations, milk, feces,urine and rumen liquor showed that there significantly ($P<0.05$) higher with R_1 group of all parameters than other tested groups. Moreover,feed intake of R_2 and R_3 groups were significantly($P<0.05$) higher compared with R_1.As for digestion coefficients the results were revealed that all nutrients digestibility were increased gradually with R_2 and R_3 in comparison of R_1.But no differences were observed of feed intake and digestion coefficients between R_2 and R_3 groups . Addition to Water consumption recorded lower values with R_2 and R_3 groups than control(R_1). Ruminal pH , VFA's and ammonia-N concentrate were recorded the highest values at 3 hrs post feeding.Molar proportion of ruminal volatile fatty acid (VFA's) found that there variations between acetic, propionate, butrtate and Iso-Biotrate values and the R_2 results showed that there significant ($p< 0.05$) decrease in acetic , butrtate and iso-biotrate than those of R_1 and R_3,as same time the propionate and valerate were gave higher value with R_2 group. Milk production as affected experimental rations showed that there were significant differences ($p<0.05$) in milk composition among the different tested groups. And the daily milk yield of R_2 and R_3 were significantly ($p<0.05$) higher than R_1.Data of kids BWG sucking their mother milk illustrated that R_2 and R_3 groups were significantly ($p<0.05$) increased compared to those in R_1 group. Thereafter the second group was recorded higher value of the total viable bacteria count than first and third groups.Economical efficiency of kids body gain , milk yield of dairy Zaribi goats based upon the differences in both growth rate and total cost.The corresponding values of the economical efficiency were 100%,123% and 119% for R1, R2 and R3 respectively.

Keyword : Different type of silages, dairy goats, milk production and constituents, performance of born kids, rumen activity and economic efficiency.

INTRODUTION

Earlier experiments have established the high intake and milk production potential of legume silages. (Castle *et al.*,1983) and (Auldist *et al.*,1999) showed the high feeding value of clover silage for dairy goats (Thomas *et al.*,1985).Other studies with red clover and alfalfa have demonstrated the superiority of legume silages in comparison with grass

silages (Hoffman *et al.*, 1998). Shortage of the concentrate feed in Egypt is a well known problem,therefore several studies were carried out to improve the nutritive values of the preserved mixture of green forages on the form of silage or hay to increase feed quantity and participate in solution of feed shortage problem and the dramatic increase in prices of animal feed ingredients .In Egypt ,sheep and goats are less developed compared to other livestock and the commercial goat's production is an intensive basis and commercial for feed resources with human. The ruminant in Egypt was predicated to be as10.8 million animal unites in year 2010.This animals required about 15.8 million tons of TDN and 2.49 million tones of DCP (Abdelhamid *et al.*,2001).The available conventional feed resources could cover only 84% and 89% of the required TDN and DCP, respectively (Abou Akkada 1984).However, feeding Egyptian berseem in green forage crops mixtures led to Saponine as considering anti nutritional factor and affected performance of ruminants and pigs (Patil *et al.*,1972).Harmful of saponine effect on cell membranes permeabilisation and other membrane. Saponins have long been known to action on erythrocyte membranes and this property has been used for their detection, (Plock *et al.,*2001).

The aim of the study is to investigate the effect of feeding the different silage mixtures types on milk yield, milk composition and rumen activity in Zaribi does and performance of their newly born kids.

MATERIALS AND METHODS

This study was conducted to evaluate the effect of mixtures of green forages on milk production, ruminal microorganisms activity and body gain of born kids sucking their mother milk in dairy Zaribi goats.

Experimental animals and rations

Eighteen Zaribi dairy does were divided into three similar groups (6 animal each) with average body weight 39.87 kg and nearly 30-36 months of age,every kid with her dam (average BW 3.60 kg).Each group was housed in a separate wall-ventilated pen. Animals were weighed at the beginning and at biweekly intervals thereafter. All animals were fed concentrate feed mixture (CFM)to cover 40%of requirements recommended by NRC(1981).Besides *ad libitum* berseem silage to R_1,silage of berseem x Raygrass for R_2 and silage of berseem x Rodgrass for R_3.Daily rations were offered to animals in two equal meals at 8 am and 4 pm.Feed intake and feces were recorded daily,Chemical analysis of the concentrate feed mixture,EBSxRay grass and EBSxRod grass and experimental rations are shown in(Table1).Clean water was permanently available throughout the experimental period to provide the production requirements.Whereas the feed and water consumption was daily measure-ed.Feed samples were prepared and keep for analyzed.Concentrate feed mixture.(CFM) consists of 36% yellow corn, 30% undecortecated cotton seed,27% wheat bran,3.0%molasses,2.5 % limestone, 1% common salt and 0.5% minerals mixture.

Feces and urine collection

At experiment end three animals from each group were chosen and put in digestion boxes preliminary to feces and urine collection. The collection period was 7 days following a two weeks as preliminary period , the feces samples were collected quantities daily during the collection period. Representatively samples of fresh feces were dried and ground then mixed and kept for chemical analysis. Whereas the urine was measured daily and collected after diluted with 20 ml of conc. sulfuric acid to kept ammonia messed until nitrogen determining.

Rumen liquor samples

Rumen liquor samples were collected at the end of the digestibility trials using a rubber stomach tube before feeding(0 hr),3 and 6 hrs post-feeding .Rumen liquor samples were strained through four layers of cheese cloth at each samples time for immediate determination of rumen digital pH meter. Ammonia-N was determined in rumen liquor according to(Conway 1962).Total volatile fatty acids concentrations were determined in rumen liquor according to(Warner 1964).

Silage making

Silage was made from green forages were chopped(10-15 cm)and sun dried to reach a moisture content of about 65-70%,the silage was prepared by filling successive layers of the shopped materials and heavy trodden before adding the next layers.However, each layer was included the chopped Ray grass and Rod grass with berseem (1:1 on DM bases). All silages were put in plastic bags for 8 weeks.(Soliman,1997).

Blood samples

Blood samples were collected from the jugular vein once before feeding (3 animals from each treatment) at the end of feeding trials. Blood samples were centrifuged at 4000 rpm for 20 minutes.Part of the separated serum was directed to enzymes activity determination, while the other part was stored frozen at -20c^0 till the biochemical analysis. Commercial kits were used for colorimetric biochemical determinations.

Economics efficiency

Economics efficiency are calculated on bases of Selling income of (milk+ income of BWG)-coast of feed intake as following :

1-Feed cost / Kg gain (LE) = Total feed cost (LE) / BWG (kg)

2-Income over feed cost (LE) = { (milk production (kg) x price (LE) +body weight gain x price(LE) -Total feed cost (LE) Aboul Ella (2000), where price of one ton CFM =2300 LE , rice straw = 80 LE , berseem hay = 800 LE ,rod grass =140 LE , ray grass =140 LE, milk = 5 LE , price of 1 kg live bod weight = 25 LE as the dominant market price in this period .

Chemical Analysis

Analyses of ingredients, CFM, Egyptian berseem (EB),rations and feces were carried out according to(A.O.A.C.2000).Fiber fractions were determined according to (Analyses of ingredients, CFM, Egyptian berseem (EB),rations and feces were carried out according(Goering and Van Soest, 1970).Plasma biochemical analysis were done using Biomerieux reagent kits.

bilirubin(Monnet 1963)Milk fat total protein, total solid, solid not fat and ash were determined according to(Ling1963). Plasma samples were used for determination of total protein(Weichselbaum ,1989),albumin(Doumas *et al.,*1971),liver enzymes(Reitman and Frankle1957)urea (Patton and Crouch 1977),creatinine(Bartil *et al.,*1971),bilirubin(Elveback,1970),Whereas hemoglobin , haematocrite(Linne and Ringsrud1992)and Saponine Oleszek (2002).

Statistical analysis

Statistical analysis of data was performed using SAS(2003) procedures for personal computer, and the significant differences among means were detected by Duncans multiple range test (Duncan 1955) .

RESULTS AND DISCUSSION

Chemical composition

The chemical composition and fiber constituents of the feed ingredients and the experimental rations are presented in Table(1).The results showed that Ray grass (R_2) and Rod grass (R_3) were higher content of CP ,CF ,EE and Ash than control group(R_1).Furthermore NFE was higher with R1 compared to R_2 and R_3 groups .In addition to the fiber fractions as well as NDF,ADF and hemicellulose were higher for R_2 and R_3 rations.Some studies reported that forages in rations should never exceed more 44% of NFC or contain less than 15% NDF.The voluntary intake of feed depends essentially on the rate of degradation of its digestible matter into particles of a size small enough to enable their passage from the reticule-rumen to the lower gut.

Table (1) : Analysis of Ingredients and experimental rations fed by lactating Zaribi goats (%on dry matter basis).

Items	Ingredients				experimental rations		
	C FM	BS	RYE	ROD	R_3	R_2	R_1
DM	90.27	88.56	87.65	89.74	90.68	87.92	89.17
OM	89.70	88.58	88.41	90.07	89.78	88.56	87.03
CP	13.79	13.16	17.84	14.09	14.16^{B}	17.39^{A}	16.58^{A}
CF	12.50	25.14	26.74	28.63	16.34^{B}	22.54^{A}	21.01^{A}
EE	1.80	2.59	3.64	2.93	2.59^{B}	3.69^{A}	2.88^{A}
ASH	10.30	11.42	11.59	9.93	10.22^{B}	11.44^{A}	12.97^{A}
NFE	61.61	47.69	40.19	44.42	56.69^{A}	44.94^{B}	46.56^{A}
DCP	-	-	-	-	10.14^{B}	13.38^{A}	12.49^{A}
SE	-	-	-	-	62.51^{A}	61.17^{B}	60.10^{B}
TDN	-	-	-	-	64.27^{A}	62.41^{B}	61.74^{B}
celluloses fractionation							
NDF					43.29^{B}	44.17^{A}	45.63^{A}
ADF					32.16^{B}	33.47^{A}	35.94^{A}
ADL					10.07	10.16	10.65
Hemicelluloses					11.13^{A}	10.70^{B}	9.69^{B}
Cellulose					22.09^{B}	23.31^{A}	25.29^{A}
NFC					26.74^{A}	24.31^{A}	20.94^{B}
UNDF					7.61	6.62	7.82
ANDF					33.92	32.52	29.81
NDS					58.47	60.86	62.37
RAC					46.78	48.53	47.91

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

Saponines residues

Saponines residues was determined by method of Oleszek (2002) in both rations, milk, feces, urine and rumen liquor Table(2).Data showed that Saponines of R_1 were significantly(P<0.01) higher for ration, milk, blood, rumen liquor ,feces and urine than other rations .Saponins more action on cell membranes and hemolytic action on erythrocyte membranes (El-Izzi *et al.*,1992,Authi *et al.*,1988,Menin *et al.*,2001). Also the Saponines has harmful damage in enzymes action and have toxic effects because Saponines are inhibition of cholinesterase isoenzymes in vitro and in vivo. Moreover Saponines is a poison associated with animal rations and toxic glycoside in Egyptian berseem, medicago sativa and sugar beet. (Plohmann *et al.,*2008) reported that Saponines has enhancement effect to the Humeral immune response on blood cells, it defects the protein digestibility and growth performance this data was obtained by (Plock *et al.*,2001,Choi *et al.*,2001) .

Table (2) : Saponine in both rations, milk , blood, rumen liquor, feces and urine fed by lactating Zaribi goats fed experimental rations .

Items	g / 100 gm.)		
	R_1	R_2	R_3
Rations	146.82^A	84.67^B	88.84^B
MILK	22.47^A	14.41^B	17.59^B
Blood	25.66^A	13.39^B	15.59^B
Rumen liquor	39.58^A	32.19^B	36.07^B
Feces	29.52^A	7.34^B	7.38^B
Urine	24.11^A	5.89^B	6.27^B

A and B Means having different superscripts within the same row are significantly different at (P<0.01) .

Silage quality

Data in Table(3) showed that the silage of R_2 and R_3 rations had good quality of the tested parameters as well as pH, ammonia-N ,lactic acid and TVFA . Addition to increase value of protein and CF values and decrease of ash and NFE than control group Table (1).These results are in agreement with those reported by Abou-Akkada and Nour(1986),they indicated that the ensilage can preserve feed and improve its feeding value .

Table(3) : Mean values of quality parameters of mixtures silages .

Items	R_1	R_2	R_3
pH value	4.37	4.82	4.49
Ammonia-N(mg/100g)	23.10^B	24.59^A	24.36^A
Lactic acid(mg /100g)	3.28	3.96	3.59
TVFA(ME q /100g)	19.92^B	21.44^A	20.78^B

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

Average daily feed intake

The criteria of dairy Zaribi goats fed different experimental rations are shown in Table(4).Group 1 had significantly (p<0.05) higher of DM intake compared to others.as same time no significant differences observed between R_2 and R_3 groups.Furthermore the water consumption was

decrease and recorded differences ($p<0.05$) lower with R_2 and R_3 groups in protein level and lower value of saponines content than those in R_1 .

Table(4): Feed intake and water consumption of lactating goats fed mixtures silages .(on DM basis) .

Items	R_3	R_2	R_1
Body weight (kg)	40.10	39.65	38.82
Body weight $^{0.75}$	15.93	15.80	15.55
DMI (gm /day/d)	1958^{A}	1759^{B}	1824^{B}
DMI As% BW	4.88	4.44	4.70
DM I (gm BW $^{0.75}$)	122.8^{A}	111.33^{B}	117.30^{A}
CPI (gm /day/d)	27.73^{B}	28.83^{B}	30.24^{A}
DM intake / kg MILK	1.33	1.10	1.13
Water consumption (Ml/h/day)	2294^{A}	2143^{B}	2068^{B}

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

Digestion coefficients

Data of digestibility coefficients are presented in Table(5).The obtained results revealed that the DMI was decreased with R_2 and R_3 than R_1.Moreover,the OM of R_1 ration was less digested and increased gradually with R2 and R3 than R_1 .Subsequently ,except of DM and OM observed that forages mixtures silage(FMS)in lactating Zaribi goats rations resulted in better digestion coefficients for R_2 and R_3 groups of all digestion nutrients parameters than R_1 ration , and results were clearly that CP digestibility was increased with higher protein rations R_2 and R_3 . This are in agreement with those reported by Leupp(2008).On the other side the fiber constituents data Indicated that digestibility coefficients of R_2 and R_3 groups were increased linearly with rations contain higher fiber level as well as Ray grass and Rod grass silages at all cell wall constituents.This may be due to the low concentration of ADL and the increase in ruminal fiber digestion that may occur with decrease of ADF content with control ration compared to second and third groups which resulted in an increase in rate of passage of digest from the rumen.(Weimer *et al*.,1999) they reported that increased dietary NFC is often observed to depress fiber digestion partly by depressing ruminal pH.(Hall,2001)reported that construction of ruminant rations must has potentially higher digestible fiber and non fiber carbohydrate contribution to the ration. Furthermore, the Energy concentration (ME,DE,GE and NE) of second and third rations were higher in all energy values .

Nitrogen utilization

As show in Table(6).Nitrogen intake(NI), nitrogen excretion(NE)and nitrogen digestion were increased with R_3 group than R_1 and R_2.nitrogen retention(NR) was recorded higher value for second and third experimental groups(R_2& R_3)with higher differences as a reflection of DM intake.However, fecal nitrogen (NE) was decrease with R_1 and R_2 ,as same time the urine nitrogen was significantly($p<0.05$) higher with R_1 and R_3 rations compared to R2.This may be due back to increase of nitrogen utilization and high retention and laxative effect reported by(Al-Yousef *et al*.,1994).Moreover, the high level of nitrogen free extract and nitrogen intake in R_1 and R_3 rations gave fast fermentation carbohydrate which can couple the fast degradation of urea in this ration.Hence the production of ammonia can be efficiency used in building microbial protein rather than adsorption from rumen wall so the level

of urinary excretion decreased with R_2 group.Nitrogen balance as percentage of NI had differ significantly ($p<0.05$)increase among R_2 and R_3 rations than R1.This may be a reflection to the higher CP digestibility in R_2 and R_3 compared to control ration.In accordance with the present results,(Mohsen *et al*.,1999). reported that increasing level of urea in diets of growing goats to 0.4 % was resulted in decreasing ($p<0.05$) NB as % of NI.Nitrogen balance obtained in this study were closed to that reported by (Yacout and El- Badawi 2001).They found that N balance of goats fed rations contained 12% CP was 41.4 g/h /d .

Table(5): Digestion coefficients and nutritive values of mixtures silages fed by experimental goats .

Items	R_3	R_2	R_1
Nutrients digestibility , %			
DM intake (kg /day)	1.958^{A}	1.824^{B}	1.759^{B}
DM	71.37^{B}	73.97^{A}	73.62^{A}
OM	69.54^{B}	71.57^{A}	70.32^{A}
CP	71.59^{B}	76.94^{A}	74.11^{A}
CF	62.81^{B}	67.51^{A}	65.39^{A}
EE	70.49^{B}	75.22^{A}	74.97^{A}
NFE	71.35^{B}	$74. 63^{A}$	73.15^{A}
GE	68.30^{B}	71.60	70.30^{A}
Fiber fractions , %			
NDF	63.70^{B}	64.60^{A}	68.40^{A}
ADF	61.20^{B}	63.80^{A}	64.30^{A}
ADL	32.80^{B}	34.50^{A}	35.90^{A}
Hemicelluloses	56.20^{B}	58.60^{B}	62.80^{A}
Celluloses	65.50^{B}	67.40^{A}	70.90^{A}
NFC	67.89^{B}	69.59^{A}	68.19^{A}
Nutritive values			
TDN% OF DM	58.73	60.86	59.55
TDN kg / day	12.82	12.45	11.91
TDN kg / kg milk	8.71	7.70	7.43
NED Mcal/ kg	1.53	1.55	1.54
NEL Mcal/ kg	0.75	0.78	0.84
NEL / NED %	49.0	50.3	54.6
NFC/ DCP	2.83	2.52	2.65
Energy concentration			
ME	2.367	2.449	2.467
GE	4.373	4.489	4.526
DE	2.887	2.986	3.009
NE	1.572	1.613	1.596
Metabolisability %			
ME/GE	54.12	54.56	54.51
Efficiency / ME utilization %			
RFQ	233.01^{A}	214.96^{B}	232.55^{A}
QI	3.01	2.78	3.00
RFV	167.70^{A}	147.55^{C}	153.33^{B}
DDM	44.33	42.87	42.36
NE/ME	66.41	64.23	64.29

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

Table (6):Nitrogen utilization of experimental rations by dairy Zaribi goats.

Items	Experimental rations		
	R_1	R_2	R_3
N intake (g / h / d)	46.13^{B}	44.36^{B}	48.39^{A}
Fecal N (g /h/ d)	11.46^{B}	11.76^{B}	12.94^{A}
Urinary N (g / h / d)	15.48^{A}	13.58^{B}	14.81^{A}
N excretion (FU + UN)	26.94^{B}	25.34^{B}	27.75^{A}
Digestion N (g / h / d)	32.67^{B}	33.60^{B}	34.45^{A}
N- balance (g / h / d)	19.19^{B}	21.02B^{A}	20.64^{A}
NB/NI, %	41.59^{A}	42.87^{B}	42.65^{A}

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

Milk production and composition

Milk yeild of dairy Zabibi goats as affected by feeding experimental rations are presented in Table (7).Data obtained showed that there differences($p<0.05$) in milk yield among experimental rations.These results may be attributed to the increase of nutritive values of R_2 and R_3 rations.The current results are in accordance with those reported by (Kholif *et al*.,1999) and (El-Ashry *et al.*,2001),they found that milk yield was ranged between (2.0 -2.1kg /head /day)for lactating goats and 6.1- 8.6 kg /head/day)for lactating buffaloes fed ration contained 50 % concentrate and 50% roughage. On the other side the milk constituents indicated that second and third groups were significantly ($p<0.05$) higher of all milk constituents compared to control group.The changes in milk contents may be due to the level of prolactin hormone secretion and efficiency of udder secretary cells.(Soliman *et al.,* 1995) .Total solid %,solid non fat % and lactose% were significantly($p<0.05$) increased when feeding R_2 or R_3 rations compared to R_1.These results are agreed with the results reported by (Allam *et al*.,2001)and (El-Ashry *et al*.,2001).The percentage of milk protein % and fat% were lower ($p<0.05$) with feeding on R_1 and R_3 rations than R_2,while there was no significant differences between R_1 and R_3.Increasing fat% synchronized with Ray grass and Rod grass mixtures silage in goats rations may be due to higher fermentation of fiber into volatile fatty acid in rumen Table(9).It had subsequently converted to fat in milk,that agreed with (Jin *et al*. 2007).On the other hand protein and lactose content increased in similar trend , this may be due to DCP and TDN intake Table (5) .These results agreed with those obtained by (Ahmed *et al*. 2003) and Bendary *et al*. 2000).The whey protein nitrogen (WPN%),whey protein(WP%)and acidity recorded higher values with significant($p<0.05$) increase when feeding with R_2 and R_3 in comparison with R1 group . Furthermore the milk composition as well as, protein yield ,solids yield, fat yield, solid not fat yield, lactose yield ash were recorded significantly lower values($p<0.05$)for R_1 ration than others. However,the NE Mcal/kg no differences were observed among experimental treatments

Table(7):Effect of mixture silage on milk yield and composition of lactating Zaribi goats.

Items	R_3	R_2	R_1
Total milk yield , kg / h/ period	176.52^{B}	198.36^{A}	194.16^{A}
Daily milk yield (kg/h/d)	1.471^{B}	1.603^{A}	1.618^{A}
Protein %	3.79^{B}	4.08 ^{A}	3.97^{B}
Total solid%	14.23^{B}	15.71 ^{A}	15.56^{A}
Fat%	3.90 ^{B}	4.10 ^{A}	3.98 ^{B}
Total N (TN)	0.60	0.65	0.64
Solid not fat(SNF%)	10.33^{B}	11.71^{A}	11.5^{A}
Lactose%	4.60^{B}	5.10 ^{A}	5.00^{A}
Non casein nitrogen (NCN%)	0.17	0.18	0.20
Non protein nitrogen (NPN %)	0.04	0.6	0.7
Casein nitrogen (CN%)	0.43	0.44	0.46
Casein %	2.75	2.81	2.94
Whey protein nitrogen(WPN%)	0.11^{B}	0.12^{A}	0.13^{A}
Whey protein (WP%)	71.00^{B}	77.00^{A}	83.10^{A}
Milk constituents yield gm / h/day			
protein yield gm / h/day	55.76^{B}	65.40^{A}	64.24^{A}
solids yield gm / h/day	209.32^{B}	251.80^{A}	251.76^{A}
fat yield gm / h/day	57.37^{B}	64.12^{A}	64.40^{A}
Solid not fat yield gm / h/day	151.95^{B}	182.90^{A}	187.36^{A}
Lactose yield gm / h/day	67.67^{B}	81.75^{A}	80.90^{A}
Ash%	0.784^{B}	0.839^{A}	0.816^{A}
Acidity %	0.189^{A}	0. 176^{B}	0.172^{B}
NE (Mcal / kg)	0.748	0.750	0.785

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

Blood profile

Values of some blood parameters are presented in(Table 8)Data obtained of R_1 group explained that there were decrease significant differences for free fatty acids (FFA), total lipids, triglycerides, cholesterol, Total lipids, Trigly-cerides,urea-N and Glucose compared to R_2 and R_3 groups, the higher value of serum urea-N of R_2 and R_3 may be due to higher level of ammonia-N in the rumen as reported also by Ibrahim *et al*. (2008).on the other hand ,haematocrit(HC),Bilirubin, Alk-P-ase and WBCs for R_2 and R_3 were recorded lower significant differences than R_1 group.In addition to the higher blood lipids might be due to the inhibition in lipiogenic enzyme activities by liver and adipose tissue of animals fed rations containing fat Storry (1981).Thus the blood minerals as well as calcium, phosphorus and magnesium in R_2 ration was recorded higher values than those obtained with R_1 and R_3 groups.This may indicate that nutrients were more available and utilizable,this results are agreed with those reported by Steele(1980).On the other hand hematological picture of goats fed experimental rations showed that there significant ($p<0.05$) decreased in erythrocyte and leucocytes for R_2 and R_3 groups compared to R_1.In addition to the fractions of white blood cells (lymphocyte, Neutrophile and Eiosinophile%) were significantly increased with R_1 group, whereas monocyte was decrease for same group than the other experimental groups.This increases of lymphocyte,neutrophile and Eiosinophile in R_1 group may be due back to the increases of saponine level because saponine have an enhancement effect to the humoral immune response and increase white blood cells as reported by Saleh *et al* . (2007).

Table(8):Blood plasma constituents and some minerals of dairy Zaribi goats as affected by experimental rations fed by.

Items	Experimental rations		
	R_3	R_2	R_1
Haematocrit values (%)	18.36^{A}	15.76^{B}	16.97^{B}
Total protein(gm / dl)	7.34	7.83	7.64
Albumen (gm / dl)	4.86	4.28	4.71
Globulin (gm / dl)	2.48	3.55	2.93
Glucose, mg/dl	76.34^{B}	$81,48^{A}$	78.2^{A}
Urea-N, mg/dl	17.45^{B}	19.87^{A}	19.27^{A}
FFA (m .mol / L)	389.23^{B}	416.78^{A}	399.69^{A}
Total lipids (g / dL)	7.34^{B}	9.21^{A}	9.59^{A}
Triglycerides(mg / dL)	78.93^{B}	94.65^{A}	88.12^{A}
Cholesterol (mg / dl)	62.48^{B}	78.94^{A}	78.36^{A}
Bilirubin (mg / 100 ml)	0.42^{A}	0.187^{B}	0.197^{B}
Alk-P-ase(Iu / L)	56.4^{A}	16.79^{B}	18.34^{B}
Ca (mg / dL)	10.26	11.94	10.68
P (mg / dL)	6.14	6.70	6.33
Mg (mg / dL)	8.53^{B}	10.34^{A}	8.28^{B}
WBCs (10^3 ul)	7.43^{A}	6.20^{B}	6.10^{B}
Lymphocyte (%)	63.7^{A}	57.37^{B}	55.87^{B}
Neutrophile (%)	57.9^{A}	41.87^{B}	42.57^{B}
Eiosinophile (%)	6.9^{A}	4.7^{B}	5.27^{B}
Monocyte (%)	14.77^{B}	21.90^{A}	17.57^{B}

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

Ruminal fermentation parameters

Table (9) presented the criteria obtained from ruminal tested fluid fermentation parameters of lactating Zaribi goats under investigation.The ruminal pH values and the maximum total VFA's values were recorded at 3 hrs post feeding.The same trend was obtained by(Johnson and Sultan1968),(Allam *et al*.1984).Moreover,ruminal ammonia-N concentrate were greatly higher and the maximum values were reached at 3 hrs post-feeding then decreased with all dietary treatments.Similar results were reported by (Ziad *et al*. 2009).subsequent, effective neutral detergent fiber (eNDF) was calculated to estimate adjustment of ruminal pH useful only when eNDF below 30% .In addition to predication of ruminal pH and eNDF were used to adjust passage rate , Fouad (2002).

Table (9):The effect of experimental rations on some rumen liquor Parameters of lactating Zaribi goats .

Items	Time	R_1	R_2	R_3	SIM
PH - values	0	6.84	6.94	6.76	0.21
	3	6.35	6.58	6.41	0.15
	6	6.61	6.83	6.73	0.11
NH3(mg/100ml RL)	0	16.48^{B}	18.37^{A}	19.45^{A}	0.31
	3	22.76^{B}	25.83^{A}	26.87^{A}	0.09
	6	18.55^{B}	20.52^{B}	23.14^{A}	0.14
TVF's(mequ./100ml RL)	0	12.61^{A}	14.67^{B}	15.36^{B}	0.19
	3	15.29^{B}	17.88^{B}	19.49^{A}	0.13
	6	14.71^{B}	16.23^{B}	18.55^{A}	0.22
% eNDF*	0	33.46^{A}	35.82^{A}	31.57^{B}	0.78
	3	21.87^{B}	27.31^{A}	23.29^{B}	0.49
	6	28.02^{B}	33.22^{A}	30.86^{B}	0.82

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

* effective neutral detergent fiber (eNDF) = (pH-5,425) / 0.04229 (Fox et al . 2000)

Molar proportion of ruminal volatile fatty acid (VFA's**)**

Data in Table (10) illustrated that there were differences between acetic, propionate , butrtate and Iso-biotrate values of rumen liquor of goats fed experimental rations. Acetic , butrtate and iso-biotrate of R_2 ration were significant($p<0.05$)decrease compared to R_1 and R_3 rations.Whereas propionate and valerate were recorded higher values with R_2 group.This results were agreed with those represented by (Mohammed *et al*.,2003). Ruminal ammonia-N concentration was greatly higher at 3 and 6 hrs post-feeding than before-feeding.The same trend was observed by Ibrahim *et al*. (2012).The lowest values of ruminal ammonia-N were recorded with R_1 and the highest values were detected with R_2 and R_3 and the differences were significant at 3 and 6 hrs post-feeding only.This increase in ruminal ammonia-N concentration in R_2 and R_3 may be due to the high content of CP in rations as reported earlier in Table1. The same results were observed by Ahmed et al.(2013) with using berseem silage and its mixtures with some grasses in goats rations.The average concentrations of total VFA's post-feeding (3 and 6 hrs) in the rumen were significantly decreased with R_1 compared with R_2 and R_3. Similar findings were shown by Haggag *et al*. (2002).and El-Kholany (2004) using mixture forage and silage in Rahmani sheep and Zaraibi goats.

Table (10). Mollar proportion of ruminal volatile fatty acid (VFAs) of dairy Zaribi goats fed on experimental rations .

Item	R_1	R_2	R_3
Acetate , %	38.09^{A}	33.47^{B}	36.61^{A}
Propionate , %	27.84^{B}	34.51^{A}	28.85^{B}
A : p	1.43:1	1.03:1	1.63:1
Butrtate, %	21.57^{A}	17.2^{B}	19.84^{A}
Iso – biotrate %	2.68^{A}	1.67^{B}	2.91^{A}
Valerate, %	1.76^{B}	2.49^{A}	1.37^{B}

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

Total bacterial count of rumen liquor

The obtained results of total viable bacteria count for R_2 ration was recorded higher significant than R_1 and R3 R_3.Table (11)illustrates the data collected for microbial protein of goats under investigation.Ruminal microbial protein was significantly different among three treatments at zero time and was significantly ($P<0.05$) higher with R_2 than of R_1 at 3 and 6 hrs post-feeding. But,R_3 recorded the medium values.This positive effect of mixture silage on ruminal microbial protein was observed also by Shehata *et al*. (2001), in the rumen of bucks, lambs and lactating does, respectively.The results obtained from this study are in harmony with those of (Kurihara *et al*.1968) who observed that the peak of bacterial counts was between 3 and 6 hr's after feedi .Nour *et al*.(1989),reported that the active bacterial population in the rumen may help to increase the rate of digestion.Total cellulolytic bacterial count of rumen liquor recorded the highest values at 3 hrs after feeding within R_2 but the lowest value was in R_1 and R_3 groups.

Total protozoal count of rumen liquor after 3 hrs of feeding showed the lowest value with R_1 compared to the other tested rations, and the highest value was obtained with R_2 group. Perhaps that back to lower level of

Saponine in R_2 ration ,this result agreement with those obtained by Sony and Sharma(1982),who found significantly increased in ciliate protozoal count with. increasing concentrate level in diet.This possibly related to ingest starch. Maximum protozoal counts were observed at 3 hrs post feeding than after 6 hrs post feeding

Table (11) . Effect of experimental rations on rumen microorganisms

Items	Time	R_1	R_2	R_3
Total bacterial count (10^7/ ml)	0	1519^B	1860^A	1347^C
	3	2175^B	2617^A	2080^C
	6	3818^B	4346^A	3576^C
Cellullolytic bacterial(10^4 / ml)	0	2.91^B	3.16^A	2.46^B
	3	4.68^A	5.57^A	3.91^B
	6	3.72^B	4.65^A	2.64^C
Total protozoal count(10^4 / /ml	0	3.97^B	4.61^A	3.88^B
	3	3.41^B	4.79^A	3.52^B
	6	2.97^B	4.27^A	3.11^B

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

Growth performance of born kids

Table(12)showed the variations in body weight gain of kids whose sucking their dams milk, the results were recorded high significant BWG with R_2 followed by R_3 compared to those in R_1 group.This increase of daily weight gain may be back to the higher milk yield and its content of total solid, total protein and milk fat(Table7).Thereby, the feed conversion was lower values with R_2 and R_3 than R_1 and the values were 6.00 , 5.36 and 5. 64 for R_1, R_2, R_3 respectively .

Table (12) : Growth performance of born kids as affected by the tested rations .

Items	R_1	R_2	R_3
Initial weight (kg)	3.55	3.45	3.70
Weaning weight (kg)	23.71	24.95	24.75
Total body gain (kg)	20.16	21.50	21.05
Daily gain (g)	168.00	179.17	175.42
Milk consumption (kg /h /d)	1.01^A	0.96^B	0.99^A
Feed conversion	6.00^A	5.36^B	5.64^A

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

Economical efficiency

Calculated economic efficiency are presented in Table(13).It based upon milk production of does,BWG of kids and total intake costs.Subsequent, final body weight and feeding cost are the most important factor affecting the maximum efficiency of milk yield and meat production. Ragrass140 L.E./ton and Rod grass 140 L.E. where kg milk was 3 L.E., while selling price of 1kg of live live weight was 25 L.E.according to local prices of year 2013[$ = 6.75 L.E.(Egyptian Pound)].The results illustrated that when goats fed ration The price of concentrate feed mixture / ton was 2500 L.E./ ton, berseem hay 1000 L.E./ t**on**

Net revenue ={(Selling income of milk +Selling income of BWG)-coast of feed intake (LE)}

$$\text{Economic efficiency \%} = \frac{\text{Net revenue / animal (LE)}}{\text{Total feed Coast (LE))}} \times 100$$

containing forages mixtures silage with high level of mitabolizable energy (ME),the cost / kg BW was decreased, specially with R_1 and R_3.The corresponding values of the economical efficiency were increased 23.00 and 19.00% for R_2 and R_3 respectively than those of control group.This indicated

that the replacement of 50% of total Egyptian berseem by Ray(R_2)and Rodgrass(R_3)in goats feeding give higher net revenue and economic efficiency values compared to control group(R_1).This improvement in economic efficiency could be attributed to improvement in both growth rate and feed conversion ratio. Whereas no significant different was observed between R_2 and R_3 groups.this results were in agreement with those obtained by (Murdoch ,1962).

Table(13):Economical efficiency(LE)of tested rations on growth of born kids .

Items	R_1	R_2	R_3
Feed intake kg / h			
DM intake (kg /h)	2495^{A}	2390^{B}	2360^{B}
DM intake(kg over all)period	299.4	286.8	283.2
Coast of intake (LE)	555.00	477.60	478.95
Milk consumption, Total milk yield and Price of milk / h overall (LE)			
Milk consumption(gm/h/d)	1953^{A}	1780^{B}	1918^{A}
Total milk yield (LE)	224.52	234.36	230.16
Price of milk/h overall(LE)	673.56	703.08	690.48
Body weight gain of offspring (kg)			
Total body weight gain(kg)	20.16	21.50	21.05
Price of BG (LE)	504.00	537.50	526.25
Revenue(LE)			
Net revenue / animal (LE)	622.56	762.98	737.73
Economical efficiency %	100.00^{B}	123.00^{A}	119.00^{A}

A and B Means having different superscripts within the same row are significantly different at (P<0.01) .

CONCLUSION

In conclusion , using 60 % of forage mixtures silages as Egyptian berseem silage (EBS),EBS x Ray grass or EBS x Rod grass)are suitable for dairy Zaribi goats feeding compared to EBS alone .These silage mixtures improved milk production and performance of born kids received their mothers milk ,and decreased feeding cost .On the other side the decreased of Ray and Rodgrass silage prices had adverse effects on animal production, which was reflected on feeding cost and economical Efficiency .

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دراسة مقارنة على مخاليط أنواع مختلفة من السيلاج وأثرها على انتاج اللبن وبيئة الكرش وأداء النمو للجداء حديثة الولادة فى الماعزالزرايبى الحلابة .

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أجريت هذه الدراسة لمعرفة تأثير إستخدام سيلاج البرسيم بمفرده أو فى مخاليط مع حشيشة الراى جراس أو حشيشة الرود جراس في علائق الماعز الزرايبي علي محصول اللبن ونشاط الكرش وكفاءة التحويل الغذائى ونمو الجداء حديثة الولادة التى ترضع لبن الأمهات . إستخدم فى هذه الدراسة ١٨من الماعز الزرايبي الحلابة بمتوسط وزن٣٩,٤٧ كج وعمر حوالى ثلاثة سنوات , كل أم معها إنتاجها (متوسط الوزن ٣,٦٩ كج) , حيث وزعت عشوائيا في٣ مجاميع متساوية (٦حيوانات بكل مجموعة) ، كل الحيوانات غذيت علي العلف المركز ليغطي٤٠% من الاحتياجات البروتينية طبقا للـ ان آر سى (١٩٨١) إضافة إلي السيلاج الذى أعطى للشبع سواء سيلاج البرسيم بمفرده فى المعاملة الأولى (مجموعة المقارنة) أو مخلوط سيلاج البرسيم مع الراى جراس او الرود جراس للمعاملتين الثانية والثالثة (المجاميع المختبرة) ، وقد غذيت المجموعة الأولى (مج١)على سيلاج البرسيم ، المجموعة الثانية (مج٢) على مخلوط سيلاج البرسيم مع الراى جراس و المجموعة الثالثة (مج٣) على مخلوط سيلاج البرسيم مع الرود جراس بنسبة(١:١). استمرت التجربة لمدة١٢٠ يوما.أوضحت النتائج أن (مج١) التى تناولت سيلاج البرسيم بمفرده كانت أقل فى محتواها من البروتين الخام المستخلص الإيثيرى و الألياف بينما كانت مرتفعة فى محتواها من الرماد والمستخلص خالى الأزوت مقارنة بالمجموعتين (مج٢) , (مج٣). كما تم تقدير المحتوى من الصابونين الضار الطبيعي فى البرسيم والذى سجل إرتفاعا معنويا مع(مج١)على مستوى(٠,٠٥) فى كلا من العليقة واللبن , سائل الكرش ,الروث , البول والدم مقارنة بالمعاملات الأخرى (مج٢),(مج٣).من ناحية أخرى وجد أن الأحماض الدهنية الطيارة والأمونيا كانتا منخفضة معنويا فى الـ(مج٢) , (مج٣) إذا قورنت بـ(مج١).أما محصول اللبن فقد سجل انخفاضا معنويا مع (مج١) كما إنخفض كل من البروتين الكلى والمواد الصلبة الكلية والدهن الكلى لنفس المعاملة مقارنة بالمعاملات التجريبية الأخرى .بينما أعطت الـ(مج٢) , (مج٣) أعلى القيم لكل مقاييس مكونات اللبن .وفى الوقت نفسه سجلت الـ(مج١) أقل القيم لكلا من المركبات الصلبة اللادهنية واللاكتوز . ومن نتائج تحليل الدم وجد أن (مج٢) , (مج٣) كانتا مرتفعتين معنويا على مستوى(٠,٠٥) لكل مقاييس الدم . أما الحملان حديثة الولادة فقد سجلت فرقا معنويا منخفضا على مستوى (٠,٠٥) فى وزن الجسم والزيادة اليومية مع (مج١) بينما أعطت الـ(مج٢) , (مج٣) أعلى المقاييس فى الزيادة اليومية لوزن الجسم وكمية اللبن المستهلكة وكذا العائد المادى . أما الناحية الإقتصادية فكانت المعاملتان الـ(مج٢) , (مج٣) أعلى فى العائد الإقتصادى مقارنة بالكنترول .

نستخلص من هذه الدراسة أن مخاليط العلف الأخضر من البرسيم المسقاوى مع حشيشة الراى جراس وحشيشة الرود جراس كانتا جيدة فى تحقيق زيادة فى الإنتاجية والنمو للصغار حديثة الولادة ومعامل التحويل الغذائى , كما ان مخلوط الراى جراس مع البرسيم وكذا مع الرود جراس كانت نتائجهما جيدة فاقت معاملة المقارنة .