THE EFFECT OF DORAMECTIN ON SOME HAEMATOLOGICAL, BIOCHEMICAL AND HORMONAL PARAMETERS IN CATTLE

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ABSTRACT

The present study was delineated to work over the possible effects of doramectin on some haematological, biochemical and hormonal profiles in cattle. Thirty six clinically healthy mature cattle were classified into two main groups(18 for each sex). Each group used in this study was classified into three subgroups (6 animals for each). The first subgroup was kept as control and injected (S/C) with saline solution. The second subgroup was injected (S/C) with therapeutic dose (200µg/kg B.W) of doramectin. While the third one received doramectin (400 µg/kg B.W). Blood samples were collected for haematological, biochemical and hormonal examination on two days, one week and two weeks post injection.

Doramectin (200 µg/kg B.w) induced a significant increase in haemoglobin level in the males, R.B.Cs count in both sexes a significant increase in total leukocytic count in both sexes. The differential leukocytic counts for this dose exhibited eosinopenia, monocytopenia and decrease in basophils %. While, the dose of (400 µg/kg B.w) produced a significant decrease in haemoglobin level in females.

Our data revealed that doramectin (400 µg/kg B.w) provoked a significant decrease in serum total proteins and albumin while doses of (200 & 400 µg/kg B.w) induced a significant decrease in total lipid, triacylglycerol (TAG) and HDL-c levels with significant increase in LDL-c and total cholesterol in both sexes. Double therapeutic dose significantly elevated the level of urea, Alkaline phosphatase (ALP) and ALT in both sexes with a significant increase in serum creatinine and AST levels in females.

Doramectin (400 µg/kg B.w) induced a significant decrease in testosterone level in males and progesterone level in females. Moreover, therapeutic and double therapeutic dose induced a significant increase in esteradiol level in females.

INTRODUCTION

The members of macrocyclic lactone compounds produced by soil dwelling actinomycetes; abamectin, doramectin, ivermectin and moxidectin are very effective against nematodes, insects and arthropods **(Entrocasso et al., 1996)**. A primary mode of action of macrocyclic lactones is to modulate chloride ion channel activity in the nervous system of nematodes and arthropods. Macrocyclic laetones bind to receptors that increase membrane permeability to chloride ions. This inhibits the electrical activity of nerve cells in nematodes and muscle cells in arthropods, causing paralysis and death of the parasites **(Barragry, 1994)**.

Doramectin (25-cyclohexyl-5-O-demethyl 25-de (1-methylpropyl) avermectin A_{1a}) is an antiparasitic drug that may interfere with gamma-aminobutyric acid (GABA) neurotransmission of parasites **(Cropp, et al., 2000)**. A single topical application of doramectin pour-on was efficacious against a broad range of nematode species in cattle **(Marley et al., 1999)**.

Doramectin redueed nematode egg output in cows and calves treated over the entire grazing season compared to untreated controls and resulted in improvements of calf weight gain. Doramectin appears to be a new de-wormer that is very efficacious against all forms of gastrointestinal nematode parasites **(Ballweber et al., 2000)**.

This investigation was planned to assess the effects of the doramectin injection on some hematological, biochemical and hormonal profiles in the cattle.

MATERIAL AND METHODS

Drugs:

Doramectin (Deetomax ®) : 1% injectable solution is a ready to-use, colorless to pale yellow, sterile solution (Pfizer Co.).

Animals:

This work was conducted on 36 clinically healthy mature cattle (18 for each sex) in a private farm. There relative body weight ranged between 400- 450 kg. They were fed on green fodder (Barseem) wheat straw and coucentrate ration ad-libitum. Each sex was classified into three subgroups (6 animal for each). The first subgroup was kept as control and injected (S/C) with saline solution. The second subgroup was injected once (S/C) with therapeutic dose (200 µg / kg B.W) of doramectin **(Yazwinski et al., 1994)**. While the third one received doramectin (400 µg / kg B.W).

Sampling:

Two days, one week and two weeks post injection two blood samples were collected from the jugular vein of each animals. The first one was collected in heparinized tubes for haematological investigation. The second one was collected in clean centrifuge tube without anticoagulant and used for separation of clear serum. The sera were separated by centrifugation at 3000 r.p.m for 15 minutes and kept frozen at -20 ^{o}C until used for biochemical and hormonal studies.

Analysis:

The whole blood samples were used for determination of haemoglobin (Hb) **(Wintrobe et al., 1967)**, total erythrocytic (R.B.Cs) and total leukocytic counts (W.B.Cs) **(Schalm, 1986)** and differential leukocytic count was performed using Giemsa stained blood film **(Coles, 1980).**

The serum samples were assayed for total proteins (TP) & Albumin **(Doumas, 1975)**, Total lipids **(Frings and Dunn 1970)** , triacylglycerols (TAG) **(Bucolo and David, 1973)** , HDL-c **(Clark et al., 1983)**, LDL-c **(Friedwald et al., 1972)**, Urea **(Putton and Crouch 1977)**, phospholipids (PL) **(Zilversmit and Davis, 1950)**, alkaline phosphatase (ALP) **(John, 1982)** , creatinine (Cr) **(Young et al., 1975)**, alanine aminotransferase (ALT) **(King, 1965)**, aspartate aminotransferase (AST) **(Reitman and Frankel, 1957)**, Total cholesterol (TC) **(Mellattini, 1978)**, testosterone **(Ismail, 1986)**, esteradiol **(Abraham, 1979)** and progesterone levels **(Mcphee and Tiberghien 1987).**

Statistical analysis of the data was carried out using Student "t test **(Snedecor and Cochran, 1980)**.

RESULTS AND DISCUSSION

The effect of doramectin on haematological parameters:

The obtained results revealed that doramectin (200 µg /kg B.w) induced a significant increase in haemoglobin level in males after two weeks while, the dose of (400 µg /kg B.w) produced a significant decrease in haemoglobin level of females after one week post injection. The therapeutic dose of doramectin (200 µg /kg B.w) evoked a significant increase in of RBCs counts in both sexes after the first and second weeks (Table, 1). These elevations may be attributed to the long persistenee of doramectin in animal tissues like lung, skin, intestine and liver for more than 48 days **(Lifschitz et al., 2000)**. This play an important role in protection of animals against anemia resulted from endoparasites **(Stromberg et al., 1999& Taylor et al., 2000)** and ectoparasites **(Rooney, et al., 1999)** .

The same dose elicited a significant increase in total leukocytic count in both sexes after the first week only This increase is attributed to neutrophilia. Moreover, the differential leukocytic count revealed eosinopenia, monocytopenia and decrease in basophils %. On the other haud, the double therapeutic dose (400 µg /kg B.w) produced a similar effect on the differential leukocytic count in addition to lymphocytopenia without change in total leukocytle count (Table, 1).

The effect of doramectin on biochemical parameters:

Our data revealed that doramectin (400 µg /kg B.w) provoked a significaut decrease in serum total proteins and albumin levels (Table, 2) after the first and second weeks post drug administration in both sexes. This decrease could bc attributed to the effect of drug on liver which is the main site of albumin biosynthesis **(Muller., 1976)**. This result is supported by elevation in liver function enzymes (Table, 3).

The therapeutic dose of doramectin elicited a significant increase in serum total proteins and albumin after two days post injection and a non signifieant effect on total proteins and their fractions of both males and females after one and two weeks (Table, 2 and 3). Average daily gain for the doramectin-treated cattle was significantly greater than that for the cattle treated with ivermectin-clorsulon combinations **(Loyacano et al., 2000)**. Moreover, doramectin treated steers had a signifieantly greater mean daily gain during the study, significantly greater feed consumption, significantly lower feed-to-gain ratio, and significantly better quality carcass grades at slaughter **(Mac Gregor et al., 2001)**.

Doramectin (200 & 400 µg/kg B.w) induced a significant decrease in total lipid and triglycerides in both sexes from the second day to the end of the experiment (Table, 2). This effect might be attributed to decreased absorption of lipids through an effect on bile that is important for excretion of the drug **(Barragry, 1994)**.

Regarding the effeet of doramectin (200 µg/kg B.w) on lipoprotein fraetions and total cholesterol level in cattle. HDL-c exhibited a signifieant decrease in male animal only throughout the experiment and in both sexes with double therapeutic dose. LDL-c showed a significant increase after two weeks in male animals only with therapeutic dose and in both sexes with double therapeutic dose.

Total cholesterol level was significautly elevated after two weeks post drug administration in males and after first and second week in females with doramectin (200 µg/kg B.w) and in both sexes after the first and second week with the dose of (400 µg/kg B.w) (Table, 2).

The increase of LDL-c level could bc reasoned to the elevation of cholesterol level since LDL-c

is the main reservoir of cholesterol (**Hussein & Azab 1998).** Also, there was a direct relationship between cholesterol and LDL-c in aged rats **(Abd-El- Fatah et al., 1999).**

Double therapeutic dose of doramectin has an adverse effect on liver and kidney functions parameter, appeared as an increase in the level of urea on the first week in males and last two weeks in females (Table, 3). The increase in the level of creatinine after first and second week in females only (Table, 3). Alkaline phosphatase (ALP) revealed a significant increase after the first and second week in males and second week in females (Table,3). ALT level was elevated after two weeks in males and throughout the experiment in females while AST increased only in females after first and seeond weeks. Likewise, therapeutic dose of doramectin has no harmful effect on liver and kidney functions of both sexes (Table, 3).

Liver function tests and assessment of creatinine and urea levels were performed in Polynesian Wuchereria bancrofti carriers treated with a single dose of ivermeetin (400 µg/kg B.w) and adverse reactions were observed in 65% of females and in 70% of males **(Cartel et al., 1992).** This effect might be attributed to the hydropic degeneration and necrosis of hepatocytes which mirrored as a significant increase in serum levels of ALT, AST and ALP **(Gehan, 1995).** Moreover ivermectin induced hydropic degeneration and cloudy swelling of the renal epithelium with hyaline casts inside the renal tubule lumen of albino rat **(Ali et al., 1992).** In keeping with these lines, doramectin in double therapeutic dose might affeet the liver and kidney function

The effeet of doramectin on sex hormones:

Our data showed a significant decrease in testosterone level with doramectin (400 µg/kg B.w) after the first and seeond week. On whereas the therapeutic dose has no effect.

Ivermectin induced a significant decrease in testosterone level, weight of prostate, sperm cell count and sperm motility with a significant inerease in sperm abnormalities in treated rabbits. It has been reported that, ivermoectin caused degenerative changes in the seminiferous epithelium with arrested spermatogenesis **(Gehan, 1995).** A similar explanation might pertain to account for the reduction of testosterone level by double therapeutic dose of doramectin .

The effect of the tested drug (200 & 400 µg/kg B.w) on female sex hormone reflects a significant increase in estradiol level with the two doses. While the double therapeutic dose induced a significant decrease in progesterone level throughout the experiment.

Ivermectin enhanced prepubertal LH levels and pubertal LH pulse amplitude, that might be involved in the accelerated somatic maturation and in puberty advancement observed in ivermectin-treated heifers. **(Lacau-Mengido et al., 2000).** Further studies showed that, heifers administered ivermectin display increased follicular development, supporting earlier investigations

regarding reduced age at puberty in heifers treated with ivermectin as a result of elevated LH hormone **(Whittier et al., 1999)**. The elevation of estradiol and reduction of progesterone levels with doramectin may be attributed to the effect of doramectin on LH hormone in a manner similar to that of ivermectin.

It could be concluded that, the haematological, biochemical and hormonal parameters reflected hepatic disorders and hormonal disturbances with double therapeutic dose that not be evidenced with the therapeutic one.

Table (1): Effects of subcutaneous injection of doramectin (200 and 400 µg / kg B.W) on some haematological parameters in cattle.

Mean ± S.E (n = 6).

Parameters	Doramectin (µg /kg B.w)	*Males*				*Females*			
		Control	2nd day	1st week	2nd week	Control	2nd days	1st week	2nd week
Hb (gm/dl)	200	10.45± 1.23	13.07± 1.43	14.12± 1.64	16.75±1.53*	11.02± 1.03	9.98± 1.68	11.24±0.99	13.18± 1.12
	400	10.45± 1.23	10.2± 1.42	9.1 ±1.54	8.3± 1.47	11.03± 1.03	7.86± 1.61	6.8± 0.89*	7.4 ±1.3
R.B.Cs (10^6/ml)	200	5.4 ± 0.21	5.9 ± 0.64	6.3 ± 0.35*	7.5 ± 0.47*	4.3 ± 0.41	4.6 ± 0.23	5.8± 0.62*	6.4± 0.24*
	400	5.4 ± 0.21	5.1± 0.3	4.9± 0.86	4.8± 0.97	4.3± 0.41	4.0± 0.64	3.8 ±0.68	4 (± 0.81
W.B.Cs (10^3/ml	200	6.3± 0.7	7.4± 0.6	8.9± 0.3*	7.5± 0.4	5.9± 0.6	6.1± 0.2	8.4 ±0.6*	7.6± 0.5
	400	6.84 0.7	6.3± 0.7	5.9 ±0.6	5.4± 0.8	5.9± 0.6	6.4± 0.5	5.6± 0.2	4.9 ±0.9
Neutrophils%	200	41± 1.24	43 ±1.69	48 ±1.36*	46 ±1.78*	39 ±1.23	42 ± 1.39	48 ±1.98*	45 ±1.63*
	400	41 ±1.24	46 ±1.47*	49± 2.01*	47 ±1.91*	39 ±1.23	45± 1.74*	50 ±1.48*	53± 1.36*
Lymphocytes %	200	54 ±1.38	57±1.45	51 ±1.47	52 ±1.09	52 ± 1.23	54 ± 1.08	52 ± 1.99	53 ± 2.01
	400	54 ±1.38	52 ±2.14	50± 2.43	51 ± 2.71	52 ± 1.23	50 ±1.98	48 ±2.36	46± 1.59*
Eosinophils %	200	3.6±0.25	3.6±0.14*	1.0 ± 0.65*	1.8 ±0.42*	4.8 ± 0.47	3.1 ± 0.4*	1.4 ± 0.2*	1.7 ± 0.1*
	400	3.6± 0.23	1.9 ± 0.15*	0.7 ± 0.08*	0.9 ± 0.05*	4.8 ± 0.47	2.6 ± 0.16*	1.1 ± 0.16*	1.8 ± 0.13*
Monocytes %	200	1.0 ±0.09	0.7±0.03*	0.8 ± 0.02	1.2 ± 0.03	3.6 ± 0.14	1.7 ± 0.05*	0.9 ± 0.01*	1.3 ± 0.03*
	400	1.0 ± 0.09	0.6 ± 0.04*	0.4 ± 0.03*	0.8 ±0.01	3.6 ± 0.14	1.5 ± 0.09*	0.7 ± 0.06*	0.9 ± 0.01*
Basophils %	200	0.4±0.01	0.1±0.02*	0.1 ± 0.04*	0.2 ± 0.01*	0.5 ± 0.03	0.2 ± 0.03	0.1 ± 0.02*	0.1 ± 0.02*
	400	0.4± 0.01	0.2 ± 0.03*	0.1 ± 0.02*	0.3 ± 0.04*	0.5 ± 0.03	0.1± 0.8*	0.3 ± 0.04*	0.1 ± 0.01*

*Significant at P< 0.05

Table (2): Effects of Subcutaneous injection of doramectin (200 and 400 µg / kg B.W) on some serum biochemical parameters in cattle.

Mean ± S.E (n = 6).

Parameters	Doramectin (µg /kg B.w)	*Males*				*Females*			
		Control	2nd day	1st week	2nd week	Control	2nd days	1st week	2nd week
TP (gm/dl)	200	8.24 ±0.26	9.4 ±0.34*	7.92 ±0.29	8.17 ±0.27	7.44 ±0.34	7.64± 0.42	7.12± 0.39	7.87 ±0.36
	400	8.24 ±0.26	7.56 ±0.42	6.13 ±0.38*	5.97 ±0.44*	7.44 ±0.34	6.79 ±0.39	5.94±0.35 *	5.46 ±0.43*
Albumin (gm/dl)	200	5.20 ±0.14	6.34± 0.21*	5.29 ± 0.33	5.15 ±0.17	4.97 ± 0.16	5.14±0.22	4.91±0.34	5.23±0.25
	400	5.20± 0.14	5.02±0.46	4.07±0.12*	3.76± 0.31*	4.97±0.16	4.89±0.34	3.68± 0.26*	3.39±0.32*
Globulins (gm/dl)	200	3.04± 0.68	3.43± 0.79	2.63±0.59	3.02±0.23	2.47±0.82	2.5±0.56	2.3± 0.63	2.64±0.87
	400	3.04±0.68	2.54±0.31	2.06±0.12	2.01±0.16	2.47±0.82	1.9± 0.31	2.26± 0.19	2.07±0.13
Total lipids (mg/dl)	200	654.4 ±14.5	595.7±12.7*	487.6± 14.6*	561.3 ±13.7*	574.6±14.2	512.4 ±11.3*	465.8 ±12.9*	427.2 ±10.9*
	400	654.4 ±14.5	513.6 ±13.5*	418.9 ±13.7*	373.6 ±12.4*	574.6 ±14.2	467.7± 14.3*	402.34 11.3*	391.4 ±13.2*
TAG (mg/dl)	200	197.4 ±5.36	162.3 ±6.87*	139.4 ±8.01*	121.3± 6.2*	160.2± 7.13	154.5± 6.89	136.9 ±5.97*	129.4± 6.72*
	400	197.4 ±5.36	159.4± 5.69*	124.7 ±6.54*	108.9 ±8.67*	160.2± 7.13	141.7 ±8.64*	123.1 ±9.54*	102.4 ±5.76*
HDL-c (mg/dl)	200	49.2 ± 2.04	42.6± 1.69*	40.3 ±1.86*	37.8 ±1.49*	41.4 ± 2.21	39.2 ± 1.68	36.8± 1.64	34.9 ±1.97
	400	49.2± 2.04	41.1 ±1.47*	36.5± 2.93*	34.2 ±1.96*	41.4 ±2.21	35.6± 2.85	33.9 ±1.76*	31.5± 1.43
LDL-c (mg/dl)	200	34.2 ±2.51	37.3± 1.98	39.7 ±2.68	41.3 ±1.64*	36.7 ±2.41	38.9 ±3.46	41.7± 2.67	45.6 ±3.47
	400	34.2± 2.51	40.2 ±3.01	42.5 ±3.12	49.6±2.97*	36.7 ±3.41	41.4 ±3.18	44.8± 2.98	48.4 ± 2.14*
TC (mg/dl)	200	147.9 ±6.46	159.6± 7.83	168.6± 8.54	174.8 ±9.75*	136.5± 5.96	148.4± 6.95	159.4± 8.73*	167.6± 7.59*
	400	147.9±6.46	162.3 ±6.97	179.3 ±9.83*	188.4± 7.53*	136.5±5.96	159.3 ±9.37	167.2 ±6.89*	179.9 ±8.67*
PL (mg/dl)	200	156.3± 7.85	164.9± 8.32	151.2± 4.37	139.5± 8.38	159.2 ±7.35	161.3 ±6.56	154.9± 8.67	147.3± 6.45
	400	156.3± 7.85	154.2±4.36	142.6±6.42	131.9±9.72	159.2 ±7.35	156.8± 5.48	147.5± 5.67	139.6±7.56

*Significant at $P< 0.05$

Table (3): Effects of Subcutaneous injection of doramectin (200 and 400 µg / kg B.W) on liver and kidney functions in cattle.

Mean ± S.E (n = 6).

Parameters	Doramectin (µg /kg B.w)	*Males*				*Females*			
		Control	2nd day	1st week	2nd week	Control	2nd days	1st week	2nd week
Urea (mg/dl)	200	52.41± 4.25	50.27± 6.35	58.34± 6.98	64.26± 5.56	47.26± 5.38	50.13±6.25	53.58±4.67	56.27±5.19
	400	52.41± 4.25	58.39± 7.14	67.32 ±5.96	75.27±6.38*	47.26±5.38	56.37± 8.01	63.89±4.98*	70.41± 6.72*
Cr. (mg/dl)	200	1.96 ± 0.14	1.84 ± 0.17	2.22 ± 0.13	2.34 ± 0.16	2.01 ± 0.12	2.31 ± 0.19	2.68 ± 0.09	2.47 ± 0.11
	400	1.96 ± 0.14	2.41 ± 0.19	2.42 ± 0.16	2.56 ± 0.19	2.01 ± 0.12	2.49 ± 0.17	2.91 ± 0.17*	2.84 ± 0.15*
ALP (U/L)	200	15.2± 1.01	14.3±0.98	12.7± 1.09	12.9 ± 0.87	13.6 ± 1.14	12.8 ± 0.93	11.7 ± 0.75	12.5 ± 0.85
	400	15.2 ± 1.01	16.7 ± 1.03	19.8 ± 0.97*	18.6 ± 0.42*	13.6 ± 1.14	14.4 ± 0.68	15.3 ± 1.21	17.4 ± 0.93*
ALT (U/L)	200	18.21± 2.24	21.14± 1.16	23.22± 2.01	20.45±1.87	16.59±2.04	18.98±1.79	21.53±2.94	19.63±2.48
	400	18.21± 2.24	24.47± 2.57	36.75± 2.97*	28.67±2.59	16.59±2.04	24.59± 2.69*	34.35±3.09*	33.17±2.87*
AST (U/L)	200	33.51±4.26	37.35±2.67	45.98±6.63	42.16±3.97	29.37±4.94	35.37±4.35	41.23±5.96	38.11±3.74
	400	33.51±4.26	41.15±5.77	42.32±6.21	45.49±5.67	29.37±4.94	40.26±5.37	48.65±6.47*	45.76±5.14*

*Significant at P< 0.05

Table (4): Effects of Subcutaneous injection of doramectin (200 and 400 µg / kg B.W) on some reproductive hormones in cattle.

Mean ± S.E (n = 6)

Parameters	Doramectin (µg /kg B.w)	*Males*				*Females*			
		Control	2nd day	1st week	2nd week	Control	2nd days	1st week	2nd week
Testosterone (ng/ml)	200	4.23±0.26	4.01±0.21	3.78±0.13	3.38±0.09	———	———	———	———
	400	4.23±0.26	3.19±0.27	1.27±0.8*	2.01±0.14*	———	———	———	———
Estradiol (pg/ml)	200	———	———	———	———	241.3±11.7	284.1±9.6*	315±12.9*	287.3±14.7*
	400	———	———	———	———	241.3±11.7	324.5±13.9*	416.7±8.1*	359±13.2*
Progesterone (ng/ml)	200	———	———	———	———	5.61±0.45	5.01±0.39	4.75±0.37	5.21±0.37
	400	———	———	———	———	5.64±0.46	4.21±0.27*	2.63±0.16*	3.68±0.18*

*Significant at P< 0.05

REFERENCES

Abd-El-Fatah, M. A.; El-Sayed , G. R. and El- Hamamy, M. M. (1999) : The effect of orally administerd melatonin on biochemical and pathological changes induced by aging and paraquat toxicity. Alex. J .Vet . Sci .: 1, 99- 112.

Abraham, G. E. (1979) : Esteradiol RIA methods of hormone analysis. Breur, H. : Hamel, D.; Kruskemper, H., eds. Stuttgart Georg Thieme Verlage, p. 408.

Ali, A. A.; Fahmy, F. M. and Edrees, N. M. (1992) : Pathological and clinico pathological studies on antiparasitic drug "Ivermectin" toxicosis in albino rats. Zag. Vet. J. 16(4). 19-31.

Ballweber, L. R.; Evans, R. R.; Siefker, C.; Johnson, E. G.; Rowland, W. K.; Zimmerman, G. L.; Thompson, L.; Walstrom, D. J.; Skogerboe, T. L.; Brake, A. C. and Karle, V. K. (2000) : The effectiveness of doramectin pour-on in the control of gastrointestinal nematode infections in cow-calf herds. Vet. Parasitol 10; 90(1-2): 93-102.

Barragry, T. B. (1994) : Veterinary Drug Therapy. Lea & Febiger Philadelphia, A waverly Company.

Bucolo, G. and David , H. (1973): Quantitaive determination of serum triacylglycerol by the use of enzymes. Clin. Chem., 19:476-482.

Cartel, J. L.; Moulia-Pelat, J. P.; Glaziou, P.; Nguyen, L. N.; Chanteau, S. and Roux, J. F. (1992) : Results of a safety trial on single-dose treatments with 400 mcg/kg of ivermectin in bancroftian filariasis. Trop. Med. Parasitol ; 43(4):263-266.

Clark, D. A.; Rozell, P. R.; and Mosser, E. L. (1983) : Evaluation of kit to measure HDL-c in serum . Clin. Chem., 29: 1311.

Coles, E. H. (1980) : Veterinary Clinical Pathology . 3rd ed . W.B. Saunders Co. Philadelphia, London , Toronto and Tokyo.

Cropp, T. A.; Wilson, D. J. and Reynolds, K. A. (2000) : Identification of a cyclohexylcarbonyl CoA biosynthetic gene cluster and application in the production of doramectin. Nat Biotechnol ;18(9):980-983.

Doumas, B. T. (1975) : Colorimetric determination of total proteins. Clin. Chem: 21: 1159 - 1166 .

Entrocasso, C.; Parra, D.; Vottero, D.; Farias, M.; Uribe L. F. and Ryan, W. G. (1996) : Comparison of the persistent activity of ivermectin, abamectin, doramectin and moxidectin in cattle. Vet. Rec.138(4):91-2.

Friedwald, W. T.; Levy, R. I. and Friedrinkson, H. (1972) : Estimation of LDL-c in plasma without ultracentrifugation. Clin. Chem., 18 :499-502.

Frings, C. S. and Dunn, R. J. (1970) : Colorimetric method for determination of total lipids based on sulphophosphovanillin reaction. Am.J. Clin. Path., 53:89-91.

Gehan, M. Z. (1995) : Some pharmacological studies on ivermectin.M.V. Sc. Thesis, Fac. Vet. Med., Alex. University .

Hussein , S. A. and Azab, M. T. (1998) : Plasma lipids and lipoprotein in newborn kids and female baladv goat during late pregnancy and onset of lactation. Egypt. J. Biochem., 13 (1): 95- 105.

Ismail, A. A. (1986) : Annals of Clinical Biochemistry. 23: 113-134.

John, D. B. (1982) : Clinical lab. Methods for Determination of Alkaline phosphatase , 9th Ed., 580-581.

King, J. (1965) : Practical Clinical Enzymology Van Nostrand Co. Ltd . 132.

Lacau-Mengido I. M.; Mejia M. E.; Diaz-Torga G. S.; Gonzalez Iglesias A.; Formia, N.; Libertun, C. and Becu-Villalobos, D. (2000). Endocrine studies in ivermectin-treated heifers from birth to puberty. J. Anim. Sci: 78(4): 817-824.

Lifschitz, A.; Virkel, G.; Sallovitz, J.; Sutra, J. F.; Galtier, P.; Alvinerie, M. and Lanusse, C. (2000): Comparative distribution of ivermectin and doramectin to parasitic location tissues in cattle. Vet Parasitol. 1;87(4):327-338.

Loyacano, A. F.; Skogerboe, T. L.; Williams J. C.; DeRosa A. A; Gurle, J. A. and Shostrom, V. K. (2000) : Effects of parenteral administration of doramectin or a combination of ivermectin and clorsulon on control of gastrointestinal nematode and liver fluke infections and on growth performance in cattle. J. Am. Vet. Med. Assoc. 1;218(9):1465-1468.

Mac Gregor, D. S.; Yoder, D. R. and Rew, R. S. (2001) : Impact of doramectin treatment at the time of feedlot entry on the productivity of yearling steers with natural nematode infections. Am. J. Vet. Res :62 (4):622-624.

Marley, S. E.; Illyes, E. F.; Keller, D. S.; Meinert, T. R.; Logan, N. B.; Hendrickx, M. O. and Conder G. A. (1999): Efficacy of topically administered doramectin against eye worms, lung worms, and gastrointestinal nematodes of cattle. Am. J .Vet. Res.; 60 (6):665-668.

Mcphee, I. M. and Tiberghien, M. P. (1987) : Progestrone RIA methods of hormone analysis.

Vet. Res., 121: 63.

Mellattini, F. (1978) : Colorimetric determination of serum total cholesterol. Clin. Chem. 24,2161-2165.

Muller, P. A. (1976) : The diagnosis of liver dysfunction in farm animals and horses. Vet. Rec 23, 330-334.

Putton, C. and Crouch, S. (1977) : Determination of serum blood urea nitrogen Anal. Chem.,49: 464-469.

Reitman, S. and Frankel, S. (1957) : Colorimetric determination of glutamic oxalacetic and glutamic pyruvic transaminase, Am. J. Clin. Path. 28 ; 56.

Rooney, K. A.; Illyes, E. F.; Sunderland, S. J.; Sarasola, P.; Hendrickx, M. O.; Keller, D. S.; Meinert, T. R.; Logan, N. B.; Weatherley, A. J. and Conder, G. A.(1999) : Efficacy of a pour-on formulation of doramectin against lice, mites, and grubs of cattle. Am. J. Vet Res; 60(4):402-404.

Schalm, O. W. (1986) : Veterinary Haematology 4th ed. Lea and Febiger, Philadelphia, U.S.A.

Snedecor, G. W. and Cochran, W. G. (1980) : Statistical Methods. 7th Ed. Iowa State University, Press, Ames, Iowa.

Stromberg, B. E.; Averbeck, G. A.; Anderson, J. F.; Woodward, B. W.; Cunningham, J.; Brake, A. and Skogerboe, T. (1999): Comparison of the persistent efficacy of the injectable and pour-on formulations of doramectin against artificially-induced infection with Dictyocaulus viviparus in cattle. Vet Parasitol ;87(1):45-50.

Taylor, S. M.; Kenny, J.; Edgar, H. W.; Mallon, T. R. and Canavan A. (2000) : Induction of protective immunity to Dictyocaulus viviparus in calves while under treatment with endectocides Vet Parasitol 1;88(3-4):219-228.

Whittier, J. C.; Weech, B. L.; Lucy, M. C.; Keisler, D. H.; Smith, M. F. and Corwin R. M. (1999): Effect of anthelmintic treatment on sexual maturation in prepubertal beef heifers. J Anim Sci ;77(3):736-741.

Wintrobe, M. M.; Rich Lee, G.; Dggs, D. R.; Bithell, T. C.; Anthenus, J. W. and Foerster, J. (1967) : Clinical Haematology 7th ed. Lea and Febiger, Philadelphia. U.S.A.

Yazwinski, T. A.; Featherston, H. and Tucker C. (1994) : Effectiveness of doramectin for treatment of experimentally induced gastrointestinal tract larval nematode infections in calves. Am. J. Vet. Res.; 55(6): 820-821.

Young, D.; Pestaner, L. and Giberrman, V. (1975) : Colorimetric determination of serum creatinine . Clin Chem., 21:1112.

Zilversmit, D. B. and Davis, A. K. (1950) : Microdetermination of phospholipids by trichloroacetic acid precipitation; J.Lab. Clin., Med. 35:155-160.

الملخص العربى

تأثير الدورامكتين على صورة الدم، بعض المؤشرات البيوكيميائية و الهرمونيه فى الماشية

المشتركون فى البحث

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قسم الأدوية والكيمياء الحيوية وكيمياء التغذية *

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أجريت هذه الدراسة على عدد ٣٦ حيوان (١٨ لكل جنس) من الماشية وذلك لدراسة تأثير عقار الدورامكتين على بعض الأوجه الدموية، المؤشرات البيوكيميائية و الهرمونية.

تم تقسيم كل جنس الى ثلاث مجموعات (٦حيوانات لكل مجموعة) . استخدمت المجموعة الأولى كمجموعة ضابطة بينما تم إعطاء المجموعة الثانية الجرعة العلاجية من الدواء (٢٠٠ ميكروجرام / كجم) بالحقن تحت الجلد فى حين أعطيت المجموعة الثالثة ضعف الجرعة العلاجية (٤٠٠ ميكروجرام /كجم) من الدواء. تم أخذ عينات دم و مصل بعد يومين، أسبوع و أسبوعين من الحقن وذلك لإجراء بعض القياسات.

وقد أوضحت النتائج أن الجرعة العلاجية (٢٠٠ ميكروجرام / كجم) قد أحدثت زيادة معنوية فى نسبة الهيموجلوبين، عدد كرات الدم الحمراء والبيضاء فى الذكور والإناث فى حين حدث انخفاض معنوى فى نسبة الهيموجلوبين مع ضعف الجرعة العلاجية (٤٠٠ ميكروجرام /كجم) فى الإناث.

وكذلك أوضحت النتائج أن الدواء بجرعة (٤٠٠ ميكروجرام / كجم) قد أحدث انخفاض معنوى فى نسبة البرتينات الكلية والزلال فى الجنسين وهرمون التستوستيرون فى الذكور و البروجيسترون فى الإناث فى حين حدثت زيادة معنوية فى نسبة البولينا، فوسفاتيز القاعدى ،الانين امينو ترانس فيريز فى الذكور والإناث مع زيادة الكرياتينين واسبرتات أمينو ترانس فيريز فى الاناث وكذلك أحدثت الجرعات (٢٠٠ و ٤٠٠ ميكروجرام / كجم) انخفاض مستوى الدهون الكلية، الجليسريدات الثلاثية و الدهون عالية الكثافة وكذلك حدثت زيادة معنوية فى الدهون منخفضة الكثافة و الكوليستيرول فى الذكور و الإناث وهرمون الاستروجين فى الإناث.

مما سبق يتضح أن استخدام دواء الدورامكتين فى الجرعة العلاجيه ليس له أثار جانبية على الماشية فى حين أن ضعف الجرعة العلاجية قد يحدث بعض الاضطرابات فى وظائف الكبد وهرمونات التناسل مما يحذر من مضاعفة الجرعة.