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EFFECT OF FEEDING LEVEL ON DIGESTIBILITY, NUTRITIVE VALUE, REPRODUCTIVE PERFORMANCE OF LACTATING BUFFALOES.

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ABSTRACT

Eighteen pregnant lactating buffaloes, 8 weeks before the expected calving data were divided into three homogenous groups (6 animals each), according to their age , parity and weight , to examine three feeding level . The first group of animals were fed ration containing concentrate feed mixture (CFM) and rice straw (RS) as 100% TDN and CP as recommended by Kearl allowance (1982) of buffalo dame (R1). The second group of animals were fed ration containing (CFM) and (RS) as 100% TDN and CP as recommended by Shehata allowance (1970) (R2). The third group of animals were fed ration containing (CFM) and (RS) as 125 % TDN and CP as recommended by Shehata allowance (1970) .

The results showed that in pre-partum and post-partum buffaloes groups fed ration containing 125 % of Shehata allowance (R3) or these fed 100% of Kearl allowance (R1) showed higher nutrients digestibility than buffalo group fed 100 % of Shehata allowance (R2) which is reflected on nutritive value as TDN and DCP .

Live body weight, live body weight changes and relative changes (to initial body weight) during late pregnancy, early lactation and weaning of buffaloes dam fed ration R1 or R3 showed better values than those fed R2. The same trend was obtained for live body weight of calves born for different groups.

Milk yield and milk yield per unit metabolic body size MBS (kg $W^{0.75}$) were higher for R1 or R3 treated than those of R2 treatment . The same trend was recorded for fat % as will with and milk energy k cal / kg milk.

It can be concluded that 125% of Shehata allowance or 100 % of Kearl allowance for pre-partum and post-partum for buffaloes are successful allowance.

Keywords: feeding level, lactating buffaloes, digestibility, reproductive performance.

INTRODUCTION

The productivity of an animal depends up on the availability of feed especially at critical times such as growth , pregnancy and lactation (Hassan et al ., 1982) . Some factors that affect milk secretion of cows were breed , stage of lactation , disease ,management and nutrition (Armstrong , 1968) Nutrition is the major factor affecting the physiological and metabolic status of buffalo , so that optimal feeding before calving such that the animal reach parturition in good body condition insures maximum production and high reproductive efficiency (El-Ashry et al ., (2003) .

Mudgal and Sivaiah , (1982) found that the digestibility of CF and NFE increased with the increasing protein and energy level , while the digestibility of other major nutrients were not affected . Also, Shahin *et al.*, (2004) found that nutrients digestion coefficient were improved when fed by buffalo calves were fed 125 % of Shehata (1970) allowance While, DM digestibility was decreased with low protein level (Baruah *et al* ., 1988).On the other hand,

El- Shinnawy (1989) , Sampath *et al* ., (1993) and Sharma *et al* ., (1993) working with buffalo calves found that the DMI and digestibility of DM , CP , CF , EE and NFE were not significantly affected by different levels of CP and TDN intake.

Different levels of CP and TDN in the daily ration of buffalo calves did not significant affect the daily body weight gain (Sharma and Singh, 1993) .In opposite, Bellows and Short (1978); Hassan *et al*., (1982) ; Metry , (1988) ; Bayoumi (1995) and El-Ashry *et al*., (2003) reported that live body weight changes (pre-partum and post-partum) and calf birth weight were positively affected by high level of feeding of lactating buffaloes.

Milk production and some reproduction traits were improved by the high level of feeding of buffaloes (Sabri and Roberts , 1988 ; Sharma et al ., 1993 and Bayoumi , 1995).The same trend was recorded by Hassan et al .,1982 on sheep and goats . Also , the daily milk yield of buffaloes was increased when fed 120 % Shehata 1970 allowance , (Afifi , 1978a) and 125 % of Ghoneim 1967 allowance , (Higazy,1985). On contrary , El-Serafy *et al*., (1984) concluded that milk yield of buffaloes fed 80 % of NRC 1978 energy allowance , was increased than 100 % and 120 % allowance . Birth weight of calves was significantly increased when their dams were maintained on high level of feeding during late pregnancy (Bellows and Short 1978 and Bayoumi , 1995) .

The present objective of the work was conducted to study the effect of different recommended allowance for pregnant buffalo dames on digestibility , nutritive values , reproductive and productive performance and milk yield .

MATERIALS AND METHODS

This study was conducted at El-Gemiza Experimental Station Animal Production Research Institute, Agriculture Research Center, Ministry of Agriculture, Egypt. Eighteen pregnant buffalo dame , two months before the expected calving date were distributed into three homogeneous groups (6 in each) , according to their age , weight , parity and milk yield . The animals ranged from 2nd to 4th parity with average body weight at calving of 653 kg.The animal groups were randomly assigned to one of the following treatments :

1- Animals were fed ration (R1) containing concentrate feed mixture (CFM) and rice straw (RS) at 100 % of TDN and CP as recommended by Kearl (1982) .
2- Animals were fed ration (R2) containing (CFM) and (RS) the daily ration was formulated to cover 100 % of TDN and CP recommended by Shehata (1970).
3- Animals were fed ration (R3) containing (CFM) and (RS) to suggested cover 125 % of TDN and CP recommended by Shehata (1970) as suggested allowance .

Daily feed allowance was offered biweekly based on pregnancy stage, post- calving, change of dame weight, milk yield and fat percentage . Roughage:concentrate ratio used was about 50:50% for perpartum and 60:40

% postpartum. The CFM was offered twice daily at 8 a.m and 4 p.m then RS was offered. Mineral blocks and fresh water were available freely throughout the experimental period.

The nutritive values of CFM on DM basis (by indirect method according to Abou-Raya , 1967) were 65 and 12% for TDN and DCP, respectively.Also,RS on DM basis was 30%for TDN and 0 % for DCP

Nutrient digestibilities were determined at two physiological stages during prepartum and postpartum using acids insoluble ash (AIA) method of Van Keulen and Young (1977). Chemical analysis of feedstuff (Table 1) and feces were carried out according to A.O.A.C.(1984). Buffalo cows were hand milked twice daily at 7.0 a.m and 4.0 p.m . Daily milk yield of each animal was recorded after 3 days of parturition up to 100 days postpartum period. Composite sample of milk (morning and evening samples) were mixed at a ratio of 1 % weight of milk yield and analyzed biweekly for fat, protein, lactose and total solids using Milkoscan apparatus "Model 133 D" , Ash content of milk was determined as reported in A. O. A. C. (1984).

Table (1) : Chemical composition of feeding stuffs and tested rations .

Item	DM	On DM basis					
		OM	CP	CF	EE	NFE	Ash
CFM	86.75	92.35	17.06	9.45	2.05	63.79	7.65
Rice Straw	91.70	81.10	3.89	35.50	1.11	40.60	18.90
Consumed	Rations (calculated)	:					
At prepartum							
R1	89.22	86.75	10.53	22.39	1.65	52.18	13.25
R2	89.13	86.72	10.53	22.30	1.61	52.28	13.28
R3	89.06	86.75	10.57	22.34	1.59	52.25	13.25
At postpatum							
R1	89.83	85.89	9.47	24.45	1.51	50.44	14.13
R2	89.87	85.62	9.07	25.21	1.50	49.83	14.39
R3	89.75	85.56	9.12	25.20	1.48	49.76	14.44

The ingredients of concentrate feed mixture (CFM) were: 30 yellow corn,35 % undecorticated cottonseed meal , 30 % Wheat bran , 3 % Molasses, 1.5 % limestone and 0.5 % salt .

Body weight of dams were recorded at different stage of pregnancy, postpartum and lactation stages. The born calves were left with their dams during the first three days of live to receive colostrums .The calves were fed individually on their dam's milk at the rate of 10 % of the body weight given in two meals for six weeks. After that, the milk allowance were reduced gradually until weaning. Calves starter and hay were available in front of the calves from the beginning of the third week of age . Body weight of the calves was recorded weekly for 15 weeks until weaning .

Statistical analysis was carried out after transforming the percentage number into Arcasin values , using F-Test (Snedecor and Cochran , 1982) and the differences among treatment means were tested using Duncan's multiple range test (Duncan , 1955) .

RESULTS AND DISCUSSION

Data obtained from digestibility trails (Table 2 and 3) indicated that the daily DM intake for R3 prepartum and postpartum, as kg /h /d or kg / $kgW^{0.75}$ respectively (125 % of Shehata allowance , 1970) were higher significantly than R1(100 % of Kearl allowance , 1982) and the intakes for R1 were higher significantly than R2 (100 % of Shehata allowance,1970).The same trend was obtained by Helmy,(1988); Bayoumi ,(1995) and El-Ashry., (2003) found that buffaloes prepartum and postpartum feeding levels, exerted highly significant (P< 0.01) effect on DM intake by high levels of TDN and DCP intake .

Table (2) : Average DM intake , nutrient digestibility and nutritive values of tested rations determined prepartum .

Item	R1	R2	R3
Body weight , kg	625.67 ± 15.26	622.67 ± 13.73	623.00 ± 54.31
Digestion coefficients %			
DM	71.83 ± 2.32	67.66 ± 4.05	72.32 ± 1.54
OM	77.25 ± 0.85	73.04 ± 2.69	76.64 ± 0.77
CP	75.52^{a} ± 1.61	67.08^{b} ± 1.93	74.67^{a} ± 1.58
CF	57.67^{b} ± 0.77	60.84^{a} ± 1.09	57.07^{b} ± 0.78
EE	81.69^{a} ± 1.47	75.22^{b} ± 1.37	79.77^{a} ± 0.95
NFE	68.89 ± 0.65	67.49 ± 0.54	67.34 ± 1.28
Nutritive values %			
TDN	59.89^{a} ± 0.60	58.63^{b} ± 0.40	58.69^{a} ± 0.65
DCP	7.95^{a} ± 0.56	7.06^{b} ± 0.25	7.89^{a} ± 0.35
Daily DM intake :			
CFM kg / h / d	6.12 ± 0.07	5.32 ± 0.09	6.78 ± 0.23
RS kg / h / d	6.03 ± 0.12	5.22 ± 0.15	6.65 ± 0.29
Total DM intake kg / h / d	12.15^{b} ± 0.41	10.54^{c} ± 0.07	13.43^{a} ± 0.06
Total DM intake kg / $w^{0.75}$	0.097^{b} ± 0.001	0.085^{c} ± 0.005	0.108^{a} ± 0.005
Daily TDN intake kg / h / d	7.28^{a} ± 0.30	6.18^{b} ± 0.25	7.88^{a} ±0.39
Daily DCP intake kg / h / d	0.97^{a} ± 0.08	0.74^{b} ± 0.10	1.06^{a} ± 0.09

a, b and c Means in the some row with different superscripts are different (P< 0.05)
R1 : Allowances of Kearl (1982) R2 : Allowances of Shehata (1970)
R3 : 125 % allowances of Shehata (1970)

DM digestion coefficients did not differ significantly among buffalo groups prepartum or postpartum fed rations R1 , R2 and R3, the same trend was obtained by Sampath *et al* ., (1993). OM and NFE digestibility coefficient did not significantly differe among different buffalo groups at prepatum stage (Table2). However, the differences in CP and EE digestibilites were significant (P< 0.05) among buffalo groups fed ration R1or R3 and those of R2 groups. On contrary, CF digestibility was higher significantly (P< 0.05) for R_2 than R1 or R3 groups. Also, OM, CP , EE and NFE digestion coefficients were significant differed (P<0.05) for R1,R3 than R2 group postpartum period (Table3) than those recorded during prepartum period,except for CF digestibility. The same trend were obtained by El-Sinnawey (1989); El-Ashry, *et al*. (2003) and Shahin and Zaki, (2004). Also, Kummar *et al*.,(1981) and Etman (1985) reported that the increase of dietary energy density improved the digestibility of all nutrients except CF digestibility with male buffalo calves.

The nutritive values as TDN and DCP did not differ significant among buffalo groups prepartum (Table 2) fed rations R1, R2 and R3 , but in postpartum (Table3) TDN and DCP of R1 and R3 were significantly (P< 0.05) higher than R2 groups . These results may be due to the increase level of CFM intake for (R1) or (R3) compared to R2. These results are in agreement with the findings of Shahin *et al.*, (2004) who reported that buffalo calves fed increased energy and protein levels in the concentrate feed mixture increased (P< 0.05) the TDN and DCP intakes.

Table (3) : Average DM intake , nutrient digestibility and nutritive values of tested rations determined postpartum .

Item	R1	R2	R3
Body weight , kg	584.33 ± 16.72	585.67 ± 11.06	583.00 ± 54.03
Digestion coefficients %			
DM	74.16 ± 2.60	68.16 ± 1.45	72.43 ± 1.65
OM	79.69^{a} ± 0.59	75.65^{b} ± 1.01	78.73^{a} ± 0.54
CP	78.41^{a} ± 1.22	72.85^{b} ± 1.63	77.54^{a} ± 0.86
CF	58.51 ± 0.49	61.77 ± 1.14	57.74 ± 1.11
EE	82.53^{a} ± 1.06	77.03^{b} ± 0.80	81.09^{a} ± 0.75
NFE	78.20^{a} ± 0.84	72.33^{b} ± 0.61	76.44^{a} ± 1.48
Nutritive values %			
TDN	66.15^{a} ± 1.01	59.38^{b} ± 0.57	62.39^{a} ± 0.47
DCP	7.43^{a} ± 0.33	6.61^{b} ± 0.23	7.07^{a} ± 0.42
Daily DM intake :			
CFM kg / h / d	5.54 ± 0.11	4.76 ± 0.07	6.03 ± 0.16
RS kg / h / d	7.55 ± 0.16	7.26 ± 0.10	9.21 ± 0.21
Total DM intake kg / h / d	13.09^{b} ± 0.27	12.02^{c} ± 0.15	15.24^{a} ± 0.34
Total DM intake kg / $w^{0.75}$	0.110^{b} ± 0.001	0.101^{c} ± 0.001	0.149^{a} ± 0.004
Daily TDN intake kg / h / d	8.66^{a} ±. 035	7.14^{b} ± 0.30	9.5^{a} ± 0.40
Daily DCP intake kg / h / d	0.97^{a} ± 0.09	0.80^{b} ±0.08	1.08^{a} ± 0.09

a, b and c Means in the some row with different superscripts are different (P< 0.05)
R1 : Allowances of Kearl (1982) R2 : Allowances of Shehata (1970)
R3 : 125 % allowances of Shehata (1970)

Live body weight, live body weight changes and relative changes (to initial body weight) during late pregnancy, early lactation and at weaning stages are summarized in Table 4 among three different experimental treatments. Live body weight changes during the last 8 weeks of pregnancy were increased (R1) or (R3) compared to that on (R2) but the difference was not significant . The same trend was recorded for live body weight of buffaloes in early lactation and at weaning . These findings are in agreement with those reported on Egyption buffalo (Afifi *et al* ., 1978b ; Metry , 1988 , Muing *et al* ., 1993 ; Bayoumi, 1995 and El-Ashry *et al* ., 2003). In this respect , El-Serafy *et al.*, (1984) reported that lactating buffaloes received 80% of energy level according to NRC (1978) allowance gained more than those received 100 or 120 % NRC requirements, when dietary protein allowance were held constant in the 3rd rations. The body weight changes (kg) and relative changes per % unit MBS were clearly affected by treatments during late pregnancy, early lactation and at weaning (Table 4) .The same trend was obtained by Hassan *et al* .; (1982) .

Table (4) : Live body changes of different experimental buffalo groups at late gestation , early lactation and at weaning stage .

Item	R1	R2	R3
Body weight : kg			
Initial body weight*	603.33 ± 30.11	604.17 ± 37.43	605.00 ± 44 19
Kg $W^{0.75}$	121.74 ± 4.64	121.86 ± 5.76	121.99 ± 6.75
In late pregnancy	657.33 ± 31.94	645.50 ± 37.31	656.00 ± 45.59
Kg $W^{0.75}$	129.82 ± 4.82	128.06 ± 5.65	129.62 ± 6.75
In early lactation	581.42 ± 31.13	578.83 ± 36.25	585.17 ± 46.11
Kg $W^{0.75}$	118.40 ± 4.83	118.01 ± 5.66	118.98 ± 7.08
At weaning	593.00 ± 30.95	577.83 ± 35.41	592.00 ± 41.14
Kg $W^{0.75}$	120.17 ± 4.57	117.86 ± 5.61	120.02 ± 6.39
Body weight changes : kg			
In late pregnancy	+ 54.00	+ 41.33	+ 51.00
In early lactation	- 21.91	- 25.34	- 19.83
At weaning	- 10.33	- 26.34	- 13.00
Relative changes (% unit MBS)			
In late pregnancy	+ 6.64	+ 5.09	+ 6.26
In early lactation	- 2.74	- 3.16	- 2.47
At weaning	- 1.29	- 3.28	- 1.62

R1 : Allowances of Kearl (1982) R2 : Allowances of Shehata (1970)
R3 : 125 % allowances of Shehata (1970)
• Initial body weight before two months of gestation .

Milk yield / head and per unit MBS ($kgw^{0.75}$) in early lactation , at weaning and during the whole period are shown in Table 5 . The average daily milk yield of lactating buffaloes at early lactation and at weaning stage of buffaloes fed (R3)or group (R1) were higher ($P < 0.05$) than the corresponding value of (R2) group . These might be due to the increase in nutrients digestibility for group (R3)or group (R1) compared with (R2) group. The milk yield per metabolic body size ($kgw^{0.75}$) had the same trend of milk yield with the three different treatments.

Table (5): Mean milk production by lactating buffaloes groups given three different nutritional treatments.

Item	R1	R2	R3
Body weight of dams at weaning kg:	587.13 ± 21.01	579.25 ± 24.28	588.58 ± 29.47
Kg $W^{0.75}$	119.28 ± 4.70	118.07 ± 5.59	119.50 ± 6.69
Total milk yield :			
1 - 8 weeks of lactation , kg	436.29	332	408.38
Kg milk / kg $BW^{0.75}$	3.66	2.81	3.42
Average daily milk , kg	7.79^{a} ± 0.64	5.75^{b} ± 0.54	7.29^{a} ± 0.41
9-15 weeks of lactation , kg	376.88	285.74	381.36
Kg milk / kg $BW^{0.75}$	3.16	2.42	3.19
Average daily milk , kg	8.97^{a} ± 0.52	6.80^{b} ± 0.49	9.08^{a} ± 0.44
Whole period (1-15 weeks of lactation) :			
Kg milk	813.17	617.74	789.74
Kg milk / kg $BW^{0.75}$	6.82	5.23	6.61
Average daily milk , kg	8.30^{a} ± 0.57	6.30^{b} ± 0.48	8.06^{a} ± 0.40

a, b and c Means in the some row with different superscripts are different ($P < 0.05$).
R1 : Allowances of Kearl (1982) R2 : Allowances of Shehata (1970)
R3 : 125 % allowances of Shehata (1970)

These results are in good agreement with the findings of Higazy , 1985 ; Afifi , 1987a ; Sabri and Roberts , 1988 ; Sharma *et al* ., 1993 ; Bayoumi , 1995 ; Ekinci and Broderick, 1997 and El-Ashry *et al* ., 2003) who reported that milk yield increased with increasing energy level .

Milk composition as percentage (Table 6) indicate that differences in protein , lactose , SNF , total solids and Ash percentage of lactating buffaloes fed the three experimental treatments were not significant , but fat percentage and milk energy per k cal / kg milk of buffaloes fed either (R1) or (R3) were higher (P <0.05) than that of (R2) group. This might be due to the positive increase of nutrients digestibility for groups fed either (R1) or (R3). Sabri and Roberts (1988) suggested that increased level of feed had highly significant increase in milk fat and protein contents. Also, Metry,(1988) ; Sharma *et al* ., (1993); Bayoumi , (1995) and El-Ashry *et al* ., (2003) concluded that energy level does not affect on milk composition. In this respect Verna et al ., (1993) showed that no differences in daily milk, fat milk and milk protein percents. When 8 multiparous buffaloes were fed ad libitum on diets containing energy 0.83 or 0.77 FUL / kg DM and 14 or 12 % protein on a DM basis .

Table (6) : Mean milk composition of buffaloes groups fed on the different experimental treatments .

Item		R1	R2	R3
Total solids	%	17.37 ± 0.20	16.87± 0.32	17.34 ± 0.18
Fat	%	7.00^{a} ± 0.14	6.48^{b} ± 0.11	6.85^{a} ± 0.13
Protein	%	4.92 ± 0.07	4.78 ± 0.13	4.99 ± 0.07
Lactose	%	4.82 ± 0.08	5.00 ± 0.13	4.87 ± 0.05
Solids not fat	%	10.37 ± 0.11	10.40± 0.23	10.49 ± 0.07
Ash	%	0.62 ± 0.02	0.62 ± 0.01	0.62 ± 0.01
Milk energy kcal/kg milk		1096.50^{a}±17.1	1036.55^{b}±12.9	1079.21^{a}±14.7

a,b and c Means in the some row with different superscripts are different(P<0.05).
R1 : Allowances of Kearl (1982) R2 : Allowances of Shehata (1970)
R3 : 125 % allowances of Shehata (1970)
• : Energy of milk (kcal / kg milk) = 115.30 (2.51+ % Fat)
Overman and Sanmann (1926) .

Live body weight of calves , average daily gains and relative gains at birth , at 10 and 15 weeks of age are shown in Table 7. The results indicate that live weight at birth , at 10 and 15 weeks of age were increased for buffaloes groups fed either (R1) or (R3) compared with that of group fed (R2). Also, when live body weight at birth is calculated as a percentage of dam weight just before calving and jest after calving , the effect of treatment was very clear. The same trend was obtained by Bellows and Short ,1978 ; Hassan *et al* ., 1982 ; Bayoumi , 1995 and El-Ashry *et al* .,(2003) .

Its possible there fore to concluded that either 125 % of Shehata allowance or 100 % of Kearl allowance for prepartum and postpartum feeding of lactating buffaloes is correlated with the best apparent nutrients digestibilities , milk yield and consequently reflected on daily gains of calves .

Table (7) : Performance of the growing buffalo calves as affected by the different nutritional treatment fed to their dams .

Item		R1	R2	R3
Body weight :				
Birth weight,	kg	40.83 ± 1.25	36.33 ± 1.02	40.17 ± 1.30
% of dam weight $W^{0.75}$		16.15	14.8	15.96
Just before borning	(1)	31.45	28.37	30.99
Just after borning	(2)	34.49	30.79	33.76
At 10 weeks ,	kg	92.17 ± 1.49	82.0 ± 2.08	89.33 ± 1.58
At 15 weeks ,	kg	120.83 ± 1.92	106.67 ± 3.70	116.0 ± 2.83
Average daily gain	kg / d			
First 10 weeks		0.733 ± 0.02	0.652 ± 0.04	0.702 ± 0.04
Last 15 weeks		0.805 ± 0.04	0.705 ± 0.08	0.762 ± 0.09
Overall		0.762 ± 0.02	0.670 ± 0.03	0.722 ± 0.03
Relative gain (% unit MBS):				
At 10 weeks ,	kg	84	84	82
At 15 weeks ,	kg	126	124	122

R1 : Allowances of Kearl (1982) R2 : Allowances of Shehata (1970)
R3 : 125 % allowances of Shehata (1970)

Relative gain (% unit MBS) = $\frac{\text{Initial MBS} - \text{Final MBS} \times 100}{\text{Initial MBS}}$

(1) Just before borning = $\frac{\text{Birth weight}}{\text{Dam weight before borning } W^{0.75}}$

(2) Just after borning = $\frac{\text{Birth weight}}{\text{Dam weight after borning } W^{0.75}}$

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تأثير مستوى الغذاء على معاملات الهضم و القيم الغذائيـــة و الكفـــاءة التناسـلية للجاموس الحلاب .

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تهدف هذه الدراسة معرفة تأثير استخدام ثلاثة مقررات غذائية مختلفة للجـــاموس قبـــل الولادة بشهرين وبعد الولادة و حتى فطام الولادات على معاملات الهضم والنمـــو ومعـــدل الأداء والكفاءة التناسلية .

استخدم ١٨ جاموسة عشار قبل الولادة بشهرين وقسمت إلى ثلاثة مجاميع متشابهة مـــن حيـــث العمر وموسم الحليب وفترة الحمل لاختبار ثلاثة مقررات غذائية وهى المجموعة الأولي تم فيهـــا تغذية الحيوانات على علف مركز وقش أرز على أساس ١٠٠ % من احتياجات مجموع المركبات الغذائية المهضومة والبروتين المهضوم بموجب مقـــررات كيـــرل ١٩٨٢ . المجموعـــة الثانيـــة استخدام فيها انفس الأعلاف السابقة ولكن حسب الاحتياجـــات تبعـــا لمقـــررات شـــحاتة ١٩٧٠. المجموعة الثالثة تم استخدام نفس مكونات العليقة السابقة باستخدام ١٢٥ % من مقررات شـــحاتة ١٩٧٠ .

وكانت أهم النتائج ما يلي :-

- تحسنت معاملات هضم القيم الغذائية التى أمكن التوصل أليها بتغذية الجاموس الحلاب قبل وبعد الولادة على مقررات كيرل و ١٢٥ % من مقررات شحاتة بالمقارنة ١٠٠% مقررات شـــحاتة فقد أدت ألي نتائج اقل و قد أخذت نتائج المركبات الغذائيـــة الكليـــة المهضـــومة و البـــروتين المهضوم نفس الاتجاه السابق لمعاملات الهضم .
- كان هناك تحسن ملحوظ في وزن الأمهات ومعدل التغير فى الوزن بالمقارنة ببداية التجربـــة و أثناء فترة الحمل وبعد الولادة وخلال بداية فترة الحليب وحتى الفطام مع مقررات كيرل و ١٢٥ % من مقررات شحاتة بالمقارنة ١٠٠% مقررات شحاتة . وكذلك وزن الولادات عند الـــولادة وحتى الفطام أعطى نفس الاتجاه .
- أوضحت النتائج أن محصول اللبن الكلى والمنسوب ألي حيز الجسم التمثيلـــي أعطـــى تحســـن واضح مع مقررات كيرل و ١٢٥ % من مقررات شحاتة كما تلاحظ ارتفاع نسبة الدهن وطاقة اللبن بالكيلو كلوري لكل كيلو لبن لكلا المقررين السابقين بالمقارنة بالمجموعة التي تتغذى على ١٠٠% مقررات شحاتة .
- من هذه الدراسة اتضح أنة يمكن استخدام بنجاح مقررات كيرل و ١٢٥ % من مقررات شحاتة للجاموس الحلاب أثناء وبعد فترة الحمل والولادة و إنتاج اللبن . حيث حسن هـــذين المقـــررين معدل النمو الولادات حتى الفطام .
- لذلك نوصى بأن تكون عليقه عجول الجاموس النامي محتويه على مقررات كيـــرل أو ١٢٥ % من مقررات شحاتة حيث إن هذه المقررات أعطت افضل نتائج لكل مـــن الهضـــم و الكفـــاءة الغذائية والنمو ومعدل الأداء الإنتاجي والتناسلي .