EFFECT OF FEEDING DIFFERENT CONCENTRATE : CORN SILAGE RATIO ON: 2- PRODUCTIVE AND SOME REPRODUCTIVE PERFORMANCE OF PREGNANT BUFFALO HEIFERS.

M.A. El-Ashry[1], G.F. Shahin[2] and T.I. El-Monayer[2]

[1]Animal Production Department, Faculty of Agriculture, Ain Shams University.

[2]Animal Production Research Institute, Ministry of Agriculture, Dokki, Giza, Egypt.

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SUMMARY

The present study was carried out to investigate the effect of feeding whole corn silage (WCS) ration with different levels of concentrate feed mixture (CFM) on productive and some reproductive performance of Egyptian pregnant buffalo heifers before calving and up to the first 105 days of first lactation season. Twenty-Four heifers were grouped into 3 feeding treatments (eight animals each). Each group was randomly fed one of the following treatments, R1: pregnant heifers were fed as the amounts of roughage were maintained to keep a constant R: C ratio of about 61.5% (23% rice straw + 38.5% berseem hay) and 38.5% CFM, respectively (control ration); while, the tested rations, R2: consisted of 25% CFM+ 75% CS and contained R3: 50% CFM+ 50% CS. Rations were formulated to cover maintenance and production allowances according to El-Ashry allowances (El-Ashry, 1980). Feeding experiment was started from the first 3 months of gestation till the first 105 days of lactation. Ages and live body weight an average at the beginning of experimental were 600 days old and 369 kg body weight, respectively. Animals received high CFM level (R3) during pre and postpartum period recorded the highest digestibility values of DM, OM, CP, EE and NFE as will as feeding values (TDN and DCP) compared with other treatments. While, CF digestibility was higher significantly ($P<0.05$) for low CFM level (R2). Daily gain, body condition score of heifers fed (R1) or high CFM levels (R3) were significantly ($P<0.05$) better than those fed low CFM level (R2). Also, animals received high CFM level (R3) were higher ($P<0.05$) in respect of live body weight, body weight changes, daily gain and body condition score at first 1st or 3 month after calving than those of (R2) which showed the poorest mean values. At the same time animals fed (R2) recorded lower ($P<0.05$) average daily milk than those of other treatments, but, milk fat, protein and lactose were not significantly ($P<0.05$) affected by R: C ratio. From this study, it could be concluded that diet of R3 which consisted of 50% CFM+ 50% WCS could be preferably fed to pregnant buffalo heifers at the first calving in which improved live body weight changes, body condition score, feed conversation, economic efficiency and consequently decrease the number of days till first calving.

***Keywords**: feeding, corn silage level, buffalo heifers,, digestibility, milk yield and performance*

INTRODUCTION

Buffaloes is the major source for milk in Egypt as they contributing more than 50% of the annual milk production in Egypt (Agriculture Economy Research Institute, 1997). Buffalo's milk is preferred by the Egyptian consumer for its richness and sensory attributes. Recently use of maize silage has increased rapidly as an excellent forage for buffaloes and cattle in Egypt. Corn plants are one of the main crops in Egypt, where its total planted area being about 2 million feddans. Mainly its highly nutritive value is related to the high energy yield and ease of mechanization with which the whole plant can be ensiled to provide highly palatable source of energy for ruminant (Mohamed *et al.* 1999). Several research (Wattiaux and Karg 2004 and Groff and Wu 2005) reported that feeding corn silage for dairy cattle improved their performance, reduced cost of feeding and minimized the amount of expensive concentrate in dairy ration.

Reproduction is a vital factor in determining the efficiency of heifer's production. The relationship between nutrition (concentrate to roughage ratio) and reproduction in ruminants is complex and often quite variable. Nutrition is the major factor affecting the physiological and metabolic status of the animals, thus optimal feeding buffalo in good body condition insures maximum production and high reproduction efficiency (El-Ashry *et al.* 2003). Succulent feed, palatable and balanced diet of constant

composition over the whole year, in surely avoiding a seasonal disturbance in production (Etman *et al.* 1994). Vandehaar *et al.* (1999) found that increasing the energy and protein density up to 1.6 Mcal of NE/ kg and 16% CP in dairy cow diets during the last month before calving improved nutrient balance of prepartum cows. Sejrsen and Purup (1997) and Sejrsen *et al.* (2000) studied the relationship between growth rate, mammary growth and milk yield in heifers and found that increased growth rate due to high feeding level before puberty onset can lead to reduced pubertal mammary growth and reduced milk yield potential. Shahin *et al.* (2006) reported that buffalo heifers fed high levels of energy based on increasing corn silage tended to have beneficial on improvement in productive and reproductive performance i.e. live body weight; rapid rate of growth, some nutrients digestibility; oestrous cycle length; some body measurements and body condition score. Suboptimal reproductive performance which caused by insufficient energy intake could be include delayed puberty, lengthened postpartum anestrous, low plasma progesterone concentration, reduced size and numbers of ovarian follicles and low pregnancy rate (Garcia-Bojalil *et al.* 1998 and Kendrick *et al.* 1999)

The objective of this study was to determine the effect of feeding different levels of corn silage in the ration of pregnant buffalo heifers on their productive, reproductive performances and economics of feeding buffaloes heifers.

MATERIALS AND METHODS

This study was conducted at El-Gemiza Experimental Station that belonging to Animal Production Research Institute, Agriculture Research Center, Ministry of Agriculture, Egypt. Twenty four growing buffalo heifers about 600 days (20 months) old and 369 Kg body weight were assigned randomly into three similar groups (8 of each group). It was fed one of the following experimental treatments: (R1) heifers were fed as the amounts of roughage were maintained to keep a constant R:C ratio of about 61.5% (23% rice straw +38.5% berseem hay) + 38.5% (CFM) as control rations; R2: 25% (CFM) + 75% corn silage; R3: 50% (CFM) + 50% corn silage. Rations were formulated to cover maintenance and production allowances according to El-Ashry allowances (1980). Feeding regime was started from the third month of gestation tell the first 105 days of lactation. The experimental rations contained (CFM), berseem hay (BH), corn silage (CS) and rice straw (RS). Mineral blocks and fresh water were available freely through the experimental period. The CFM was ndividually weighed for each animal and offered twice daily at 7 a.m. and 4 p.m., while roughage was offered at 8 a.m. and 5 p.m. Daily feed intake was individually recorded, while body weight of each heifer was biweekly recorded before morning feeding. All experimental heifers were kept under semi-open sheds, and individual daily feeding was applied. Throughout the feeding period, body condition score (BCS) as changes in live body weight were monthly recorded for animals in the morning after overnights holding of feed and water (Ebrahim, 2004). Feed allowance was adjusted biweekly accorded to the change in body weight. Chemical analysis of different feed stuffs and calculated chemical composition of the experimental rations are presented in Table (1).

Table (1): Chemical analysis of experimental feed stuff and calculated tested rations

		Nutrient % of DM					
Item	DM	OM	CP	CF	EE	NFE	Ash
Feedstuff							
CFM*	88.87	89.55	15.69	11.44	1.73	60.69	10.45
Corn silage	36.15	86.47	7.55	23.42	2.40	53.10	13.53
Rice Straw	89.44	80.61	2.27	37.50	1.13	39.71	19.39
Berseem hay	88.34	87.67	11.60	27.49	1.43	47.15	12.33
Tested ration							
Ration 1 (control)	88.80	86.77	11.03	23.61	1.48	50.65	13.23
Ration 2	49.33	87.24	9.60	20.43	2.23	54.98	12.76
Ration 3	62.51	88.01	11.62	17.43	2.02	56.94	11.99

R1= 61.5% (23% RS +38.5% BH) + 38.5% (CFM) R2=25% (CFM) + 75% CS R3=50% (CFM) + 50% CS
**The ingredients of (CFM) were: 39% yellow corn, 29% undecorticated cottonseed meal, 14% rice bran, 9% soybean meal, 5% vinaes, 3% limestone and 1% salt.*

Weight of dams, newborn calves was immediately recorded after calving and placenta after expulsion. Buffalo cows were hand milked twice daily, at 7 a.m. and 4 p.m. Daily milk yield of each animal was

recorded from parturition up to 105 days postpartum and composition samples were withdrawn for milk composition analysis. Composition of milk (fat, protein, total solids and solids not fat) were analyzed by a Milko Scan, Model 133B. Animals were observed for estrus twice daily at 7 a m and 4 p m. Data of observed estrous, service period and Days open were recorded for each animals. Buffaloes were observed for oestrus twice daily, at 7 a.m. and 4 p.m. and recorded for each animal. Two digestibility trials were conducted during pre and postpartum periods by using three animals in each experimental groups, individual feeds and fecal grab samples were collected for a 3 days period and composted for each animal to determine total tract apparent nutrients digestibility using silica (McDonald *et al.* 1995) as an internal marker. Feed and fecal samples were chemically analyzed according to the methods of A.O.A.C. (1995). Data were statistically analyzed according to SAS (1995). Differences among means were determined by using Duncan's test (1955).

RESULTS AND DISCUSSION

Chemical analysis

Chemical analysis of experimental rations are presented in Table (1). Results clearly indicated that highest percentages of OM, CP and NFE were associated with ration (R3) compared with other treatments. On the other hand, results showed that highest percentage of CF and Ash were recorded with ration (R1) followed by R2, while R3 recorded the lowest values. Regarding, the percentage of EE, it was observed that R2 recorded the highest values, followed by R3, and then R1 recorded the lowest values.

Digestibility and feeding values

Data in Tables (2 and 3) showed that animals fed R3 recorded the highest ($P<0.05$) digestibility values of DM, OM, CP.EE and NFE compared with other treatments. This result may be attributed to high feeding level of CFM (50%) in the diet (R3) and consequently due to increasing the percentage of CP in this diet (Table1). Concerning digestibility of CF it was significantly ($P<0.05$) improved due to low proportion of CFM in association with high level of corn silage (R2) compared with the other treatments. This may be attributed to the increase of rumen microbial activity and differences in rate of digestion. On the other hand, results obtained in Tables (2 and 3) indicate that the digestibility for all nutrients during postpartum, were appeared to be higher than those recorded during prepartum period. This might be attributed to different as in dry matter intake and the rate of passage of digesta, which may due to the pregnancy status of animals. These results are in agreement with those obtained by Cilliers *et al.* (1998); El-Ashry *et al.* (2003 and 2008) who reported that the increasing of dietary CFM levels improved the digestibility of all nutrients expect CF digestibility.

Nutritive values

Nutritive values expressed as TDN and DCP of the experimental rations are presented in Tables (2 and 3). The values as TDN and DCP were significantly increased ($P<0.05$) with heifers that fed high level of CFM with low level of corn silage during pre and postpartum. While, animals fed (R2) recorded the lowest values as (TDN and DCP) compared with other treatments. The high TDN values of rations contained high CFM (50%) and corn (50%) silage may be attributed to the mutual associative effect of corn silage with CFM. Concerning, DCP values, may be due to increasing in percentage of CP in the diets (Table 1) and coincided with those CP digestibilities. These results are in accordance with those obtained by (Khinizy *et al.* (1997); Taie *et al.* (1998) and Etman *et al.* (2007).

Productive performance during prepartum stage

The results of heifer's performance are shown in Table (4). Heifers fed (R3) recorded significantly the higher total gain, daily gain and body condition score compared with other treatments. These results agree with those reported by Mehrez *et al.* (1993); Shahin (2004); Etman *et al.* (2007) and El-Ashry *et al.* (2008) who reported improvement growth performance of animals by increasing dietary level of CFM. Weights at 3 and 9 months of gestation were almost similar for heifers fed different experimental rations, with no significant differences among them. Also, total body weight gain, heifers fed rations (R1 or R3) was higher than those fed ration (R2) with, no significant differences as well. Regarding the average daily gain, its values was significant higher with R3 than that of R1 or R2 being 0.674, 0.646 and 0.627 kg respectively. The differences did not significant between R1 and R2 rations. The significant response of R3 in respect of daily gain probably due to the more balanced of dietary nutrients of this ration. Average daily feed intake expressed as either kg DM and TDN kg / head/ day for 75% corn silage (R2) group was

Table (2): Nutrients digestibility and feeding value of pregnant buffalo heifers fed the experimental rations determined at prepartum stage

Item	Treatment		
	R 1	R 2	R 3
Digestibility %			
DM	64.28^{b} ± 0.36	62.35^{c} ± 0.35	67.12^{a} ± 0.64
OM	62.85^{b} ± 0.54	61.12^{c} ± 0.83	65.83^{a} ± 1.61
CP	60.44^{b}± 0.61	58.57^{c}± 1.41	62.93^{a} ± 0.81
CF	51.52^{c} ± 0.55	56.61^{a} ± 0.71	53.44^{b} ± 0.64
EE	66.45^{b}± 0.72	64.46^{c} ± 0.60	70.24^{a} ± 1.48
NFE	67.53^{b} ± 1.67	65.50^{c} ± 1.22	71.89^{a} ± 0.89
Feeding value%			
TDN	59.57^{b} ± 0.27	57.87^{c} ± 0.08	61.61^{a} ± 1.21
DCP	6.63^{b} ± 0.03	6.25^{c} ± 0.04	6.95^{a} ± 0.02

a ,b and c means of different letters in the same row are significant different

Table (3): Nutrients digestibility and feeding value of buffalo dams fed the experimental rations determined at postpartum stage

Item	Treatment		
	R 1	R 2	R 3
Digestibility %			
DM	65.37^{b} ± 1.12	63.88^{c} ± 1.13	68.75^{a} ± 1.33
OM	65.43^{b} ± 1.04	62.95^{c} ± 0.85	68.39^{a} ± 1.11
CP	63.27^{b}± 0.86	61.09^{c}± 1.42	66.47^{a} ± 1.51
CF	52.24^{c} ± 1.23	57.25^{a} ± 0.83	54.62^{b} ± 1.85
EE	67.20^{b}± 1.46	65.03^{c} ± 1.48	71.88^{a} ± 1.86
NFE	69.86^{b} ± 1.27	66.79^{c} ± 1.53	72.72^{a} ± 0.94
Feeding value%			
TDN	61.32^{b} ± 0.55	59.49^{c} ± 1.17	64.95^{a} ± 0.76
DCP	6.97^{b} ± 0.05	6.52^{c} ± 0.03	7.32^{a} ± 0.04

a ,b and c means of different letter in the same row are significant different

Table (4): Effect of experimental treatments on growth performance of buffalo heifers

Item	Treatment		
	R 1	R 2	R 3
Age of heifers at conception (days)	608.4^{b}±13.80	621.6^{a}±18.90	570.0^{c}±12.0
Live body weigh , kg at			
Months of gestation-3	367.31±5.56	365.49 ± 4.44	373.65 ± 7.43
Months of gestation-9	483.5±24.42	478.27±21.28	494.95±22.50
Total body weight gain from 3-9 months,kg	116.19^{b}±10.58	112.78^{b}±12.11	121.30^{a}±13.11
Daily gain ,kg	0.646^{b}	0..627^{b}	0.674^{a}
Body condition score at:			
Months of gestation-3	2.45^{b}±0.12	2.11^{c}±0.10	2.65^{a}±0.13
Months of gestation-9	2.85^{b}±0.11	2.52^{c}±0.13	3.23^{a}±0.14
Feed intake			
CFM	6	3.13	5.5
CS	-	9.37	5.5
BH	3.0	-	-
RS	3.5	-	-
Total DM	12.5^{a}	12.5^{a}	11.0^{b}
TDN	6.16^{c}	7.97^{a}	6.88^{b}
DCP	0.861^{a}	0.703^{c}	0.773^{b}
Feed conversion kg			
Kg DM/ kg gain	19.35^{a}	19.94^{a}	16.32^{b}
Kg TDN/ kg gain	9.54^{c}	12.71^{a}	10.21^{b}

a ,b and c means of different letters in the same row are significant different.

higher than that for 50% corn silage (R3) group. This might be due to the high level and palatability of corn silage in this ration. While, in respect of DCP heifers fed ration (R1) recorded higher value (P<0.05), than ration (R3). The lowest one was recorded for (R2) ration. It might be due to the decrease in percentage of CP in the (R2) ration (Table1), which had the reduced CFM level among the experimental rations.

The feed conversion expressed as the intake of DM required per kg gain (Table 4) showed that the pregnant heifers fed (R3) had better (P<0.05) feed conversation followed by both (R1) and then R2 showed the poorest one. It might attribute to the mutual positive associative effect that causing of increases a daily body gain and decreased of DMI. Concerning, feed conversion that expressed as intake of TDN required per kg gain, it was significantly (P<0.05) poorest with heifers fed (R2) than those of other treatments. These results are in harmony with those obtained by Perry and Cecava, (1995); Etman *et al.* (2007) and El-Ashry *et al.* (2008).

Live body weight changes and relative changes

Results obtained in Table (5) showed that heifers fed (R3) appeared to have higher live body weight and $kw^{0.75}$ at 3- months of gestation, just before and after calving, with no significant differences among treatments. Inspection of these Table, data revealed that live body weight and $kw^{0.75}$ at days after calving 30, 90 and 105, were significantly higher (P<0.05) with heifers fed highest level from CFM with corn silage (R3). While, animals fed (R2) ration recorded the lowest values compared with other treatments. These finding agree well with those obtain by Prasad *et al.* (1995); Shahin (2000) and Etman *et al.* (2007) who concluded that the animals fed on high feeding or concentrate level appeared to show higher live body weight change and $kw^{0.75}$. Concerning, the body weight changes and relative changes (% unit MBS) at 30, 90 and 105 days after calving, it could be noticed that animals fed (R3) recorded higher significant (P<0.05) than those other treatments, with exception of relative changes at conception to just before calving and at before to after calving, with no significant differences.

Table (5): Live body weight changes and relative changes of buffalo heifers fed different experimental rations

Item		Treatment R 1	R 2	R 3
No .of animal		8	8	8
Live body weight, kg at				
Months of gestation-3 (conception)	1	367.31±5.56	365.49 ± 4.44	373.65 ± 7.43
$K w^{0.75}$		83.90	83.59	84.99
Just before calving	2	503.94±26.79	499.20±17.04	514.13±19.75
$K w^{0.75}$		106.36	105.61	107.97
Just after calving	3	444.52±24.10	445.57±16.95	454.79±20.74
$K w^{0.75}$		96.81	96.98	98.48
Days after calving- 30	4	448.87^{b}±23.15	429.97^{c}±15.68	470.94^{a}±19.56
$K w^{0.75}$		97.52	94.42	101.10
Days after calving- 90	5	478.67^{b}±25.91	456.72^{c}±18.22	505.50^{a}±18.42
$K w^{0.75}$		102.34	98.80	106.61
Days after calving- 105 (final)	6	488.25^{b}±22.67	463.92^{c}±18.51	515.25^{a}±17.68
$K w^{0.75}$		103.87	99.96	108.15
Live body weight changes , kg at				
Conception to just before calving		136.63	133.71	140.48
Just before to after calving		59.42	53.63	59.34
Days after calving- 30		$+4.35^{b}$	-15.60^{c}	$+16.15^{a}$
Days after calving- 90		$+29.80^{b}$	$+26.75^{c}$	$+34.56^{a}$
Days after calving- 105		$+9.58^{a}$	$+7.20^{b}$	$+9.75^{a}$
From calving to final body weight		$+43.73^{b}$	$+18.35^{c}$	$+60.46^{a}$
Relative changes (% unit MBS) at				
- 1 to 2		+21.12	+20.85	+21.28
- 3 to 2		-9.86	-8.90	-9.64
- 3 to 4		+0.73	-2.71	+2.59
- 3 to 5		+5.40	+1.84	+7.63
- 3 to 6		+6.80	+2.98	+2.94

a ,b and c means of different letters in the same row are significant different

These results are in agreement with those obtained by El-Ashry *et al.* (2003); Zaki and Shahin, (2004) and Shahin *et al.* (2006). This might be due to the increase fed intake of CFM level, improved in nutrients digestibility, feeding values expressed as TDN and DCP and higher metabolizable energy and protein in this ration (R3), which would be more efficient utilized for growth.

In support to the mentioned results Dawson, (1994); Ebrahim, (2004) and Shahin *et al.* (2006) found that the decline in body weight of high yielding cows and buffaloes during the early stage of lactation period may be excessively due to the mobilization of body nutrient reservoirs since 10-15 % of total energy for milk production of cows are supplying from body reserves.

Some reproductive traits

Data presented in Table (6) showed that animals fed (R3) recorded higher ($P<0.05$) values of calve birth weight, placenta and fetus liquid weight than those other treatments. Animals fed (R2) recorded higher age at first calving, drop of fetal membrane (hours) compared with both of them (R1 or R3). Differences were significant. These results seem to agree with those of Houghton *et al.* (1990) and Shahin, (2000).

Also, data in Table (6) indicated that mean interval to the first postpartum estrus, service period and days open were significantly shorter ($P<0.05$) in the animals fed (R3), followed by (R1), while, animals fed (R2) were significantly performed the longer value. As obtained in the present study El-Keraby *et al.* (1981); Hafez, (1990); Fadel, (1995); Mahdy *et al.* (2001) and Shahin *et al.* (2006) reported similar results. This might be due to the high level of CFM in the ration improved metabolizable energy and protein in this ration (R3).

Table (6): Some reproductive performance of buffalo heifers fed different experimental treatments.

Item	Treatment		
	R 1	R 2	R 3
Calve birth , kg	$36.36^{b}\pm1.2$	$35.08^{c}\pm0.41$	$39.40^{a}\pm0.90$
Placenta weight, kg	$5.15^{b}\pm0.2$	$4.13^{c}\pm0.15$	$6.12^{a}\pm0.14$
Drop fetal membrane (hours)	$6.21^{a}\pm0.33$	$9.58^{a}\pm0.41$	$5.42^{c}\pm0.17$
Fetus liquid weight, kg	$15.63^{b}\pm1.3$	$14.90^{c}\pm0.94$	$17.43^{a}\pm1.90$
Gestation period length, days	297.8±5.3	303.0±2.7	296.0±2.7
Age at first calving, days	$906.2^{b}\pm20.0$	$924.6^{a}\pm15.0$	$864.7^{c}\pm19.0$
Interval to the first postpartum estrus, days	$56.17^{b}\pm2.8$	$79.3^{a}\pm1.9$	$42.7^{c}\pm2.1$
Service period (SP), days	$36.7^{b}\pm2.7$	$61.7^{a}\pm3.1$	$22.33^{c}\pm1.9$
Days open (DO), days	$92.87^{b}\pm 3.55$	141.0a±4.7	$65.03^{c}\pm2.5$

a ,b and c means of different letters in the same row are significant different

Milk and its composition

Data presented in Table (7) showed that animals fed (R1 or R3) had significantly ($P<0.50$) higher milk yield, 7% FCM, fat, protein, lactose, TS and SNF yield expressed as daily, kg compared with animals fed (R2). These results are in agreement with those obtained by El-Ahsry *et al.*(2003) and Etman *et al.* (2007) who reported that the animals fed on high level of CFM with corn silage had significantly higher milk yield and 7% FCM than those fed low level of CFM with CS. Concerning, the percentages of milk fat, protein, lactose, TS , SNF and Ash, its values had no significant differences among dietary treatments. This might be due to the substantially increases of nutrient digestibilities for R1 or R3 corresponding to those of R2. These results are in agreement with those reported by Bayoumi, (1995) and Etman *et al.* (2007) reported that differences due to different levels of CFM with corn silage proved to be of no significant effect on percentage of milk constituents.

Feed intake, conversion and economic efficiency

Data in Table (8) indicated that animals fed (R1) control ration consumed significantly higher DM and DCP compared with other treatments (R2 or R3), while, those fed (R2) recorded significant ($P<0.05$)

higher TDN intake than those on other treatments. This might be due to the different level of CFM and the accomplished roughage (corn silage or rice straw and berseem hay) in experimental rations.

Table (7): Effect of concentrate level on milk yield and its composition in buffalo milk during the first calving (first 105 days of lactation season)

Item		Treatment R 1	R 2	R 3
Milk yield, kg/ animal/ day		5.23[a]±0.53	3.94[b]±0.74	5.12[a]±0.88
7% FCM* yield, kg/ animal/ day		4.79[a]	3.68[b]	4.72[a]
Milk composition				
Fat	%	6.20±0.12	6.38±0.06	6.24±0.04
Fat yields	kg	0.32[a]±0.02	0.25[b]±0.03	0.32[a]±0.03
Protein	%	2.76±0.06	2.84±0.06	2.80±0.06
Protein yield	kg	0.144[a]±0.02	0.112[b]±0.02	0.143[a]±0.03
Lactose	%	4.10±0.06	4.20±0.05	4.16±0.07
Lactose yield	kg	0.214[a]±0.02	0.165[b]±0.03	0.213[a]±0.04
TS**	%	11.25±0.06	11.56±0.12	11.16±0.10
TS yield	kg	0.59[a]±0.06	0.455[b]±0.09	0.57[a]±0.10
SNF***	%	8.10±0.10	8.23±0.10	7.92±0.10
SNF yield	kg	0.42[a]±0.04	0.32[b]±0.06	0.41[a]±0.07
Ash	%	0.63±0.02	0.65±0.03	0.63±0.02
Ash yield	kg	0.03±0.01	0.03±0.01	0.032±0.01

a ,b and c means of different letters in the same row are significant different
**7% FCM was calculated as 0.265x milk yield (kg) + 10.5 x fat yield (kg) (Raafat and Salch, 1962)*
*** TS= total solids *** SNF= Solids not fat*

Table (8): Feed conversion and economic efficiency of lactating buffaloes (first calving) fed different experimental rations

Item	Treatment R 1	R 2	R 3
Daily feed intake, kg			
CFM	6.5	3.25	6
Corn silage	-	9.75	6
Berseem hay	3	-	-
Rice straw	4.5	-	-
Total feed intake , kg			
DM	14.5[a]	13[b]	12[c]
TDN	6.71[c]	8.29[a]	7.50[b]
DCP	0.971[a]	0.761[c]	0.899[b]
Feed Conversion:			
Kg DM/ kg 7% FCM	3.03[b]	3.53[a]	2.54[c]
Kg TDN/ kg 7% FCM	1.40[c]	2.25[a]	1.59[b]
Kg DCP/ kg 7% FCM	0.203[a]	0.207[a]	0.190[b]
Economic efficiency:			
7% FCM yield, kg	4.79	3.68	4.74
Average daily gain , kg	0.416	0.175	0.576
Price of milk yield, LE	21.56	16.56	21.33
Price of daily gain, LE	7.488	3.15	10.37
Total out put, LE	29.05	19.71	31.70
Cost of feed intake (in put, LE)	13.52	10.24	12.90
Return*	15.53	9.47	18.80
Relative economic efficiency %	100	-39.02	+21.06

*The price of feed stuffs as DM basis and products: CFM / ton = 1573 (LE); CS / ton= 417.941(LE); berseem hay / ton = 1017 (LE) and rice straw / ton = 134.5 (LE) and live body weight / kg= 14 LE. a ,b and c means of different letters in the same row are significant different * Return= total out put, L.E – Cost of feed intake, L.E*

Concerning the feed conversion expressed as the amount of DM, TDN or DCP intake to produce one kg 7% FCM, data showed that animals fed (R3) had better fed conversion for DM and DCP than those of other treatments. However, animals fed (R2) showed the poorest ($P<0.05$) fed conversion for DM, TDN and DCP. Poorest fed conversion for animals group fed (R2) for heifers at first calving might

be attributed mainly to the degree of development of their udder (size, structure and tissue) that being declined compared with other treatments and consequently negatively affected their corresponding milk yield. These results agreed with those reported by Metry, (1988) and Bayoumi, (1995).

Also, data in Table (8) indicated that the feed cost was most expensive for animals fed (R1) followed by those on (R3), and the lowest value for animals fed (R2). On the other hand, the highest values of daily milk yield price were recorded for both groups (R1 or R3) compared with group (R2). The high values of return were recorded for (R3) (18.80 LE) followed by (R1) (15.53 LE). The (R2) group was ranked the third (9.47 LE). Regarding the relative economic efficiency, it was higher in the animals fed (R3) (+ 21 %) versus the (R2) group which was lowest recorded the (-39 %) based on control ration. This might be due to the reduced daily milk yield although the lowest feed cost of ration (R2) than those other treatments (Table 8). These results seem to agree with those of Mohamed *et al.* (1999) and Etman *et al.* (2007).

CONCLUSION

From the previous results, It could be concluded that pregnant buffalo heifers fed ration containing 50% CFM + 50% corn silage (R3) showed some improvement in production and reproduction performance i.e., growth rate and consequently a decreased the number of days on feeding till first calving. Thus, it should be recommended to apply as good diet for feeding the pregnant buffalo heifers in all production and reproduction stages.

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تأثير التغذية على نسب مختلفة من المركزات وسيلاج الذرة على الاداء الانتاجى والتناسلى لعجلات الجاموس المصرى العشار

محمد عبد المنعم العشرى[1] و جمال فاروق شاهين[2] و طارق إبراهيم المنير[2]

[1]قسم الانتاج الحيوانى، كلية الزراعة، جامعة عين شمس، شبرا الخيمة، القاهرة.

[2]قسم تغذية الحيوان ، معهد بحوث الإنتاج الحيواني ، مركز البحوث الزراعية ، الدقي، الجيزة

أستخدم 24 عجلة جاموسي العشار بمتوسط وزن 369 كجم و عمر 600 يوم لدراسة معدلات النمو و معاملات الهضم و الكرش والكفاءة التناسلية والاقتصادية للعجلات الجاموس العشار المغذاه على مستويات مختلفة من سيلاج الذرة مع مخلوط العلف المركز المصنع. وكل مجموعة تتكون من 8 عجلات لاختبار ثلاث معاملات غذائية حسب مقررات العشري 1980م كالاتى:-

المعاملة الأولى: (مجموعة المقارنة) وكانت نسبة المواد المركزة الى الخشنة هى 38.5: 61.5 وكانت العليقة الخشنة عبارة عن دريس برسيم وقش الارز.

المعاملة الثانية: هي العليقة التي تحتوى على 25% علف مركز + 75% سيلاج الذرة .

المعاملة الثالثة: هي العليقة التى تحتوى على 50% علف مركز + 50% سيلاج الذرة .

وقد استمرت التجربة بعد ان وصلت العجلات الى ثلاث اشهر الأولى من العشار حتى 105 يوم الأولى من موسم الحليب تم خلالها دراسة أداء العجلات حيث كان يتم وزنها كل 15 يوم وتم اخذ عينات من الغذاء المأكول ومن روث كل حيوان لمدة ثلاثة أيام متتالية فى مرحلتى ما قبل و ما بعد الولادة لتقدير معاملات هضم المركبات الغذائية المختلفة باستخدام طريقة الرماد غير الذائب كمرقم داخلى (AIA).، وكانت أهم النتائج ما يلى:

- العجلات التي تغذت على المعاملة الثالثة سجلت أعلى معدلات نمو يومي و انتاج لبن و كذلك معدل التغير فى الوزن و كفاءة التحويل الغذائي لكل من المادة الجافة و البروتين المهضوم.
- وكذلك تحسنت معاملات هضم المادة الجافة والعضوية والبروتين الخام و المستخلص الأثيري والمستخلص الخالي من الأزوت وكذلك القيمة الغذائية لمجموع المركبات الغذائية المهضومة للعجلات التي كانت تتغذى على مستوى عالي من العلف المركز (المعاملة الثالثة).
- بينما تحسنت معاملات هضم الألياف الخام و تحسنت الكفاءة الاقتصادية لمجموعة العجلات التى غذيت على المعاملة الثانية .

لذلك يمكن التوصية بالتغذية على علائق تحتوى على 50% علف مركز + 50% سيلاج الذرة حيث سجلت أفضل نتائج لكل من الهضم والكفاءة الغذائية ومعدلات النمو وإنتاج اللبن والأداء الانتاجى والتناسلي وأفضل مردود اقتصادي لعجلات الجاموس العشار فى أول موسم ولادة .