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EFFECT OF VITAMIN E SUPPLEMENTATION ON MILK YIELD, MILK FATTY ACIDS PROFILE AND ECONOMICAL EFFICIENCY IN BUFFALO COWS

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SUMMARY

The current study was accomplished to determine the effect of pre-calving administration of vitamin E on post-partum performance of buffalo cows. Fifteen pregnant buffalo cows of three years age were divided in to 3 groups: Control, treatment (T_1) and treatment (T_2). Control group were given no treatment, T_1 group was given vitamin E (3000 IU/h/d) whereas; T_2 group was given vitamin E (6000 IU/h/d) before 8 week of expected calving even after calving 4 months. Milk yield were different significantly ($P \leq 0.05$) among treatment groups. T_1 and T_2 showed ($P \leq 0.05$) daily milk yield, being 6.97 and 8.13 kg, respectively. The milk composition was not different ($P \geq 0.05$) in all groups. The vaccenic acid and romanic acid was higher in treated groups in comparison with control group. The feed and economic efficiency were higher in treated groups than those of control group. Animal group (T_2) showed the best both feed efficiency and economic efficiency, being 1.618 kg DM per 7% kg FCM and 1.7 (price of milk yield /feed cost), respectively. Generally, vitamin E supplementation to lactating buffalo cows rations especially higher level (6000 IU) improved actual milk yield and increased feed and economic efficiency.

Keywords*: *Vitamin E, milk yield, fatty acids profile, economic efficiency and Buffalo.

INTRODUCTION

Vitamin E is a fat-soluble vitamin and is not synthesized in the rumen. The vitamin E requirement must therefore be provided in the feed. However, the vitamin E content of the basal diet is highly variable and is not known in most situations. Although vitamin E content is high in fresh grass, it markedly reduces during storage and conservation (Persson Waller *et al.*, 2007). Most diseases in dairy cows occur at or just after calving, which is a period associated with immune suppression, resulting in an increased susceptibility to infections, as reported by Mallard, B. A. *et al*., (1998) and Persson Waller (2000). The vitamin E (α-tocopherol) status of dairy cows is one important component of a well-functioning immune system because of its antioxidant effects on cows (Hogan, *et al.*, 1993; Weiss and Spears, 2006) and young dairy calves (Cipriano, *et al.*, 1982). At parturition, plasma concentrations of vitamin E were found to decrease by 47 % because of secretion of the vitamin into the udder during colostrogenesis, decreased dry matter intake (DMI) at calving, and an increased need for antioxidants during this time (Goff and Stabel, 1990; Meglia, *et al.*, 2006).

Consumers are increasingly aware of the link between diet and health, and recently fatty acids have gained special attention for their potential health benefits. Conjugated linoleic acid (CLA) is one such bioactive FA that may function to improve health maintenance and prevent chronic diseases. When consumed as a natural component of the diet, cis-9, trans-11 18:2 CLA rumenic acid (RA) has been consistently shown to offer anticarcinogenic and antiatherogenic effects in biomedical studies using animal models of human disease (Parodi, 2004; Bauman *et al*., 2006). The presence of RA in human diets originates almost exclusively from ruminant-derived milk and meat products (Ritzenthaler *et al*., 2001). Rumen microbial biohydrogenation of PUFA produces RA and trans-11 18:1 vaccenic acid (VA) as intermediates (Palmquist *et al*., 2005). Although some RA escapes from the rumen before complete saturation, the major source of RA in milk fat is endogenous synthesis from vaccenic acid (VA) via the mammary enzyme Δ9-desaturase (Bauman and Lock, 2006). Environmental and physiological factors that affect the milk fat content of RA have been identified, with diet having the greatest effect (Chilliard *et al*., 2000); Palmquist *et al*., 2005). The ability to minimize risk of diet-induced milk fat depression (MFD) would have potential application and interest in many situations, including the use of diets designed to achieve a sustained increase in milk fat content of CLA. Diet induced MFD results in a characteristic pattern of reduced percentage and yield of milk fat, and a shift in the FA composition of milk fat (Bauman and Griinari, 2003; Harvatine *et al*., 2009). Results from several recent investigations have suggested a possible role for vitamin E in preventing the shift in rumen biohydrogenation pathways and subsequent MFD (Charmley and Nicholson, 1994; Focant *et al*., 1998; Kay *et al*., 2005; Bell *et al*., 2006; Pottier *et al*., 2006).

The aim of the present study was to investigate the effect of vitamin E supplementation in ration on milk yield, composition and in turn its effect on performance of buffalo cows.

MATERIALS AND METHODS

The present work aimed to study the effect of vitamin E supplement to buffalo cows rations during late pregnancy (60 days pre-partum) and/or lactation (120 days post-partum), and its influences on buffalo cows daily milk yield and its composition (protein, fat, lactose, total solid and solids not-fat % (SNF) and fatty acid composition). The study was accomplished at throughout the period from October 2016 to March 2017 farm animal production in Mostorod district belonging to Animal Production Department, Faculty of Agriculture, Al-Azhar University, Cairo, Egypt.

Feeding and management of buffaloes:

Fifteen pregnant Egyptian buffalo cows with an average live body weight 500 kg and 5 years old age were randomly (according preceding milk yield) assigned into three nutritional groups during late gestation (8 weeks pre-partum).

During the experimental period, routine health management of the farm was followed and animals were having any health disorder were excluded from the study. They were shifted from dry pregnant cow paddocks to the calving pen just one week before the expected calving date and retained till 4–5 days after calving.

The first group was used as a control (C), nil Vitamin E supplement. The 2^{nd} (T_2) and 3^{rd} groups (T_3) were individually received only 3000 and 6000 IU of α-tocopherol acetate/h/d, respectively. during late gestation 60 days pre-partum before the expected calving date and/or lactation 120 days post-partum.

In this respect, the United States Pharmacopeia (USP) defines one International unit (IU) of vitamin E as equal to 1 mg of α-tocopheryl acetate (NRC 2001) thus, to supplement 6000 IU of vitamin E, 6000 mg (equivalent to 6 g) and to supplement 3000 IU of vitamin E, 3000 mg (equivalent to 3g) of α-tocopheryl acetate was offered.

Experimental animals were housed in semi–opened pens, offered their daily requirements during pregnancy and lactation. Concentrate feed mixture (14 % CP and 60 % TDN) + green berseem (*Trifolium alexandrinum),* + rice straw were offered to pregnant and lactating buffalo cows in two equal meals at 9.00 am and 6.00 pm (Table 1), with the ratio of 4 : 2 : 2 for concentrate feed mixture : green berseem : rice straw, as dry matter basis, respectively. Fresh drinking water was freely available all over the day time.

Table (1): Chemical composition of feedstuffs (DM basis %).

Item	DM	Composition as DM basis						NDF	ADF
		OM	CP	CF	EE	NFE	Ash		
Pelleted CFM	91.80	89.66	15.46	18.51	4.93	50.76	10.34	39.00	28.20
Rice Straw	91.20	87.61	5.13	36.89	2.30	43.29	12.39	70.10	61.00
Berseem	14.85	84.65	15.51	26.13	1.21	41.80	15.35	41.00	33.00

CFM = Concentrate feed mixture.

***Milk samples*:**

Lactating buffalo cows of different experimental groups were daily hand milked two times after calving (colostrum period) until 4 months of calving. Representative biweekly composite milk from morning and evening samples were collected to study buffalo cows quality of milk (protein, fat, lactose, ash, total solid and solids not-fat % (SNF)) and fatty acid composition during 4 month collection period. Also, actual milk yield was estimated as 7 % milk yield by using the method of Raafat and Saleh (1962) as follow:

$$7\ \%\ FCM\ yield = 0.265 \times MY\ (kg) + 10.5 \times FY\ (kg)$$

Where: FCM = Fat corrected milk, MY = Milk yield, and FY = Fat yield.

Fat percentage was determined by Gerber method according to British Standard Institution (1951). Solids not fat content was calculated by the difference between total solids and fat content. Lactose content was determined calorimetrically according to Barrnett and Abd El-Tawab (1957). Total nitrogen was determined by the semi-micro Kjeldahl distillation method according to Ling (1963).

Fatty acid analysis:

Milk samples from each biweekly were combined for FA analysis per buffalo cow. The extraction of milk fat was based on the method of Hara and Radin (1978) and the transmethylation of the esterified FA were acheived according to the method of Christie (1982) as modified by Chouinard *et al*., (1999).

Chemical composition of concentrates, green fodder and rice straw were analysed according to A.O.A.C. (1990). The methods of Van Soest *et al.,* (1991) were used for NDF and ADF determination.

Statistical analysis:

Data were subjected to statistical analysis using two-way classification (for milk yield and milk composition) and one-way analysis of variance (for fatty acids), using the general linear Models procedure adopted by statistical package software SAS version 9.1 SAS (2002), Cary, NC., USA. Differences between means were tested for significances using the L.S.D test, according to Duncan (1955). Analysis of variance and least square means was carried out using the following equations:

$$Y_{ij} = \mu + T_i + M_j + E_{ij} \quad \text{and} \quad Y_{ij} = \mu + T_i + E_{ij}$$

Where: Y_{ij} = the observation of the measured parameter, μ = *overall mean,* T_i = the effect of dietary treatment, M_j = the effect of sampling time and E_{ij} = the random error term.

RESULTS AND DISCUSSION

Effect of vitamin E supplementation on milk yield:

Data presented in Table (2) showed the effect of vitamin E supplementation to buffalo cows rations on daily milk yield. It could be noticed that the overall mean of monthly milk yield recorded 174, 209 and 244 kg for animal fed control, T_1 and T_2 treatments, respectively. Corresponding values of average daily milk yield were 5.80, 6.97 and 8.13 kg, showing the highest significant ($P< 0.05$) values with T_2 treatment. At the same time, vitamin E supplementation did not have any significant effect among treated groups on buffalo cows concerning milk yield when it added during the pre-partum.

Generally, the T_2 containing 6000 IU of vitamin E appeared to the highest milk yield. Also, overall mean monthly as daily 7 % FCM yield look like the same trend of actual 7% FCM yeild, showing height milk yield with T_2 recording 263 and 8.77 kg with monthly and daily milk yield, respectively. On the other hand, differences in actual as 7% FCM yield among succeed periods were not significant, as shown in Table (2).

The eminent protective role of GSH-PX and vitamin E on membrane integrity might epitomize however one of the mechanisms over which selenium and vitamin E boosted milk production (Lacetera *et al*., 1996).

Sinek *et al*. (2000) reported an increase of 13.8 % in milk yield of animals supplemented with vitamin E α-tocopheroal 9000 IU/Kg concentrate mixture. The increase in milk yield was assumed to be due to protection of mammary tissue from free radicals. The present results agreed with the results of Anwar *et al*., (2014), Kafilzadeh, *et al.,* (2014), Salama *et al.,* (2015) and Maurya *et al*., (2016), while the opposite trend was observed by Chatterjee (2002).

Table (2): Average daily and total actual and 7 % FCM yield for buffalo cows during successive periods.

Item	Experimental ration			Overall mean
	Control	T1	T2	
No. of experimental animal	5	5	5	
Lactation period (day)	120	120	120	
Average Monthly milk yield (kg/head)				
1st month	161	203	226	197 ±27.96
2nd month	175	203	279	219 ±29.96
3rd month	190	222	242	218 ±28.32
4th month	171	209	228	203 ±28.00
Overall mean	174[b] ± 25.32	209[ab] ± 17.25	244 [a] ± 19.91	
Average daily actual milk yield (kg/head)	5.80[b]	6.97[ab]	8.13[a]	
Average Monthly 7 % FCM yield (kg/head)				
1st month	156	225	253	211 ±18.22
2nd month	209	202	294	235 ±16.24
3rd month	163	235	245	214 ±19.23
4th month	204	238	261	234 ±13.54
Overall mean	183 [b] ± 16.36	225[ab] ± 10.18	263 [a] ± 15.74	
Average daily 7% FCM yield (kg/head)	6.10[b]	7.50[ab]	8.77[a]	

a and b small letter; means with different superscripts in the same row and column indicated significant differences at (P< 0.05).
Control=Concentrate feed mixture : Berseem :Rice straw with ratios of 4 : 2 :2 (MD basis, T1=Control + 3000 IU of α-tocopherol acetate, and T2=Control + 6000 IU of α-tocopherol acetate

Effect of vitamin E supplementation on milk chemical composition:

Results in Table (3) indicated insignificant differences among groups in buffalo cows milk chemical composition percentages. T_1 and T_2 appeared to have lower (P <0.05) fat and SNF percentages without significant difference between both the two supplemented groups 7.73 and 7.80 % fat versus 8.28 and 8.65 % SNF, respectively. It was, also, detected that, both of the control buffalo cows and T_2 (those having higher milk yield) *i.e.* 174 and 244 kg / month, respectively, tended to have almost similar insignificant fat percentages *i.e.* 8.05 and 7.80 %, respectively.

On the other hand, both of T_1 and T_2 indicated lower SNF *i.e.* 8.28 and 8.65 %, respectively, in compare with the control group. This result might be related to the insignificant differences detected in fat percentages for both the two supplemented groups.

It could be noticed that the overall mean of protein, lactose, SNF, TS and ash contents ranged 3.15 to 3.40; 4.74 to 5.00; 8.65 to 9.18, 16.01 to 17.23 and 0.75 to 0.77%, respectively. However, the significant differences among experimental treatment in all previous characters were not sigificant.

It could be concluded that, dietary vitamin E supplementation of pregnant and lactating buffalo cows did not have any significant impact on milk chemical composition. The results were agreement with those of. Focant *et al*., (1998); Kay *et al*., (2005); Awawdeh, (2015) and Kafilzadeh, *et al.*, (2014).

According to Poilitis and Kwai-Hang, (1988) and Pauselli *et al*., (2004), the only positive effect of dietary vitamin E or/and Se supplementation on all milk chemical characteristics was mainly correlated to mammary glands health. The role of mammary health on milk quality, particularly its effect on somatic cells count, being of great value, since it is mainly interfering with cheese making properties and other better technological characteristics.

Table (3): Chemical composition of buffalo cows milk as affected by dietary treatments.

Item	Time of measuring	Experimental ration		
		Control	T_1	T_2
Fat % (F)	1m	6.76	8.06	8.16
	2m	8.90	6.96	7.53
	3m	5.66	7.56	7.13
	4m	8.86	8.35	8.40
	Overall mean	8.05±0.30	7.73±0.19	7.80±0.26
Protein (P)	1m	3.30	3.50	3.33
	2m	3.36	3.03	2.73
	3m	2.96	3.26	3.10
	4m	3.96	2.96	3.46
	Overall Mean	3.40±0.20	3.19±0.10	3.15±0.16
Lactose% (L)	1m	4.86	5.23	5.06
	2m	4.93	4.50	4.06
	3m	4.36	5.00	4.73
	4m	5.86	4.33	5.10
	Overall Mean	5.00±0.32	4.76±0.17	4.74±0.25
Ash % (A)	1m	0.70	0.83	0.76
	2m	0.76	0.73	0.66
	3m	0.70	0.73	0.76
	4m	0.93	0.73	0.80
	Overall Mean	0.77±0.04	0.75±0.02	0.75±0.02
Solids not-fat % (SNF)	1m	8.86	8.67	9.16
	2m	9.06	8.27	7.46
	3m	8.03	9.00	8.60
	4m	10.76	7.18	9.36
	Overall Mean	9.18±0.57	8.28±0.30	8.65±0.44
Total solids % (TS)	1m	15.63	16.73	17.33
	2m	17.96	15.23	15.00
	3m	15.70	16.56	15.73
	4m	19.63	15.53	17.76
	Overall Mean	17.23±0.75	16.01±0.39	16.45±0.55

Control=Concentrate feed mixture : Berseem :Rice straw with ratios of 4 : 2 :2 (MD basis, T1=Control + 3000 IU of α-tocopherol acetate, and T2=Control + 6000 IU of α-tocopherol acetate

Effect of vitamin E supplementation on fatty acids profile (%) in milk fat:

One focus of the current study was to enhance and sustain Romanic acid RA (C18:2) concentration in milk fat through the dietary addition of vitamin E, and milk FA composition was significantly affected

(Table 4). Milk fatty acid profiles of cows fed T_1 diet (3000 IU) characterized by higher levels of linoleic acid (C18:2) compared with the control group. Pottier *et al*., (2006) reported that, the addition of vitamin E induced few significant changes in milk fatty acid profile and the high dose of dietary vitamin E provided significantly increased milk fat content by 17.93% and yield by 15.56 % and decreased trans-10 C18:1 content by 47.06%. In addition, it managed to significantly increase the daily yields of vaccenic by 102.56% and rumenic acids by 56.67%.

The supplementation of vitamin E with both two levels (3000 and 6000 IU/day) significantly decreased the level of C15 in milk, whereas it significantly increased the levels of C4 and rumenic acids. However, the graphs showed that, the sequence of administration of vitamin E had a significantly positive effect on the production of vaccenic acid and rumanic acid. It could be noticed that rumanic acid (C18:2) and vaccenic acid VA (C18:1) were increased in milk fat being doubled in buffalo cows fed vitamin E treatments (T_1 and T_2) compared with non-vitamin E supplemented treatment groups control.

Table (4): Effect of vitamin E supplementation on fatty acids profile (%).

Item		Experimental ration		
		Control	T1	T2
Butyric	C4	$0.23^{b}\pm0.04$	$0.48^{ab}\pm0.10$	$0.51^{a}\pm0.04$
Caproic	C6	0.25 ±0.01	0.33 ±0.09	0.28 ±0.01
Caprylic	C8	2.87 ±0.97	2.76 ±0.76	2.71 ±0.72
Capric	C10	4.53 ± 1.37	4.52 ±1.43	4.20 ±1.07
Lauric	C12	4.90 ± 0.83	4.23 ±0.47	4.95 ±0.97
Myristic	C14	$13.31^{ab}\pm 2.63$	$9.99^{b}\pm1.75$	$19.38^{a}\pm0.73$
Myristoleic	C14:1	1.63 ± 0.28	0.71 ±0.04	1.00 ±0.34
Palmitic	C16	24.14 ± 4.56	24.65 ±6.95	28.11±2.50
Palmitoleic	C16:1	3.04 ± 0.86	3.09 ±0.46	2.11 ±0.41
Stearic	C18	5.80 ± 0.94	6.23 ±1.09	7.71 ±1.67
Vaccenic acid	C18:1	8.65 ± 0.59	13.16 ±4.11	17.78 ±4.56
Romanic acid	C18:2	$0.21^{b}\pm 0.07$	$0.54^{a}\pm0.08$	$0.46^{ab}\pm0.06$

a,b and c small letters; means with different superscripts in the same row and column indicated significant differences at (P< 0.05).
Control=Concentrate feed mixture : Berseem :Rice straw with ratios of 4 : 2 :2 (MD basis, T1=Control + 3000 IU of α-tocopherol acetate, and T2=Control + 6000 IU of α-tocopherol acetate

Similar patterns for changes in the rumanic and vaccenic content of milk fat were consistent with the fact that Δ9-desaturase catalyzes the endogenous synthesis of RA from VA (Bauman and Lock, 2006).

Effect of vitamin E supplementation on feed intake and feed utilization efficiency.

Date presented in Table (5) showed that the averages daily feed unit intake expressed as kg DM, TDN, and DCP per head were decreased with the experimental groups. The results showed higher DM intake with the 3rd group which fed higher level of vitamin E (6000 IU), recording 14.19 kg DM versus 13.77 kg DM with group fed lowest vitamin E (3000 IU), while the control group recorded the height value (14.86) kg DM.

Generally, increasing vitamin E level as supplementation treated T_2 increased feed unit intake as DM, TDN and DCP. Increasing feed intake with increased vitamin E level showed higher in both actual and 7% FCM yield, with no significant differences. However, the difference between group feed control ration and those feed T_2 ration in milk yield were significant, as shown in Table (2).

The results show that, the group fed higher level of vitamin E (6000 IU, T_2) appeared the highest feed efficiency, being 1.745, 0.925 and 0.148 kg DM, TDN and DCP per kg actual milk, respectively, versus 1.618, 0.857 and 0.138 kg DM, TDN and DCP kg / kg 7 % FCM yield.

The results of Table (5) showed that the group fed higher level vitamin E (T_2) recorded the highest efficiency followed by those fed lower level of vitamin E (T_1), while the control group was the lowest feed efficiency.

Effect of vitamin E supplementation on feed cost and economic efficiency:

The results of Table (6) showed that the cost of feed intake were 35.20, 35.50 and 38.34 LE with groups fed intake control, T_1 and T_2 rations, respectively, showing the highest feed cost with group fed higher level from vitamin E (T_2). However, the opposite trend was shown with daily feed cost/kg milk yield recording 6.07, 5.09 and 4.72 LE with control, T_1 and T_2 rations, respectively. The efficiency expressed as daily feed cost/7% FCM yield was 5.77, 4.73 and 4.37 LE for groups fed control, T_1 and T_2 ration, respectively.

From these results, it could be noticed that the feed cost/kg actual milk or 7% FCM yield was decreased with increasing level of vitamin E supplementation. Accordingly, net revenue appeased to increase, recording 11.20, 20.26 and 26.70 LE with control, T_1 and T_2 ration, respectively. At the same time the net revenue per both actual milk or 7% FCM yield showed the same previous trend, being 1.93, 2.91 and 3.28 versus 1.84, 2.70 and 3.04 LE with control, T_1 and T_2 ration, respectively. Also, the economic efficiency showed higher value with heights level of vitamin E, being 1.32, 1.57 and 1.70 with control, T_1 and T_2 ration, respectively.

Table (5): Average daily feed intake and efficiency of lactating buffalo cows fed different experimental ration.

Item	Ration		
	Control	T1	T2
No. of animal	5	5	5
Average LBW (kg)	600	580	590
Experimental period (day)	180	180	180
Av. daily feed unit intake (kg)			
DM (kg /head)	14.86	13.77	14.19
TDN (kg /head)	7.87	7.30	7.52
DCP (kg /head)	1.26	1.12	1.21
Av. daily actual milk yield (kg)	5.80^{b}	6.97^{ab}	8.13^{a}
Av. daily 7% FCM yield (kg)	6.10^{b}	7.50^{ab}	8.77^{a}
Feed efficiency with actual milk:			
Kg DM/kg milk yield	2.562	1.976	1.745
Kg TDN /kg milk yield	1.357	1.047	0.925
Kg DCP /kg milk yield	0.217	0.161	0.148
Feed efficiency with 7% FCM:			
Kg DM/kg 7% FCM yield	2.436	1.836	1.618
Kg TDN/kg 7% FCM yield	1.290	0.973	0.857
Kg DCP/kg 7% FCM yield	0.207	0.149	0.138

a,b and c small letters; means with different superscripts in the same row and column indicated significant differences at (P< 0.05).
Control=Concentrate feed mixture : Berseem :Rice straw with ratios of 4 : 2 :2 (MD basis, T1=Control + 3000 IU of α-tocopherol acetate, and T2=Control + 6000 IU of α-tocopherol acetate

Table (6): Average feed cost and economic efficiency for lactating buffalo cows fed different experimental rations.

Item	Ration		
	Control	T_1	T_2
Av. daily feed intake, As fed, (Kg/head):			
Concentrate feed mixture (CFM)	6.993	6.797	6.895
Egyptian berseem	19.999	16.970	17.980
Rice straw	5.998	5.493	5.691
Av. daily actual milk yield (kg)	5.80^{b}	6.97^{ab}	8.13^{a}
Av. daily 7% FCM yield (kg)	6.10^{b}	7.50^{ab}	8.77^{a}
*Feed cost and economic efficiency:			
Cost of feed intake (LE/head)	35.20	35.50	38.34
Price of milk yield (LE/head)	46.40	55.76	65.04
Daily feed cost/kg milk yield (LE)	6.07	5.09	4.72
Daily feed cost/7% FCM yield (LE)	5.77	4.73	4.37
Net revenue (LE)	11.20	20.26	26.70
Net revenue/ kg milk yield	1.93	2.91	3.28
Net revenue/ 7% FCM yield	1.84	2.70	3.04
Economical efficiency	1.32	1.57	1.70

**Based on the assumption that the price of one ton of concentrate feed mixture, Egyptian Berseem, rice straw and vit E α-tocopheroal was 4000, 300, 200 and 700000 LE, respectively, while the price of one kg milk yield as seeling was 8 LE*

Control=Concentrate feed mixture : Berseem :Rice straw with ratios of 4 : 2 :2 (MD basis, T1=Control + 3000 IU of α-tocopherol acetate, and T2=Control + 6000 IU of α-tocopherol acetate

CONCLUSION

It could be concluded that the higher level of vitamin E (6000 IU, T_2) impoved net revenue and economic efficiency comparison with the lower level (3000 TU, T1). Also, groups fed vitamin E supplementation increased milk yield and feed efficiency comparison with the control ration (without supplementation).

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تأثير أضافة فيتامين هـ على أنتاج اللبن وتركيب دهن اللبن والكفاءة الاقتصاديه فى الجاموس

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أجريت هذه الدراسة بمحطة أبحاث وتجارب مسطرد التابعه لقسم الانتاج الحيواني – كلية الزراعة بالقاهرة – جامعة الازهر خلال الفترة من أكتوبر 2016 الى مارس 2017. وكان الهدف من هذه الدراسه هو معرفة تأثير أضافة فيتامين هـ خلال الفتره من قبل ميعاد الولاده المتوقع 60 يوم حتي بعد الولاده 120 يوم على محصول أنتاج اللبن وتركيبه وتركيب دهن اللبن والكفاءة الغذائيه والاقتصاديه. حيث تم توزيع عدد 15 جاموسه على ثلاث مجاميع بشكل عشوائي وكان يتم تغذيتهم على علف المزرعه المكون من علف مركز + برسيم مصري + قش أرز وكانت المجموعه الاولي كنترول بدون أي أضافات والمجموعة الثانيه (T_1) أضيف لها 3000 وحده دوليه/ رأس/ يوم من فيتامين هـ (الفاتوكوفيرول أسيتات) والمجموعه الثالثه (T_2) أضيف لها 6000 وحده دوليه/رأس/يوم من فيتامين هـ (الفاتوكوفيرول أسيتات). وتم تسجيل كميه اللبن اليوميه لكل المجموعات وكذلك تم جمع عينات اللبن لتحليل التركيب الكيماوي لها وتحليل التركيب الكيماوي لدهن اللبن ومعرفه مدي تأثير محتواه من الاحماض الدهنيه المشبعه والغيرمشبعه وحساب الكفاءه الغذائية والاقتصاديه للعلائق المختلفه. وقد أوضحت النتائج المتحصل عليها ما يلي:-

1- زيادة كميه أنتاج اللبن بشكل معنوي فى المجموعتين المضاف لهما فيتامين هـ مقارنا بالكنترول وكانت المجموعه الثالثه أعلى المجموعات بالمقارنه بباقي المجموعات. خيث سجلت المجموعة الثالثه 8.13 كجم مقابل 6.97 كجم للمجموعه الثانيه بينما سجلت مجموعه الكنترول 5.80 كجم لبن/حيوان/يوم.

2- لم يلاحظ أي تأثير معنوي على التركيب الكيماوي للبن من حيث كمية الدهن أو البروتين أواللاكتوز أو الرماد بأضافة الفيتامين من عدمه علي كل المجموعات.

3- حدث تأثير معنوي على بعض الاحماض الدهنية الغير مشبعه فى دهن اللبن حيث زاد حمض الرومنك زياده معنويه فى الجموعه الثانيه مقارنا بالكنترول وكذلك زاد محتواه فى المجموعه الثالثه مقارنا بالكنترول ولكن بدون وجود اختلاف معنوي, أما جمض الفاكسينك فقد زاد محتواه في كلا من المجموعه الثانيه والثالثة مقارنا بالكنترول بدون اختلافات معنويه بينهم.

4- ترتب على النتائج السابقه ان تحسنت الكفاءة الغذائية والاقتصاديه للعلائق المضاف اليها فيتامين هـ مقارنا بالكنترول وكانت الافضلية للمجموعه الثالثة حيث سجلت 1.618 كجم ماده جافه مأكوله لكل 7% كجم لبن معدل الدهن مقابل 2.436 كجم ماده جافه مأكوله/ 7%كحم لبن معدل الدهن للمجموعه الاولي (كنترول – بدون أضافات) وقد أنعكس ذلك على الكفاءه الاقتصاديه حيث سجلت المجموعه الثالثه 1.7 مقابل 1.32للمجموعه الاولي.

و بالتالى فقد أدت المعامله بفيتامين هـ خلال الفتره الاخيره من الحمل (أخر شهرين من الحمل) حتي بعد الولاده بأربع شهور الي زيادة انتاج اللبن بفارق معنوي وكذلك بزياده ملحوظه لبعض الاحماض الدهنية الغير مشبعه فى دهن اللبن مثل حمض الرومنك والفاكسينك وما ترتب على هذا من تحسين فى الكفاءة الغذائيه والاقتصاديه. لذلك نوصي بأضافة فيتامين هـ (الفاتوكوفيرول أسيتات) للجاموس خلال هذه الفتره وهي قبل ميعاد الولادة المتوقع بشهرين حتي بعد الولاده بأربع شهور لما لها من أثار ايجابيه على الاداء الانتاجي والاقتصادي بشكل عام.