J. Agric. Sci. Mansoura Univ., 26 (11): 6745 - 6757, 2001.

INFLUENCE OF USING FOLIC ACID ON LACTATING ZARAIBI GOATS PERFORMANCE

Ahmed, M.E.[1], Fathia A. Ibrahim[1]; Faten F. Abou Ammou[1] and Ahlam A. El-Shewy[2]

1- Animal Production Research Institute, Agricultural Research Center, Giza.

2- Food Technology and Dairy Science Department, National Research Center, Dokki.

ABSTRACT

Forty female Zaraibi goats (during the last month of pregnancy) in the 3rd and 4th sea7sons of lactation were used to study the effect of folic acid on milk production, some rumen and blood parameters and changes of live body weight of Zaraibi does. Forty

does were divided randomly into four equal groups (10 females each). Animals in groups G1,G2 and G3 received 0, 2 and 6 mg folic acid/kg body weight(BW) daily, respectively in their diets. But, G4 received one intravenous injection of 4 ml saline solution containing 40 mg folic acid, weekly. Feeding allowances of Zaraibi does were calculate according to NRC (1981).

The obtained results showed that using folic in Zaraibi does rations improved milk yield by 8.8, 11.6 and 22.1% forG2,G3 and G4, respectively compared with the co7ntrol(G1),and the improvement was significant with G4. However, milk composition was not significantly affected by folic acid. The results of rumen parameters of Zaraibi goats showed that pH value, ammonia-N and volatile fatty acids (VFA's) were not significantly differed among the groups. Moreover, no remarkable effects of folic acid were observed on hemato-biochemical parameters. Feed utilization efficiency, based on DM, was better with G4 then followed by G3 and G2 compared with the control ration (G1).

Accordingly, it could be concluded that using folic acid had positive role on improving milk yield for lactating Zaraibi goats without any adverse effect on milk composition as well as rumen and blood parameters. It improved also fee7d utilization.

Keywords: Zaraibi goats- folic acid-performance-milk yield-milk composition- feed utilization.

INTRODUCTION

It is known that ruminal microorganisms synthesize B-complex vitamins, even if ruminants are fed vitamin B-free diets and these synthesized B-complex vitamins are sufficient to avoid deficiency symptoms in animals (Lardinois, *et al*, 1944).

Recently, there is a new appr7oach for adding some of B-complex vitamins to improve animal health and performance (Horner *et al*., 1986; Zinn *et al*., 1987; Girard *et al*, 1995; Hoblet, 1996 and Trower, 1996). One of these added vitamins was folic acid. 7

Folic acid i7s named: vitamin M, *Lactobacillus casei* factor, vitamin B_c and P.G.A.. Now, folacin is used as the group name of naturally occurring compounds. The pure folic acid is a combination of the pteridine nucleus, para-aminobenzoic acid and glutamic acid. The richest sources of folic are dried brewer's yeast (2400 ug/100g), soya flour (430 ug/100g) and wheat germ (310 ug/100g). The active form (tetrahydrofolic acid) acts as a carrier of "one carbon" moiety in an activated form for methylation reactions. The formyl carbon carried by tetrahydrofolic acid is used in many important reactions such as: a) a source of7 carbons 2 and 8 in the purine nucleas, b)in conversion of glycine to serine, c)in methylation of homocysteine to methionine and d) in synthesis of choline (Marks, 1975 and Leenard, 1984).

Concerning the exogenous supply of folates to dairy cows, some studies indicated the following: 1) the requirements of folic acid could be increased during gestation, 2) long term administration of folic acid increased both of milk yeild and milk protein by 14 and 10%, respectively, during the last half of the lactation curve in multiparous cows, and 3) dialy dietary supplement7s of folic acid increased milk folates (Girard *et al* .,1989 and 1995 and Girard and Matte, 1995 and 1998).

Moreover, milk folates are necessary for human, since folates have a role in prevention of neural tube defects in newborns, cardiovascular diseases and cancer (Whitehead and Rosenblatt, 1994; Morrison, *et al*., 1996 and Jennings, 1995).

The objective of this work was to study the effect of folic acid on milk yield and its composition as well as on some ruminal and blood par7ameters for lactating Zaraibi goats.

MATERIALS AND METHODS

This study was carried out during year 2000-2001 at El-Serw Experimental Station belonging to the Animal Production Research Institute, Agricultural Reseanch Center, Ministry of Agriculture and Food Technology and Dairy Science Deportment , National Research Center.

Forty lactating Zaraibi does in the 3^{rd} and 4^{th} seasons of lactation aging 36-60 months and weighting on average about 51 kg were divided randomly into four equal groups, 10 females each. They were selected from El-Serw Station Herd. The animals were in the late pregnancy period (5^{th} month of pregnancy) and continued for nine months of lactation. Each group was housed in a semi- roofed yard (4x3x5 meters). Animals were weighed at the beginning and thereafter at two-weeks intervals. The animals were fed two weeks as a transitional period on the same rations before the start of the experimental work.

Animals in groups G1, G2 and G3 received in feed 0,2 and 6 mg folic acid/kg BW daily, respectively. Folic acid was mixed with 10 g of ground concentrate and offered daily as a powder top- dressed over the concentrate feed mixture as reported by Chiquette *et al*.(1993).But, in G4 they received weekly one intravenous injection of 4 ml saline solution containing 40 mg folic acid. A level of 40 mg of folic acid was used, according to Girard *et al*.(1989).

Feeding allowances (as crude protein of the does at late pregnancy and lactation) were calculated according to NRC(1981). The amounts of concentrate feed mixture (CFM) and berseem hay(BH) were estimated to cover 60 and 40% of CP requirements, respectively. The CFM consists of 30% un-decorticated cottonseed meal, 37% yellow corn, 20% wheat bran, 6% rice bran, 3% molasses, 2.5% limestone, 1% common salt and 0.5% minerals mixture. The chemical analysis of the CFM and BH are shown in Table (1). Water was available all times. The rations were offered twice daily at 8 am and 5 pm. Samples of feeds were analyzed according to A.O.A.C. procedures (1988).

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

Feed	D M	OM	CF	CP	EE	NEE	Ash
Concentrate feed mixture, CFM	89.5	91.5	16.78	14.72	3.05	56.95	8.5
Berseem hay, BH	88.3	86.5	27.03	10.41	2.50	46.56	13.5

DM: Dry matter , OM: organic matter, CF: crude fiber,
CP: Crude protein ,EE: ether extract and NFE: nitrogen free extract

The daily milk yield was recorded for each goat. Representative milk samples (about 0.5% of total milk produced) were taken once monthly from each goat, from the morning and evening milkings of the same day. Then the samples were composited and analyzed for total solids (TS), fat, protein, and solids non-fat (SNF) according to Ling procedures (1963), while milk lactose was calculated by differences.

Rumen fluid samples were taken using stomach tube before and post-feeding (3 and 6 hrs) at the end of feeding trials. The samples were filtered through 3 layers of gauze and directed to the determination of pH-valve. Ammonia nitrogen (NH_3-N) concentration was measured according to Conway (1957) while the total volatile fatty acids(VFA's) were measured according to the technique described by Warner (1964)

Blood samples were collected from the jugular vein at 3 hr post-feeding from 3 does of each group once at the end of experimentation. The whole blood was immediately directed to hematological estimation. Another blood sample was centrifuged at 4000 rpm for 20 minutes. Part of the separated sera was directed to enzymes determination while the other part was stored frozen at –20 C^o till the other biochemical analysis. Commercial kits were used for all colorimetric determinations.

Statistical analysis system (SAS, 1989) was used for least square of variance for repeated measures. The following model was applied:

Yijk =U + Ti +eik + Wj +(TW) ij +Eijk; where yijk =an observation on the k^{th} animal in the j^{th} week given the i^{th} treatment , U= an effect to all animals (population mean), Ti =an effect common to all animals (population) given i^{th} treatment, eik =an error(1) (animal within treatment), Wj = an effect common to all animals in the j^{th} week, Twij = an effect due to i^{th} treatment, j^{th} week of lactation, and eijk =a randomized error. Differences among means were tested by Tukey test

RESULTS AND DISCUSSION

It is worth to report that results of the statistical analysis indicated that there were no significant interaction effects between lactation weeks and experimental groups for all variables studied except for milk yield.

1- Daily feed intake:

Average daily dry matter intake by Zaraibi does through late pregnancy, suckling period and lactation are summarized in Table(2). The daily DM intake of pregnant Zaraibi does was not affected by folic acid, whereas it was differed during suckling period (113.39, 115.36, 116.46 and 119.07 g/kg $w^{0.75}$) for various groups(G1,G2 ,G3 and G4, respectively). The same trend was observed also during lactation period with different treatments a shown in Table(2). Similar results were noticed by Girard *et al* (1995) and Girard and Matte (1998).

Table (2) : Average daily dry matter (DM)intake* by Zaraibi does during different experimental periods(gestation, suckling and lactation)

Items	Groups			
	G1	G2	G3	G4
Daily DM intake (g/h/d) during gestation				
from CFM	729.0	731	730	735.0
from BH	682.0	683	683	687.5
Total DM intake(g/h/d)	1411.0	1414	1413	1422.5
DM intake g/kg $w^{0.75}$	72.28	72.18	72.24	72.03
Roughage: concentrate(R/C)ratio	48:52	48:52	48:52	48:52
Daily DM intake (g/h/d) during suckling period(early lactation)				
From CFM	887.52	924.97	932.95	987.70
From BH	841.75	866.83	879.10	894.78
Total DM intake (g/h/d)	1721.27	1791.8	1812.05	1882.48
D M intake (g/$kg^{w.75}$)	113.39	115.36	116.46	119.07
R/C ratio	48:52	48:52	48:52	48:52
Daily DM intake (g/h/d) during lactation period				
From CFM	671.05	687.6	696.5	722.2
From BH	625.3	641.3	643.4	676.75
Total DM intake (g/h/d)	1296.35	1328.9	1339.9	1398.95
DM intake (g/kg $w^{0.75}$)	85.85	86.48	86.72	89.41
R/C ratio	48:52	48:52	48:52	48:52

***Group feeding**

The daily DM intake expressed as g/kg $w^{0.75}$ during lactation period was higher than that consumed during the late pregnancy period in all treatments. This may be attributed to the increased rumen size of the animals for the parturition and being free of the gravid uterus stress on the rumen. It may be also attributed to the higher requirements for milk production (Abdelhamid *et al.,* 1999a)

2-Milk yield

The averages of biweekly milk yield of lactating Zaraibi goats during suckling (early lactation) and lactation periods are presented in Table (3).

3

The obtained results indicated that daily milk yield of Zaraibi goats during most of lactation weeks was significantly higher with G_4 (injection)compared with the control (G_1). Also, animals given 2 mg (G_2) and 6 mg (G_3) folic acid had higher milk yield during all the experimental periods especially at early lactation weeks (from 2^{nd} to 12^{th} week) compared with the control (G_1), but the differences were not significant in most cases.

The overall mean of daily milk yield was the highest (1.38 kg) with G_4 followed by G_3 (1.26 kg) then G_2(1.23 kg)and lastly the control (G_1) which recorded the lowest value(1.13 kg). Thus, daily milk yield was improved by 8.8, 11.6 and 22% for G_2, G_3 and G_4, respectively compared with the control. Therefore, it could be reported that the parenteral supplement of folic acid (G_4) was more effective ($p < 0.05$)in increasing daily milk yield than the dietary supplement. In the same line, using folic acid (4mg/kg BW/day) in maltiparous cows ration led to an improvement in milk yield from 34.8 to 37.0 kg during the first 100 days of lactation and from 29.0 to 32.0 kg during the period from 101 to 200 days of lactation (Girard and Matte, 1998). A similar increase in milk production was observed for multiparious cows that received a parenteral supplement of folic acid during the last half of lactation (Girard *et al.*, 1995). Significant increase in milk yield was observed only with G_4 (reached 22%) during the present study which may be due to differences in folic acid dose and/or the application route.

3-Milk composition

No clear effect of dietary supplementation of folic acid (2 or 6 mg/kg BW) was observed for milk contents (Table 4). Moreover, total solids and SNF tended to decrease with dairy goats received a parenteral supplement of folic acid (G_4), but without significant differences ($p \geq 0.05$). This decrease in total solids and SNF with G_4 may be attributed mainly to the higher milk production. Girard and Matte(1998) observed that milk contents(total solids, fat, lactose, casein nitrogen and whey protein nitrogen) were not significantly affected with the addition of folic acid (0,2and 4 mg/kg BW)in dairy cow rations.

Table (4): Effect of folic acid on milk composition(%) by lactating Zaraibi goats.

Items	Groups				SE
	G1	G2	G3	G4	
Fat	4.45	4.47	4.47	4.41	0.05
Protein	2.97	3.01	3.0	2.98	0.03
Lactose	4.57	4.53	4.50	4.50	0.03
Total Solids	12.58	12.64	12.50	12.33	0.14
Solids non fat (SNF)	8.13	8.17	8.02	7.92	0.12

4-Rumen parameters:

Table (5) illustrates the data collected for some rumen parameters of dairy goats under investigation. The minimum pH values and the maximum NH_3-N and VFA’s values were recorded 3 hrs post feeding. The same trend was obtained by Gorsch et al(1971) and Ahmed(1999). Rumen pH and NH_3-N values as well as rumen VFA's concentrations were not significantly ($p \geq 0.05$) affected by the treatments as shown in Table(5). However, the values of rumen pH and NH_3-N tended to decrease in folic acid groups especially G4 (injection), but rumen VFA's concentration increased as a result of folic acid supplementation. The present results are in agreement with those obtained by Chiquetta *et al* (1993).

Table (5). Rumen liquor parameters of the dairy goats under the experimental groups.

Items	Hours	Groups.				SE
		G1	G2	G3	G4	
pH Value	0	6.86	6.90	6.82	6.79	0.03
	3	6.10	6.07	6.04	6.00	0.04
	6	6.37	6.33	6.24	6.20	0.03
Ammonia-N (mg/100ml)	0	15.6	15.87	15.60	16.20	0.32
	3	23.98	23.12	24.07	22.71	0.49
	6	22.40	21.95	21.83	20.88	0.33
Total volatile fatty acids (m Eq./100ml)	0	8.33	8.40	8.37	8.50	0.20
	3	10.33	10.47	10.53	10.67	0.13
	6	9.53	9.60	9.70	9.73	0.17

5-Blood profile:

Data of hemato-biochemical parameters of dairy Zaraibi goats are presented in Table (6). The obtained results indicated that the values of Hb, Hct and RBC's tended to increase in animals given folic acid especially G4, but the differences were not significant($p \geq 0.05$). Also, the same effect was observed with total protein and globulin. But, the values of albumin, urea-N, glutamic oxaloacetic transaminase (GOT) and glutamic pyruvic transaminase (GPT) were decreased by the treatment but not significantly ($p \geq 0.05$). The obtained values are within the normal ranges reported by Jain(1986)(for hemato logical parameters) and kaneko (1989)(for biochemical parameters) for healthy goats and in line with the finding of Girard and Matte(1995 and 1999)who gave folic acid to lactating dairy cows.

6-Changes in live body weight (LBW):

Body weights of Zaraibi does during the last month of pregnancy, suckling and lactation are shown in Figure (1). The initial LBW's (at the 5^{th} month of pregnancy) were approximately equal in the 4 groups (ranged from 50.5 to 51.10 kg). The LBW of does increased to the maximum before parturition (end of pregnancy)and recorded the highest values (ranged from 54.3 to 55.7 kg) then sharply decreased (post- parturition) to the minimum at 60 day(in G2 and G3)and 75 day (in G1 and G4) of lactation. Thereafter, it tended to increase again(but very slowly) within all groups during the lactation period. Devendra (1979) recorded a decline in body weight of high milk yielding goats during the first month post-parturition. Moreover, Abdelhamid *et al* (1999b) observed that animals (Zaraibi goats)fed 100% NRC had decrease in LBW from 13 to 22% at 60 day post-parturition. In the present study, the decreases in LBW of does attained during the second month (60 day) were about 24.0, 21.1, 18.5 and 16.7% of body weight for G1,G2,G3 and G4, respectively. Haider (1994)observed that the LBW of desert Barki does decreased during early lactation and reach a minimum value at the 4th week then tended to increase with advancing of lactation.

Concerning the effect of folic acid, the results indicated that LBW tended generally to increase by the treatment, especially with G4 (injection) during most of experimental periods. The averages of LBW before parturition were 54.3, 54.7,54.9 and 55.7kg and the corresponding values at the 60th day were 36.5, 37.4,37.8 and 39.0 kg, whereas at the 270th day were 38.9,39.4,39.6 and 40.8 kg for G1, G2, G3 and G4, respectively. The present results are in accordance with those obtained by Girard *et al* (1995) and Girard and Matte (1998).

Table (6). Blood parameters of dairy goats under the experimental groups.

Items	Groups				SE
	G1	G2	G3	G4	
Hematological parameters:					
Hemoglobin(Hb),g/dl	8.80	8.93	9.00	9.33	0.10
Hematocrit(Hct),%	26.67	26.90	27.10	28.13	0.29
Red blood cells (RBC's) x 10^6/µl	11.93	12.90	12.97	13.46	0.30
Biochemical parameters:					
Total protein, g/dl	6.57	6.63	6.60	6.73	0.04
Albumin, g/dl	3.70	3.57	3.60	3.60	0.05
Globulin, g/dl	2.87	3.07	3.00	3.13	0.04
Urea –N, mg/dl	15.67	15.40	15.27	14.83	0.25
GOT, u/l	45.99	42.83	43.33	42.50	2.02
GPT, u/l	14.03	13.73	13.33	13.40	0.29

7-Production efficiency:

Feed utilization efficiency was determined for all groups as the amount of milk produced per one kg DM intake as shown in Table(7). Using folic acid by lactating Zaraibi goats had positive effect on production efficiency compared with the control group. The best production efficiency value as kg milk/kg DM intake given by G4 (0.885) followed by G3 (0.842)then G2 (0.829). While, the lowest value (0.784) was obtained by the control group (G1). This improvement in production efficiency may be due to the role of folic acid in increasing feed utilization efficiency to milk production. Since folic acid increases microbial digestion(Bauiller-Oudot *et al*.,1988) for its essentiality in the metabolism of certain bacteria(Hungate, 1966).

fig

Table (7). Average daily feed intake, milk yield and production efficiency of the experimental groups.

Items	Groups			
	G1	**G2**	**G3**	**G4**
Av. Daily feed intake during lactation(from 1st to 9th month)				
CFM (g/h)	743.2	766.7	775.3	810.7
BH (g/h)	697.5	716.5	722.0	749.4
Total DM intake (g/h)	1440.7	1483.2	1497.3	1560.1
DM intake (g/kgw$^{0.75}$)	94.9	96.10	96.63	99.30
Av. daily milk yield (g/h)	1130	1230	1260	1380
Production efficiency				
kg milk/kg DM intake	0.784	0.829	0.842	0.885

CONCLUSION

It could be concluded that folic acid had a positive role on improving milk yield by lactating Zaraibi goats and the improvement was twice higher with the parental supplement of folic acid (reached 22%in G4) compared with the dietary supplement (8.8 and 11.6%for G2 and G3, respectively). In addition, feed utilization efficiency was better with folic acid groups especially G4 group. However, no remarkable (significant) effects of folic acid were observed on milk composition as well as on rumen and blood parameters.

REFERENCES

Abdelhamid, A.M., E.I. Shehata and M.E Ahmed(1999 a). Physio-nutritional studies on pregnant and lactating goats fed on rations differing in roughage/concentrate ratio at different feeding levels and/or not supplemented with bentonite. 1-Effects on feed and water consumption and some rumen parameters. J. Agric. Sci., Mansoura Univ.,24(8):3863.

Abdlhamid, A.M., E.I. Shehata and M.E. Ahmed (1999 b). Physio-nutritional studies on pregnant and lactating goats fed on rations differing in roughage/concentrate ratio at different feeding levels and/or not supplemented with bentonite. 3-Effects on productivity, reproductivity and digestive and metabolic disturbances. J. Agric. Sci., Mansoura Univ., 24 (9): 4637.

Ahmed, M.E. (1999) Improving feed conversion efficiency during reproduction-stress. Ph.D. Thesis, Fac. Agric., Mansoura Univ.

A.O.A.C (1988). Official Methods of Analysis of the Association of Official Analytical Chemists. 12th Ed. Washington,D.C.

Bouiller-Oudot, M.,A. Belfadla, and M. Candau.(1988). Influence de l'addition de vitamines du groupe B sur la dégradation des constituants pariétaux(paille-foin-pulpe)par les micro-or-ganismes du rumen en fermenteur semi-continu. Reprod. Nutr.Dev. 28:153.

Chiquette, J., C.L. Girard, and J.J. Matte. (1993). Effect of the diet fed to growing steers and folic acid addition on digestibility and ruminal fermentation. J. Anim. Sci. 71: 2793.

Conway, F (1957). Modification Analysis and Volumetric Errors. Rev. Ed. Lockwood, London.

Devendra, C.(1979). Goat production in Asian region, current status available , genetic resources and potential prospects. Indian Dairy Man. xxx,(8) :513.

Girard, C.L. and J.J. Matte.(1995). Serum clearance and urinary excretion of pteroylmonoglutamic acid in gestating and lactating dairy cows. Br. J. Nutr. 74: 857.

Girard, C.L. and J.J. Matte. (1998). Dietary supplements of folic acid during lactation. Effects on the performance of dairy cows. J. Dairy Sci. 81: 1412.

Girard, C.L., and J.J. Matte. (1999). Changes in serum concetrations of folates, pyridoxal, pyridoxal –5– phosphate and vitamin B_{12} during lactation of dairy cows fed dietary supplements of folic acid. Can. J. Anim. Sci. 79: 107.

Girard, C.L., J.J. Matte, and G.F. Tremblay.(1989). Serum folates in gestating and lactating dairy cows. J. Dairy Sci. 72: 3240

Girard, C.d., J.J. Matte and G.F. Tremblay. (1995). Gestation and lactation of dairy cows: A role for folic acid. J. Dairy Sci 78: 404.

Gorsch, R., H, Bergner and P, Pritzo(1971). Turnover of urea given in dissolved form to sheep. Archiv fur Tierernahrung,21:475.

Haider, A.I.(1994). The yield and composition of milk and preweaning growth rate of Barki desert goats in Egypt. Alex.J.Agric. Res., 39:155.

Hoblet, K. (1996). Effect of biotin on claw health in first lactation Holstein cows. Proc. 9th International Symposium on Disorders of Ruminant. Digit. April. 1996.

Horner, J.L., C.E, Coppock, G.T. Schelling, J.M. Labore, and D.H. Nave, (1986). Influence of niacin and whole cottonseed on intake, milk yield and composition, and systemic responeses of dairy cows. J. Dairy Sci. 69: 3087.

Hungate, R.E. (1966). The Rumen and its Microbes. Academic Press, New York.

Jain, N.C (1986). Veterinary Hematology.4th Ed., Lea & Febiger, Philadelphia

Jennings, E. (1995). Folic acid as a cancer – preventing agent. Med. Hyporheses. 45: 297.

Kaneko, J.J(1989). Clinical Biochemistry of Animals. 4th Ed. Academic Press, Inc. USA

Lardinois, C.C., R.C. Mills, C.A. Elveiijem, and E.B. Hart. (1944). Rumen synthesis of the vitamin B complex as influenced by ration composition. J. Dairy Sci.27: 579.
Leenard M. (1984). The dictionary of vitamins. Thorsons Publishers Limited Wellingborough, Northamptonshire.
Ling, E.R (1963). A Text Book of Dairy Chemistry. Champan and Hall, Ltd, London.
Marks, J. (1975). A Guide to the Vitamins. Published by MTP (Medical and Technical Publishing COLTD) St. Leonard's House Laneaster. England.
Morrison, H.I., D. Schaubel, M. Desmeules, and D.T. Wigle. (1996). Serum folate and risk of fatal coronary heart disease. JAMA. 275: 1893.
NRC (1981) Nutrient Requirements of Domestic Animals. Nutrient requirement of goats. National Research Council, Washington, DC.
SAS (1989). SAS user's guide: Statistics, Version 6.8. SAS Inst. Cary, North Carolina, USA.
Trower, S.L (1996) Effects of niacin and nonfiber carbohydrate on the metabolic status during the transition period and lactional performance. J. Dairy Sci. 79 (suppl.1): 199.
Warner, A.C.T. (1964). Production of volatile fatty acids in the rumen: methods of measurement. Nutr. Abst& Rev., 34: 339.
Whitehead, V.M. and D.S. Rosenblatt (1994). Folic acid supplementation and neural tube defects. Clin. Invet. Med. 73: 253.
Zinn, R.A., F.N. Owens, R.I. Stuart, J.R. Dunbar, and B.B. Borman. (1987). B-Vitamin supplementation of diets for feedlot calves. J. Anim. Sci. 65: 267

J. Agric. Sci. Mansoura Univ., 26 (11), November, 2001.

تأثير استخدام حمض الفوليك على أداء الماعز الزرايبى الحلاب.

محمد إبراهيم أحمد[1] ، فتحية عبد العظيم إبراهيم[1] ، فاتن فهمي أبو عمو[1]، أحلام عبد الحليم الشيوى[2]
١- معهد بحوث الإنتاج الحيوانى-مركز البحوث الزراعية –الجيزة.
٢- قسم الصناعات الغذائية والألبان- لمركز القومى للبحوث- الدقى-الجيزة

تم استخدام ٤٠ عنزة زرايبى أثناء الشهر الأخير من الحمل وفى الموسم الثالث أو الرابع لانتاج اللبن وذلك بهدف دراسة تأثير استخدام حمض الفوليك على انتاج اللبن وتركيبه وبعض قياسات سائل الكرش والدم والتغير فى وزن الأمهات خلال موسم الحليب. قسمت الحيوانات عشوائياً لأربعة مجموعات متساوية(١٠ إناث فى كل مجموعة)وأعطيت الحيوانات جرعات (فى العليقة) من حمض الفوليك (صفر, ٢ , ٦مجم /ك جم وزن حى يومياً) للمجموعات الأولى والثانية والثالثة على التوالى ولكن فى المجموعة الرابعة أُعطيت حمض الفوليك(٤٠ ملجم أسبوعياً مع ٤ مل محلول ملحى) عن طريق الحقن الوريدى. وقد أُعطيت الاحتياجات الغذائية طبقاً لمقررات NRC لعام ١٩٨١.وقد أوضحت النتائج:.

زيادة فى معدل إنتاج اللبن اليومى تقدر ٨,٨ و١١,٦و٢٢,١% للمجموعات الثانية والثالثة والرابعة على التوالى مقارنة بالكنترول وكان التحسين معنوياً فى المعاملة الرابعة

لم يحدث تغير جوهرى فى مكونات اللبن(الدهن-البروتين- اللاكتوز-المواد الصلبة)بين المجموعات.

استخدام حمض الفوليك لم يؤثر معنوياً على قياسات سائل الكرش متمثلة فى رقم الحموضة و الأمونيا والأحماض الدهنية الطيارة, ومع ذلك لوحظ انخفاض قيم الأمونيا بعد الأكل وارتفاع قيم الأحماض الدهنية الطيارة مع الحيوانات التى اعطيت حمض الفوليك خاصة المجموعة الرابعة.

لم يحدث تأثير معنوى على قياسات الدم وإن كان هناك تأثير إيجابى على الهيموجلوبين وكرات الدم البيضاء والجلوبيولين نتيجة للحقن بحمض الفوليك.

لوحظ تحسن فى أوزان الأمهات نتيجة للمعاملة بالفوليك خاصة المجموعة الرابعة لكن بدون فروق معنوية

تحسنت كفاءة تحويل الغذاء مع مجموعات حمض الفوليك حيث سجلت أفضل قيمة مع المجموعة الرابعة تلتها الثالثة ثم الثانية وأخيراً المجموعة الأولى (الكنترول).

من هذه الدراسة نلاحظ أن حمض الفوليك له تأثير إيجابى على إنتاج اللبن بدون حدوث أى تغيرات سلبية على تركيب اللبن أو البيئة الداخلية للماعز الزرايبى الحلاب,كما أدى حمض الفوليك إلى تحسين كفاءة تحويل الغذاء

Table (3): Effect of folic acid on milk yield (kg/h/d) by lactating Zaraibi goats

Groups	Lactation weeks																		Overall means	SE
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36		
G1	2.05^{b}	1.82^{b}	1.7^{b}	1.57^{b}	1.42^{b}	1.3^{b}	1.16^{b}	1.12^{b}	1.10^{a}	1.07^{a}	$.99^{a}$	094^{b}	0.85^{b}	0.77^{a}	0.71^{c}	0.66^{c}	0.57^{b}	0.54^{b}	1.13^{b}	0.04
G2	2.16^{ab}	2.12^{ab}	1.89^{ab}	1.72^{ab}	1.62^{ab}	1.56^{a}	1.28^{b}	1.18^{ab}	1.14^{a}	1.07^{a}	1.05^{a}	098^{ab}	0.88^{ab}	0.76^{a}	0.77^{bc}	0.72^{bc}	0.67^{ab}	0.62^{ab}	1.23^{b}	
G3	2.21^{ab}	2.12^{ab}	1.89^{ab}	1.74^{ab}	1.55^{b}	1.46^{ab}	1.29^{ab}	1.17^{ab}	1.12^{a}	1.05^{a}	1.04^{a}	1.01^{ab}	0.98^{ab}	0.92^{a}	0.89^{ab}	0.80^{ab}	0.74^{a}	0.67^{a}	1.26^{ab}	
G4	2.52^{a}	2.37^{a}	2.16^{a}	1.9^{a}	1.76^{a}	1.64^{a}	1.44^{a}	1.27^{a}	1.22^{a}	1.16^{a}	1.11^{a}	1.12^{a}	1.03^{a}	0.96^{a}	0.91^{a}	0.83^{a}	0.74^{a}	0.68^{a}	1.38^{a}	

Means in the same column with different superscripts differ significantly at $p<0.05$

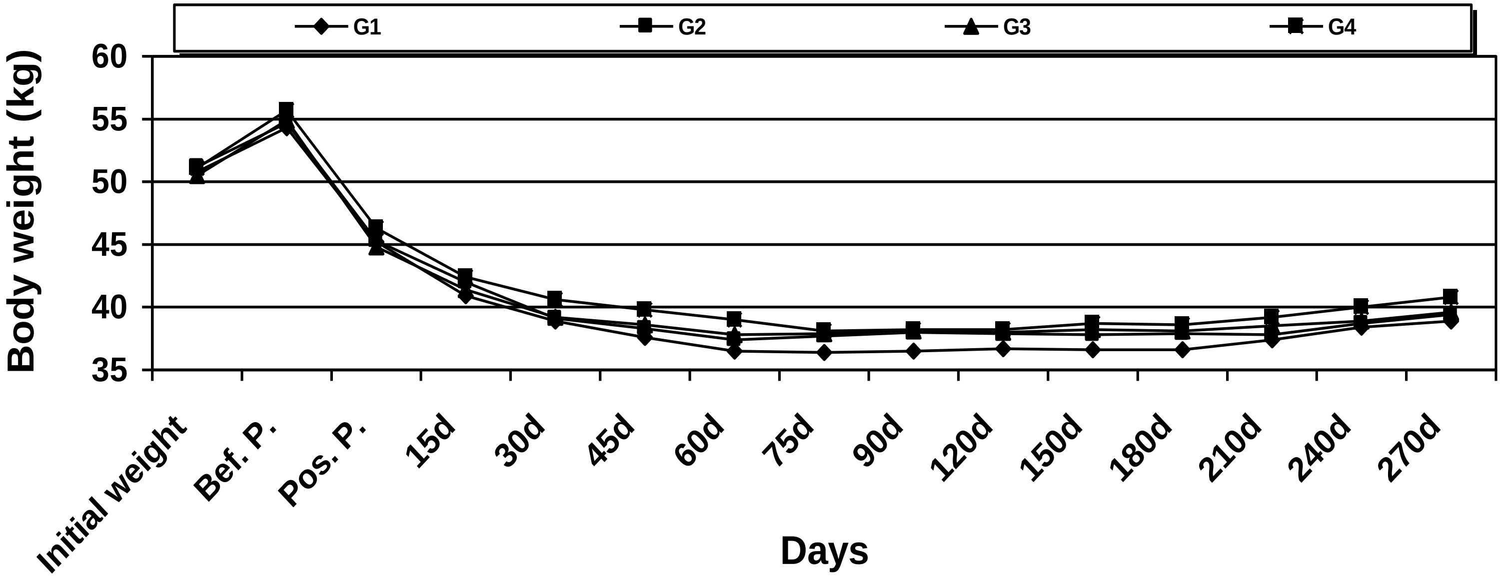

Fig (1) :Body weight changes of Zaraibi does during the last month of pregnancy as well as suckling and lactation periods as influenced by folic acids treatments.