EFFECT OF ROTATING LASALOCID AND MONENSIN PLUS TYLOSIN ON PERFORMANCE OF SUCKLING BUFFALO CALVES

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ABSTRACT

Twenty four newly born buffalo calves (12 males & 12 females) weighing 35.18±0.50 kg were used in a feeding trial through suckling period (112 day). Animals were divided into four similar groups (6 calves each, 3 from each sex). Calves in all groups were fed on natural buffalo milk, starter and green berseem. Ionophores were supplemented with suckling milk in the morning feeding. First group (control, C) was without supplementation, the second group (L) was supplemented with lasalocid, the third group (MT) was supplemented with monensin plus tylosin and the fourth group (LMT) had daily rotating L or MT. Four digestion trials were conducted using 3 male calves (aged 10 weeks) in each group weighing 72.38 kg to evaluate the different experimental rations. The results indicated that supplementation of ionophores to rations of growing buffalo calves improved nutrients digestibility and nutritive value. However, ruminal pH values, total volatile fatty acids (VFA,s) and ammonia nitrogen (NH_3-N) were insignificantly affected by ionophores supplementation. Molar proportion of propionic acid increased, while acetic acid and butyric acid proportions significantly ($P<0.05$) decreased for ionophores groups compared to the control group. Serum urea nitrogen concentration was unaffected whereas serum proteins, globulin and cholesterol concentrations increased by ionophores supplementation. Conversely, insulin concentration decreased in treated groups compared to the control group. Calves fed rations containing ionophores gained more and consumed the lowest DMI than those fed untreated ration especially at the early stage of their life (4 weeks). Ionophores supplementation improved efficiency of both dietary energy and digestible crude protein (DCP) while decreased feed cost per kg gain compared to the control group. It can be concluded that supplementation of lasalocid and monensin with tylosin (LMT) by daily rotating, or lasalocid (L), also monensin plus tylosin (MT) to growing buffalo calves during suckling period gave best body weight gain and feed efficiency with lowest feed cost per kg live body weight gain. LMT group was superior to both L and MT groups.

Key words: Ionophores, lasalocid, moninsen, tylosin, buffalo calves, digestibility, rumen and blood parameters, growth.

INTRODUCTION

Ionophores such as monensin, lasalocid and tylosin have been effectively used as growth promoters, anticcocidiostats and reduce of several types of diarrhea in calves (Daenicke et al., 1982 and Kellems, 1998). These ionophores have been tested as additives to concentrate feed mixture of young suckling calves (Jack et al., 1986). Moreover, ionophores such as monensin and lasalocid alter fermentation in the rumen through their effects on activity of microbial population. They cause an increase in propionic acid and reduction of methan production, which improved both the feed efficiency and growth rate in the young calves (Kellems, 1998). Moreover, tylosin controls subclinical infections or decreases the incidence of liver abscesses (Perry and Cecava, 1995). Ionophores improve feed to gain ratio by depressing feed consumption without decreasing daily weight gain. The increase in ruminal propionate is associated with improvement in feed efficiency as a result of increasing the gain (Ryssen, 1991). Mixing ionophores with fresh milk or milk replacer is an effective method of protecting young calves against early infection with coccidia (McMeniman and Elliott, 1995). At the same time, few studies were conducted on combinations of lasalocid or monensin with tylosin on performance of buffalo calves during suckling period. Therefore, the present study was conducted with the objective of determining the effect of dietary inclusion of lasalocid (L) also monensin with tylosin (MT) or by daily rotating L and MT (LMT) on nutrient digestibility, feeding value, ruminal activity and growth rate of growing buffalo calves. In addition, the feed cost and efficiency were considered.

MATERIALS AND METHODS

The study was carried out at the experimental farm of the Department of Animal Production, Faculty of Agriculture, Kafr El-Sheikh, Tanta University. Twenty-four newly born buffalo calves (12 males & 12 females) weighing 35.18 ± 0.50 kg were separated from their dams after having their colostrum. Animals were divided into four similar groups (6 calves each, 3 from each sex). Calves in all groups were fed natural buffalo milk, starter and green berseem through the suckling period (112 day). Ionophores were mixed with suckling milk in the morning feeding. Concentration of lasalocid, monensin and tylosin were 28, 28 and 14 µg/ml of milk. The first group (C, without any additives) was considered as the control, the second group (L) was supplemented with lasalocid, the third group (MT) was supplemented with monensin plus tylosin and the fourth group (LMT) had daily rotation of L and MT. Calves were bucket fed twice daily at 8 A.M and 4 P.M. Feed requirements of calves were determined as recommended by Ranjhan (1982). Body weight was recorded biweekly from birth to the end of the trial (16 weeks). The average chemical composition of fresh buffalo milk, starter and berseem are shown in Table (1).

Table 1. Chemical analysis of feed ingredients and experimental rations used in buffalo calves feeding.

Ingredients	DM %	Composition of DM, %					
		OM	CP	CF	EE	NFE	Ash
Starter*	87.57	96.02	20.12	4.14	2.65	69.11	3.98
Milk	16.75	94.51	25.67	--	39.64	29.20	5.49
Berseem	16.43	85.70	16.13	31.65	1.52	36.40	14.30
Experimental rations (calculated)**							
C	25.33	92.48	19.96	12.20	9.81	50.41	7.62
L	23.61	92.27	19.90	12.51	9.68	50.18	7.73
MT	24.03	92.47	20.01	11.92	9.93	50.61	7.53
LMT	22.86	92.47	20.01	11.92	9.93	50.61	7.53

* Composed of: 56.7% corn grain, 30.0% soybean meal, 10.3% wheat bran, 1% limestone, 1% bone meal and 1% common salt.

** Calculated experimental rations were composed (as DM) of: 23.16% milk (M), 42.29 starter (S), and 34.55% berseem (B) as control (C), 25.82% M, 36.80% S and 37.38% B (L), 24.96% M, 38.35% S and 36.69% B (MT), 26.26% S, 33.98% S and 39.76% B (LMT).

Digestion trials were conducted during suckling period at 10 weeks of age using 3 male calves in each group with average body weight of 70.8, 73.1, 71.4 and 74.2 kg for groups C, L, MT and LMT, respectively to evaluate the different rations. Feces were collected quantitatively daily from each animal during the collection period. Samples of feedstuffs and feces were taken for chemical analysis according to AOAC (1990). At the end of feeding trail, rumen liquor samples were collected 3 hr after the morning feeding by a rubber stomach tube from 3 calves randomly of each treatment. Values of pH were determined directly using Beckman pH meter, while 1 ml. saturated mercuric chloride solution was added to the rest of each sample for stopping the microbial activity and then filtered through a double layer of cheese cloth and stored in polyethylene bottles in freezer (-20°C) until analysis. Concentration of ammonia-N (NH_3-N) was determined using magnesium oxide distillation (AOAC, 1990). Total volatile fatty acids (VFA`s) concentrations were estimated using steam distillation method (Warner, 1964). The strained ruminal fluid samples were prepared for individual VFA`s by high pressure liquid chromatography (HPLC) according to Bush et al. (1979). Blood samples were drawn from the jugular vein into clean tubes at the same time of rumen liquor collection. Blood serum was used to determine insulin, glucose, cholesterol, urea, total proteins and albumin according to the methods described by Varoley

(1976). While serum blood globulin concentration was calculated by the difference between total proteins and albumin concentration.

The data were analyzed using General Linear Model Procedure adapted by SPSS (1997) for one way analyses of variance and means were differentiated using Duncan's multiple range test (Duncan, 1955).

RESULTS AND DISCUSSION

Feed intake, digestibility and nutritive value

Data presented in Table 2 indicated that dry matter intake (DMI) for buffalo calves was nearly similar for all the experimental groups. Digestion coefficients of dry matter (DM), organic matter (OM) and nitrogen free extract (NFE) were significantly ($P<0.05$) higher for both L and LMT groups than the other groups. However, crude protein (CP), ether extract (EE) and crude fiber (CF) digestibilities were not significantly by ionophores supplementation. Generally, addition of L, MT and LMT to buffalo calf rations improved nutrients digestibility. Abd El-Salam (1996) and Baraghit et al. (1999) indicated that the digestibility of DM, OM, CP, CF, EE and NFE were relatively higher for buffalo calves groups fed rations containing lasalocid. Moreover, Su et al (1993) found that the digestion coefficients of most nutrients were increased when kids were given low monensin level in their rations, while feed intake was similar in all tested rations. However, Marounek et al. (1989) showed that digestibility of DM, OM, CP and NFE were not affected when the suckled calves were fed on the control and monensin supplemented rations.

Table 2. Average of feed intake, digestibility coefficients and nutritive value of the different experimental rations.

Items	Experimental rations				SEM*
	C	L	MT	LMT	
DM intake, kg/day	1.85	1.88	1.83	1.83	-
Digestibility %					
DM	65.74^{a}	69.69^{b}	69.08^{ab}	71.11^{b}	1.14
OM	68.89^{a}	74.53^{b}	72.08^{ab}	75.28^{b}	1.44
CP	72.90	77.06	75.50	77.69	1.07
CF	18.58	28.79	20.86	23.51	2.20
EE	81.28	83.18	80.62	83.01	1.03
NFE	76.97^{a}	83.20^{b}	81.10^{ab}	84.95^{b}	1.72
Nutritive value, % (on DM basis)					
TDN	73.60^{a}	78.82^{b}	76.66^{ab}	79.91^{b}	1.39
DCP	14.55	15.33	15.11	15.55	0.22

^{a,b} means in the same row with different superscripts differ significantly at ($P<0.05$)
SEM: Standard error of mean

Data concerning nutritive value (Table 2) revealed that TDN values were significantly ($P<0.05$) higher for L and LMT groups than the other groups. Moreover, DCP values were slightly improved by ionophores supplementation but the differences were not significant. Improvement of the nutritive value by using ionophores may be mainly due to the improvements of nutrients digestibility and nitrogen retention for treated animals. Zorrilla-Rios et al. (1985) found that lasalocid supplementation improved the nutritive value of the steer rations by 32%.

Fermentation in the rumen

Rumen liquor parameters of buffalo calves fed the different experimental rations are presented in Table 3. Ruminal pH value, total volatile fatty acids (VFA`s) and ammonia nitrogen (NH_3-N) concentration did not significantly differ among the different groups. These results were in harmony with the findings of many authors (Hadjipanayiotou et al., 1988 working on early weaned lambs and kids; Morris et al., 1990 working on cattle, Clary et al., 1993 working on steers, Marounek et al., 1991 and Baraghit, et al., 1999 working on young calves) who found that supplementation of some ionophores such as monensin (M), lasalocid (L), monensin plus tylosin (MT) or rotating L and MT (LMT) did not significantly affect on pH value, NH_3-N and total VFA`s concentrations in the rumen liquor of ruminants. Also, Anderson et al. (1988) demonstrated that $NH_3$-N concentration was not affected, while VFA`s concentration was increased when suckling calves were given rations supplemented with lasalocid. However, El-Jack et al. (1986) recorded that monensin addition at level 30 µg/g milk replacer caused a decrease of ruminal NH_3-N concentration from 130 to 101 mg/L in suckling Friesian calves.

Molar proportion of propionic acid was significantly ($P<0.05$) increased, while acetic acid, A/P ratio and butyric acid proportions were significantly decreased ($P<0.05$) for ionophores supplemented groups compared to the control group. The MT group had the highest propionate and lowest butyrate molar proportions compared with the other groups. These results were in accordance with many investigators (Hadjipanayiotou et al., 1988 with early weaned lambs and kids; Marounek et al 1989 with suckling calves, Kalachnyuk, 1989 and Clary et al., 1993 with steers, Abd El-Salam, 1996 and Baraghit et al., 1999 with young buffalo calves) who demonstrated that feeding of these animals on a diet supplemented with L, M, MT or rotating L and MT increased molar propionate portion while acetate, A/P ratio and butyrate values were decreased in the rumen liquor. Baraghit et al. (1999) revealed that the differences in acetic, propionic and butyric acids were due to body weight development, type of ration and

lasalocid treatment. Moreover, Perry and Cecava (1995) showed that using ionophores (M and L) causes an alteration in the rumen fermentation pattern such that there is an increase in propionic acid production, which results in more efficient fermentation, so that there is a reduction hydrogen and carbon dioxide losses.

Table 3. Rumen liquor parameters of buffalo calves fed the different experimental rations.

Items	Experimental rations				SEM
	C	L	MT	LMT	
PH	5.92	6.20	6.11	6.00	0.06
Total VFA`s, meq/100 ml.	7.35	8.12	7.95	8.17	0.19
NH_3-N, mg/ 100 ml.	20.35	18.90	19.50	20.11	0.68
VFA`s molar proportions, %					
Acetic acid	43.50^a	40.88^b	40.42^b	40.60^b	0.31
Propionic acid	25.16^c	26.61^b	27.48^a	26.35^b	0.31
A/P ratio	1.73	1.54	1.47	1.54	-
Butyric acid	16.73^a	14.68^b	14.20^c	14.98^b	0.10

^{a,b,c}means in the same row with different superscripts differ significantly at (P<0.05)

Blood metabolites

Data of some blood metabolites (Table 4) indicated that no significant differences were detected among the different groups concerning blood urea concentration. These results were in accordance with the findings of Spears and Harvey (1984) who found that serum urea concentration was unaffected by monensin supplementation at different levels to steers rations. Serum proteins and globulin concentrations were significantly (P<0.05) higher for calves fed ration containing L than both C and MT groups. Moreover, albumin concentration was significantly (P<0.05) higher for all ionophores groups than the control group. Sivkova et al. (1982) reported that addition of monensin to lamb rations at levels of 15, 50 and 100 g/ton of feed increased both plasma protein and albumin while reduced globulin concentration. Gomez and Jouany (1994) indicated that sheep fed ration supplemented with L had higher albumin concentration than the control. In the present study, increase of serum proteins, albumin and globulin concentrations in some or all ionophores groups might be due to improvements in protein digestibility and efficiency of dietary DCP (Tables 2 & 6).

Blood glucose concentration was significantly higher while insulin concentration was lower (P<0.05) for L group than the other groups. These results were in harmony with those reported by Shetaewi and Ross (1991) who confirmed that L supplementation to ewes rations reduced insulin but glucose

concentration increased compared to the control animals. Higher blood glucose in groups supplemented with L may be due to increase molar propionic acid percentage in rumen fluid of these groups compared to the control group (Table 3). Perry and Cecava (1995) reported that most of absorbed propionic acid is converted to glucose by the liver. Moreover, propionic acid is a precursor for about 80% of glucose synthesized by the liver with amino acids and lactic acid that are minor substrates for glucose synthesis. Cholesterol concentration was higher ($P<0.05$) with L group than ether the control or MT group. These results were agreed with those reported by Hegazy et al. (1997) with sheep.

Generally, the heamatological parameters in the present study were within the normal range of calves and were nearly similar with those obtained by Metwally and Mohsen (1997) with growing buffalo calves and Metwally et al. (1999) with suckling Friesian calves. In addition, lasalocid supplementation at the level of 29mg/kg feed did not have any negative effect on blood constituents with ewes (Shetaewi and Ross, 1991).

Table 4. Average values of some blood metabolites of buffalo calves fed the different experimental rations

Items	Experimental rations				SEM
	C	L	MT	LMT	
Serum proteins, g%	7.52^{a}	8.71^{b}	8.05^{ab}	8.55^{b}	0.27
Albumin, g%	3.91^{a}	4.36^{b}	4.54^{b}	4.50^{b}	0.15
Globulin, g%	3.61^{a}	4.34^{b}	3.51^{a}	4.05^{ab}	0.20
Urea, mg %	34.00	34.00	33.33	35.00	0.34
Glucose, mg/L	60.15^{a}	66.07^{b}	$61:86^{a}$	60.34^{a}	1.37
Insulin, IU/L	5.88^{b}	4.79^{a}	5.75^{b}	5.03^{a}	0.27
Cholesterol, mg %	194.98^{a}	244.98^{b}	208.02^{a}	219.99^{ab}	10.64

^{a,b} means in the same row with different superscripts differ significantly at ($P<0.05$)

Feed intake and growth rate

The averages of daily gain were 506.70, 545.76, 531.62 and 552.46g, for calves fed C, L, MT and LMT rations, respectively while the corresponding dry matter intake (DMI) was 1.94, 1.74, 1.80 and 1.71 kg/day (Table 5). These results cleared that calves fed rations containing L and LMT were gained significantly ($P<0.05$) higher than those fed ether the control (C) or MT ration. However, DMI decreased by 7.2-11.9% for ionophores groups compared to the control group. Generally, feeding of growing buffalo calves on diets containing ionophores improved daily gain especially at the early stage (first 4 weeks) of age and reduced DMI compared to the control group. These results agree with the findings of Eicher-Pruiett et al (1992) who indicated that growth rate was higher during

early life stage of calves (6 weeks), while from 8-12 weeks daily gain was not affected by lasalocid addition to suckled milk. Moreover, Hadjipanayiotou et al (1988) with kids and lambs, Morris et al. (1990) with cattle, Marounek et al., (1991) and Baraghit et al. (1999) with young calves found that daily gain increased while DMI decreased when the animals were fed rations containing L, M, MT or rotating Land MT (LMT) daily or weekly. Daily gain and DMI increased in suckled calves fed rations supplemented with lasalocid or monensin (Anderson et al., 1988; Kalachnyuk, 1989; Sinks et al., 1992; and McMeniman and Elloit, 1995). However, Su et al. (1993) indicated that feed intake was similar for kids fed a diet supplemented with monensin at levels 0, 15 and 30 mg/kg. Low monensin level increased weight gain by 3.6%, however, the high M level reduced growth performance to below than control.

In the present study, improvement of growth rate and reduction of DMI might be due to increase of ruminal propionic acid concentration for treated calves compared with the controls. Perry and Cecava (1995) observed that ionophores supplementation increased daily gain by 8%. The increase of propionic acid and associated improvement in feed efficiency results in some increase in gain. Baraghit et al. (1999) working on young buffaloes calves indicated that increase propionic production is favorable for growth promotion since it acts as a major precursor of hepatic gluconenogensis.

Table 5. Mean values of feed intake, body weight and daily gain of growing calves fed the different experimental rations.

Items	Experimental rations				SEM
	C	L	MT	LMT	
No. of calves	6	6	6	6	-
Body weight, kg					
Initial weight, kg	35.67	35.00	34.50	35.50	0.50
Final weight, kg	92.42	96.13	94.04	97.38	1.10
Total gain, kg	56.75^{a}	61.13^{b}	59.54^{ab}	61.88^{b}	1.13
Daily gain, g	506.7^{a}	545.8^{b}	531.6^{ab}	552.5^{b}	10.12
Feed intake (DM), kg/day					
Whole milk	0.449	0.449	0.449	0.449	-
Starter	0.820	0.640	0.690	0.581	-
Green berseem	0.670	0.650	0.660	0.680	-
Total DM intake, kg	1.939	1.739	1.799	1.710	-

^{a,b}means in the same row with different superscripts differ significantly at ($P<0.05$).

Feed efficiency and feed cost.

Results in Table 6. showed that the values of energy intake were 2.82, 2.51, 2.60 and 2.48 kg TDN/kg gain for C, L, MT and LMT groups, respectively. Likewise, the corresponding values of protein intake were 557.03, 488.80, 511.55 and 481.16 g DCP/kg gain. These results cleared that calves fed rations containing ionophores were more efficient in dietary energy and protein than that fed control ration. Improvement in the efficiency of energy and protein utilization due to ionophores supplementation was reflected on the growth rate of calves as shown in Table 5. It may be due to the ionophores supplementation increase the ruminal propionate (Table 3). Supplementation of ionophores decreased feed intake, so feed efficiency improved in treated animals than untreated (control). These results are in harmony with those reported by Hadjipanyiotou et al. (1988); Su et al. (1993) and Kellems (1998) who found that supplementation of L, M, and T for rations of kids and young calves improved feed efficiency and general health.

Data concerning feed cost per kg gain (Table 6) indicated that values of feeding cost (absolute or as % from control) recorded for ionophores groups decreased by 6.8-11.7% than those observed for control group, but the differences were not significant.

Table 6. Efficiency of dietary energy and protein utilization and feed cost of different experimental rations consumed by growing calves.

Items	Experimental rations			
	C	L	MT	LMT
Energy intake				
TDN, kg/calf/day (DMI X TDN/100)	1.43	1.37	1.38	1.37
TDN, kg/kg gain	2.82	2.51	2.60	2.48
Protein intake				
DCP, kg/calf/day {(DMIxDCPx1000)/100}	282.3	266.8	271.9	265.8
DCP, g/kg gain	557.0	488.8	511.6	481.2
Feed cost				
Feed cost, L.E/ kg gain	9.00	8.10	8.39	7.95
Feed cost, L.E/ kg gain (as % of control)	100	90.00	93.2	88.3

It can be concluded from the present study that supplementation of lasalocid and monensin plus tylosin by rotating, lasalocid, monensin plus tylosin to buffalo calves during suckling period gave best body weight gain, efficiency of energy and DCP with lowest feed cost per kg live body weight gain. LMT group was superior to both L and MT groups.

REFERENCES

Abd El-Salam, A. M. M. (1996). The effect of some growth promoters on productive efficiency of buffalo calves. Ph. D. Thesis, Fac. Agric. Ain Shams Univ., Egypt.

Anderson, K. L, T. G. Nagaraja, J. L. Morrill, P. G. Reddy, T. B. Avery and N. V. Anderson (1988). Performance and ruminal changes of early-weaned calves fed lasalocid. Journal of Animal Science. 66: 806.

AOAC (1990). Association of Official Analytical Chemists,. Official Methods of Analysis. 14th Ed. Washington, D. C.

Baraghit, G. A., M. M. Youssef, B. M. Ahmed, S. S. Omar and O. M. El Malky (1999). Effect of lasalocid supplementation on nutrients digestibility, rumen fermentation and performance of buffalo calves. Egyptian J. Nutrition and Feeds 2 (special issue): 393.

Bush, K. J., R. W. Russell and J. W. Young (1979). Quantitative separation of volatile fatty acids by high pressure liquid chromatography. J. Liquid Chromate 2:1367.

Clary, E. M., R. T. Brandt, D. L. Harmon and T. G. Nagaraja (1993). Supplementation fat and Ionophores in finishing diets. Feedlot performance and ruminal digesta kinetics in steers. J. Anim. Sci., 71: 3115.

Daenicke, R., K. Rohr and H. J. Oslage (1982). Effect of monensin on rumen fermentation, performance and body composition of growing bulls. Livestock Production Science, 8: 479.

Duncan, D. B. (1955). Multiple Range and Multiple F-test. Biometrics, 11:10.

Eicher-Pruiett, S. D, J. L. Morrill, T. G. Nagaraja, J. J. Higgins, N. V. Anderson and P. G. Reddy (1992). Response of young dairy calves with lasalocid delivery varied in feed sources. J. Dairy Science. 75: 857.

El-Jack, E. M., R. J. Fallon, F. J. Harte and M. J. Drennan (1986). Effect of avoparcin, flavomycin and monensin sodium inclusion in a calf concentrate diet on calf performance. Irish J. Agric. Res. 25: 197.

Gomez, L. and J. P. Jouany (1984). Effect of lasalocid and cationomycin on the evaluation of certain parameters in the blood plasma of sheep. Archives Animal Nutrition. 46: 283.

Hadjipanayiotou, M., Ch. Papachristoforou and S. Econommides (1988). Effect of lasalocid on growth, nutrient digestion and rumen characteristics of chios lambs and Damascus kids. Small Ruminant Research, 1: 217.

Hegazy, M.A., M. G. A. Malk-MGA and M. S. Ziada (1997). Influence of dietary lasalocid on some serum characteristics as well as semen quality and freezability in adult barki rams. Assiut Vet. Medical J., 75: 64.

Jack, E. M. El., R. J. Fallon, F. J. Harte and M. J. Drennan (1986). Effects of avoparcin, flavomycin and monensin sodium inclusion in calf concentrate diet on calf performance. Irish J. Agric. Res. 25: 197.

Kalachnyuk, G. I. (1989). Effect of monensin on rumen fermentation and performance of young calves. Archives of Animal Nutrition, 39: 793.

Kellems, Richard O. (1998). Livestock Feeds and Feeding. 4th ed., USA.

Marounek, M., O. Petr, J. Janovsky, M. Podsednicek, G. Flachowsky, F. Schone and A. Henning (1991). Effect of monensin and virginiamycin on rumen fermentation and performance of young calves. Vitamine und Weitre Zusatzstoffe bei Mensch and Tier. 3. Symposium, Jena 26.27 September. 319.

Maroùnek,M., V. Skrivanova and L. Machanova (1989). Effect of monensin on digestibility of nutrients. Landwirtschaftliche Forschung, 42: 273.

McMeniman, N. P. and R. Elliott (1995). Control of coccidia in young calves using lasalocid. Australian Vet. J., 72:7.

Metwally, A. M. and M. K. Mohsen (1997). Influence of age on certain haematological and biochemical constituents in the blood of growing buffalo calves. J. Agric. Res. Tanta Univ., 23: 334.

Metwally, A. M., E. A. Omar and A. Y. Salem (1999). Studies on some blood components, rumen fluids and growth an influenced by addition of volatile fatty acids and age of suckling Friesian calves. J. Agric. Res., Tanta Univ., 25: 27.

Morris, F. E., M. E. Branine, M. L. Galyean, M. E. Hubbert, A. S. Freeman and G. P. Lofgreen (1990). Effect of rotating monensin plus tylosin and lasalocid on performance, ruminal fermentation, and site and extent of digestion in feedlot cattle. J. Anim. Sci., 68: 3069.

Perry, T. W. and M. J. Cecava (1995). Beef Cattle Feeding and Nutrition. 2nd ed., Academic press, INC, USA..

Ranjhan, S. K. (1982). Animal Nutrition in Tropics. 2nd ed., India.

Ryssen, J. B. J.van (1991). Effect of monensin and its metabolites in broiler litter on sheep consuming the broiler litter. J. of the South African Veterinary Association.62: 94.

Shetaewi, M. M. and T. T. Ross (1991). Effects of concentrate supplementation and lasalocid on serum chemistry and hormone profiles in Rambouillet ewes. Small Ruminant Research, 4: 365.

Sinks, G. D., J. D. Quigley, and C. R. Reinemeyer (1992). Effect of lasalocid on coccidial infection and growth in young dairy calves. J. American Veterinary Medical Association, 200: 1947.

Sivkova, K., E. Enev, V. Rusev and A. Petkov (1982). Ammonia in rumen and caecum and urea and protein in blood of lambs on a diet containing monensin. 2 Mezhdunarodnyi simpozium po fiziologii pishchevareniya zhvachnykh i ikh produktivnosti, Stara Zagora, 25-27th Nov., P. 137.

Spears. J. W. and R. W. Harvey (1984). Performance, ruminal and serum characteristics of steers fed lasalocid on pasture. J. Anim. Sci., 58: 460.

SPSS (1997). SPSS Bacic 7.5 for Windows, User's Guide; spss Inc.

Su, A. K., S. S. Yan and S. C. Wu (1993). Effect of monensin concentration in diets on growth performance and propionate concentration in the rumen of crossbred kids. J. Taiwan Livestock Research, 26: 297.

Varoley, H., (1976). Practical Clinical Biochemistry. 4th edition, New Delhi, India.

Warner, A. C. I., (1964). Production of volatile fatty acids in the rumen, methods of measurement. Nutr. Abstr. And Rev., 34:339.

Zorrilla-Rios, J., G. W. Horn, M. A. Andersen, G. J. Vogel and M. J. Ford (1985). Effect of stage of maturity of wheat forage and lasalocid supplementation on site and extent of digestion of nutrients by steers. J. Anim. Sci., 61: Suppl.339.

الملخص العربي

تأثير تعاقب إضافة اللازالوسيد والمونسين مع التيلوزين علي أداء عجول الجاموس الرضيعة

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قسم الإنتاج الحيواني- كلية الزراعة بكفر الشيخ- جامعة طنطا- مصر

استخدم في هذه الدراسة ٢٤ من العجول الجاموس الرضيعة متوسط وزنها ٣٥,١٨ ± ٠,٠٥ كجم عند الميلاد. قسمت الحيوانات إلي أربعة مجموعات متساوية بكل منها ٦ عجول (٣ذكور & ٣ إناث) وغذيت الحيوانات في كل المجموعات علي اللبن الجاموسي الكامل والبادئ بالإضافة إلي البرسيم الأخضر خلال تجربة نمو (١١٢ يوم). كانت منشطات النمو (Ionophores) تضاف إلي لبن الرضاعة مرة واحدة صباحا بتركيز ٢٨، ٢٨، ١٤ ميكروجرام/مل لبن بالنسبة لكل من اللازالوسيد والمونسين والتيلوزين علي التوالي.

كانت المجموعة الأولي (المجموعة المقارنة) تغذي علي مواد العلف السابق ذكرها بدون إضافات أما المجموعة الثانية كانت تغذي علي العليقة المقارنة + اللازالوسيد، المجموعة الثالثة كانت تغذي علي العليقة المقارنة+ المونسين مع التيلوزين أما المجموعة الرابعة فكانت تغذي علي العليقة المقارنة+ اللازالوسيد بالتعاقب مع المونسين والتيلوزين يوميا (تعطي يوم لازالوسيد واليوم الثاني مونسين مع التيلوزين وهكذا بالتناوب). كما أجريت أربعة تجارب هضم باستخدام ثلاثة من ذكور العجول الرضيعة من كل مجموعة متوسط وزنها ٧٢,٣٨ ± ٠,٧٨ كجم عند عمر ١٠ أسابيع وفي نهاية تجربة النمو (عند عمر ١١٢ يوم) تم أخذ عينات من سائل الكرش والدم وأوضحت الدراسة النتائج الآتية:

١- تحسنت معاملات الهضم والقيمة الغذائية بإضافة منشطات النمو لعلائق عجول الجاموس النامية.

٢- لم تتأثر درجة حموضة الكرش وكذلك تركيزات كل من نيتروجين الأمونيا والأحماض الدهنية الطيارة الكلية معنويا (علي مستوي ٥٪) باستخدام منشطات النمو في حين ازداد تركيز البروبيونات وانخفض تركيز كل من الأسيتات والبيوتيرات في سائل الكرش معنويا (علي مستوي ٥٪) بإضافة منشطات النمو.

٣- تركيز اليوريا في سيرم الدم لم يتأثر معنويا بينما ازداد تركيز كل من البروتينات الكلية، الجلوبيولين والكوليسترول باستخدام منشطات النمو وكذلك ازداد تركيز الجلوكوز في دم الحيوانات المعاملة باللازالوسيد فقط ومن ناحية أخرى انخفض تركيز الأنسولين في الدم بالنسبة للمجموعات المعاملة مقارنة بمجموعة الكنترول.

٤- معدل النمو اليومي ازداد معنويا (علي مستوي ٥٪) بإضافة منشطات النمو في حين انخفض متوسط المادة الجافة المأكولة بالنسبة للمجموعات المعاملة مقارنة بمجموعة الكنترول.

٥- تحسنت الكفاءة الغذائية في صورة طاقة وبروتين خام مهضوم/ كجم نمو نتيجة إضافة منشطات النمو مقارنة بالمجموعة المقارنة بينما انخفضت تكلفة الغذاء لكل كيلوجرام نمو بنسبة تتراوح من ٦,٨-١١,٧% للمجموعات المعاملة مقارنة بمجموعة الكنترول.

يتضح من هذه الدراسة أن إضافة منشطات النمو مثل المونسين واللازالوسيد والتيلوزين إلي علائق العجول الجاموس الرضيعة كان له تأثير إيجابي حيث أدى إلي زيادة معدلات النمو خصوصا خلال الشهر الأول من عمرها. وكذلك أدى إلي تحسين الكفاءة الغذائية في صورة طاقة وبروتين مهضوم كما أدت إلي انخفاض تكلفة الغذاء بالنسبة لهذه الحيوانات. تفوقت المجموعة التي تم فيها تعاقب منشطات النمو عن بقية المجموعات تليها مجموعة اللازالوسيد ثم مجموعة المونسين مع التيلوزين بالنسبة لأداء عجول الجاموس الرضيعة.