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EFFECT OF FLAVOMYCIN ON THE PERFORMANCE AND BLOOD CONSTITUENTS OF FRIESIAN AND BUFFALO CALVES

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SUMMARY

Flavomycin was given to male buffalo and Friesian calves (20 mg/animal/day) during the fattening period to show its effect on the performance and blood constituents. The obtained data revealed slight increase in the total gain with shortening of the fattening period in the treated animals. Hemoglobin, SGOT, SGPT., total lipids and cholesterol values showed non significant changes. Significant elevation in the total protein, α and δ globulins as well as in T_3 were recorded.

INTRODUCTION

Performance promotors are added to the feed of agricultural livestock solely for physiological, nutritional and dietary reasons. Their registration and use are uniformly regulated and controlled in the various countries by laws governing animal feedstuffs.

Flavomycin is the trade name for the antibiotic performance promotor Flavophospholipol. Flavomycin has a marked antibacterial effect on numerous Gram positive and Gram negative microorganisms, where it inhibits their reproduction by intervening in the biosynthesis of murein layer (structural substance of the bacterial cell wall) results in cell bursting, [Huber et al., (1966) and Huber and Nesemann, (1968)].

Bonomi et al. (1975) and Hilpert et al. (1984) recorded that, Flavomycin allows protein sparing by reducing the microbial break down of protein resulting in a lower ammonia content in the intestinal lumen and an increase in the digestibility of amino acids. They also recorded that Flavomycin elevates the digestibility of methionine by 5%.

Valerani (1980) stated that, Flavomycin increases the formation of volatile fatty acids especially propionic acid which is absorbed by the ruminal wall and oxidized by aerobic metabolism to produce energy. The author also reported that, the propionic acid plays a particular role in the protein synthesis.

Grant (1974) and Fallon (1985) mentioned that the use of flavomycin in dose levels of 16 mg/kg. milk replacer and 47 mg/head/day during rearing and fattening period, respectively results in an increase in the weight gain with reduction in the fattening period.

The present study was aimed to clear if the growth promotor (Flavomycin) has side toxic effect on the hemoglobin concentration and some biochemical parameters of buffalo and Friesian calves during the fattening period.

MATERIAL AND METHODS

(A)- Material:

I- Drug:

Flavomycin is a weak acid with 1.96 weight percent phosphorous content in the form of colorless, amorphous soluble in water salt, produced by Hoechst company. Flavomycin has a various generic names:-
Flavomycin is the generic name of the WHO, Bambermycins is the generic name of the U.S.A., Flavocorn is the generic name of Japan, while Moenomycin is the scientific name indicating the place in which the production strain was discovered.

II- Animals:-

Sixteen buffalo and Friesian male calves were used in this experiment. Buffalo calves were divided into two groups (3 each), Friesian calves were also divided into two groups (5 each). The first group served as control in both species, while the second was given Flavomycin in a dietary concentraiton of 20 mg/ animal/day during the fattening period (Brander et al., 1982).

At the beginning of the experiment, buffalo and Friesian calves were nearly of the same age (11 months) with non significant differences in their body weight (220 ± 6 kg and 217 ± 9kg for buffalo and Friesian calves respectively).

Both control and treated animals were fed the same ration which is composed of concentrate mixture, clover hay, ground corn and rice straw. The amount of hay and ground corn was 2kg/head/day and ad-libitum rice straw in addition to concentrate amount according to the Morrison requirements (1959). The composition of the concentrate mixture was mentioned in Table (1).

Table (1): Composition of the ration used in the experiment :

Ingrdient	%
Cotton seed cake	23
Maize grain	30
Wheat bran	24
Rice bran	15
Molasses	4
Calcium	3
Ordinary salts	1

The ration was offered twice daily and the animals were watered twice daily at 8 a m. and 2 p.m.

(B) Methods:-

I- Body weight development:

The body weight was recorded at the start of the experiment, and every four weeks. The daily gain was calculated as follow:

$$\frac{\text{Final Weight - Initial weight}}{\text{Number of days}}$$

The animals were slaughtered at 450 kg body weight (end of the fattening period) and blood samples were collected for two purposes:

1- Blood samples with anticoagulant (EDTA) for hemoglobin estimation.
2- Blood samples without anticoagulant for serum collection and biochemical studies.

II- Hemoglobin:

Hemoglobin concentration was determined by the cyanmethaemoglobin method (Miller and Weller, 1971).

III- Biochemical studies:

1- Glucose, urea, creatinine, GOT (Glutamic oxalacetic transaminase), GPT (Glutamic pyruvic transaminase), total lipids and cholesterol were measured colourmertrically according to the methods mentioned by, Trinder (1969), Natelson (1957), Husdan and Rapoport (1968), Reitman and Frankel (1957), Henry (1964) and Flegg (1973), respectively.

2- Thyroxine (T4) and Triiodothyronine (T3) were measured in the serum by means of radioimmunoassay according to Larsen (1981) and Tietz (1976), respectively.

3- Electrophoretic pattern of serum protein was assayed according to Kaplan and Savory (1965).

IV- Statistical analysis:

The obtained data were analysed according to Snedecor (1969).

RESULTS AND DISCUSSION

Body weight development in control and treated groups were recorded in Table (2). The obtained results denote slight increase in total gain in the treated animals. This increase occurred at shorter period than that of control groups. Regarding the average daily gain, it is clear that the treated animals excelled the control gorup by 0.2 kg gain in Friesian and 0.07 kg in buffalo. Similar results were obtained by Grant (1974), who stated that the daily gain and fed utilizations were improved in cattle fed Flavomycin during the whole fattening period. Our results agree with Kanev et al. (1981), who found that the main daily gins were 760, 812 and 750 g. in fattening calves used Monensin, Flavomycin and control respectivley. The improvement in the body weight gain may be attributed to the fact that Flavomycin promotes the bacteria in the digestive tract responsible for break down of cellulose and thus affords better utilization of feed. Flavomycin also promotes the growth of amylolytic and cellulytic microorganisms which ferment both starch and cellulose (Giesecke and Hendrickx, 1973).

Table (2) : Effect of Flavomycin on the body weight devlopment in fricsian and buffulo calves.

group / parameter	Fricsian		Buffalo	
	Control	Treated	Control	Treated
Average daily gain (kg/ day).	0.72±0.075	0.74±0.071	0.50±0.09	0.57±0.06
Feed conversion. (kg starch value/ kg gain)	7.61±0.79	7.32±0.81	12.26±1.03	10.32±1.06
Fattening period (day).	343.0±40.5	303.0±51.5	463.0±114.5	419.0±127.3

Results of haemoglobin concentration, glucose, urea, serum creatinine, SGOT., SGPT., S. total lipids and cholesterol were shown in Table (3).

The obtained results revealed that Flavomycin failed to produce significant effect on the previous parameters in the fattening buffaloes and Friesian calves during the whole period of experiment.

Generally all changes were fluctuating around the normal physiological range as indicated by (Dukes, 1955). Also our results were similar to those obtained by Said (1987).

Electrophoretic pattern of serum protein in the control and treated groups was recorded in Table (4): The results revealed significant elevation of the total protein, α and δ globulins in both Friesian and buffalo treated calves comparing with control groups. This elevation in the immune status may be attributed to the improvement of the overall performance especially protein and energy metabolism in the Flavomycin treated calves (Valerani, 1980).

Thyroxine (Total T_4) and triiodothyronine (T_3) values were tabulated in Table (5). The results of T_4 revealed non significant differences between the treated and control groups, but there was a mild elevation in the value of T_3 in the treated gorup than the control in both Friesian and buffalo calves.

The elevation of T_3 may be attributed to the increased level of α globulin and also to the over active eat and drink of the treated animals. This was confirmed by the insignificant decrease of the cholesterol level which may tend to fall in cases of hyperthyrodism (Soliman and Abd El-Moty, 1974).

Table (3): Mean values ± S. E. of hemoglobin and some serum biochemical constituents in control and Flavomycin treated Friesian and buffalo calves.

group / parameter	Friesian		Buffalo	
	Control	Treated	Control	Treated
Hemoglobin (g/dL)	12.12 ± 1.10	10.22 ± 1.26	11.73 ± 2.13	15.53 ± 2.32
Glucose (mg / dl).	106 ± 3.27	109.2 ± 8.27	100.33 ± 0.88	102 ± 7.00
Urea (mg / dl).	15.26 ± 0.69	14.54 ± 0.74	16.83 ± 0.82	16.37 ± 0.79
Creatinin (mg / dl).	1.22 ± 0.05	1.3 ± 0.08	1.13 ± 0.03	1.27 ± 0.15
GOT. (u / L).	39.88 ± 0.75	40.5 ± 0.75	36.8 ± 2.3	40.73 ± 0.84
GPT. (u / L).	37.26 ± 2.40	38.12 ± 2.87	34.23 ± 4.4	35.13 ± 4.86
Total lipid (mg / dL)	574.8 ± 46.78	565.2 ± 43.98	667 ± 11.93	660.33 ± 5.81
Cholesterol (mg/ dL)	148.4 ± 8.94	134.2 ± 4.3	94.67 ± 11.97	86.33 ± 3.180

Table (4) : Serum protein electrophoretic pattern (g %) in all groups during the fattening period.

group / parameter	Friesian		Buffalo	
	control	treated	control	treated
Total protein	6.70 ± 0.15	7.23 ± 0.18*	6.69 ± 0.15	7.23 ± 0.17*
Albumin	4.42 ± 0.22	4.52 ± 0.36	4.42 ± 0.22	4.52 ± 0.36
Total globulin	2.28 ± 0.31	2.71 ± 0.21	2.27 ± 0.30	2.71 ± 0.21
A / G	1.94 ± 0.31	1.66 ± 0.26	1.94 ± 0.19	1.66 ±0.022
α	1.19 ± 0.006	1.27 ± 0.006*	1.06 ± 0.0001	1.3 ± 0.002*
β	1.01 ± 0.006	1.14 ± 0.26	1.00 ± 0.0001	1.06 ± 0.026
δ	0.10 ± 0.009	0.30 ± 0.11 *	0.21 ± 0.10	0.35 ± 0.0008*

* Significant at P ≥ 0.05

Table (5) : Effect of Flavomycin on the T_4 and T_3 values in Freisian and buffalo calves.

group / parameter	Friesian		Buffalo	
	Control	Treated	Control	Treated
T4 (µg / dL)	3.84 ± 0.04	3.85 ± 0.41	3.20 ± 0.23	3.03 ± 0.06
T3 (µg / dL)	106 ± 2.44	119.6 ± 6.05	120 ± 5.0	126 ± 5.14

From the previous data it can be concluded that Flavomycin increases the overall performance of fattening Friesian and buffalo calves in addition to the indirect improvement of the immune status throught the elevation of the α and δ globulins/

Also we can say that, Flavomycin is considered as a safe growth promotor although it was given in high dietary concentations.

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