

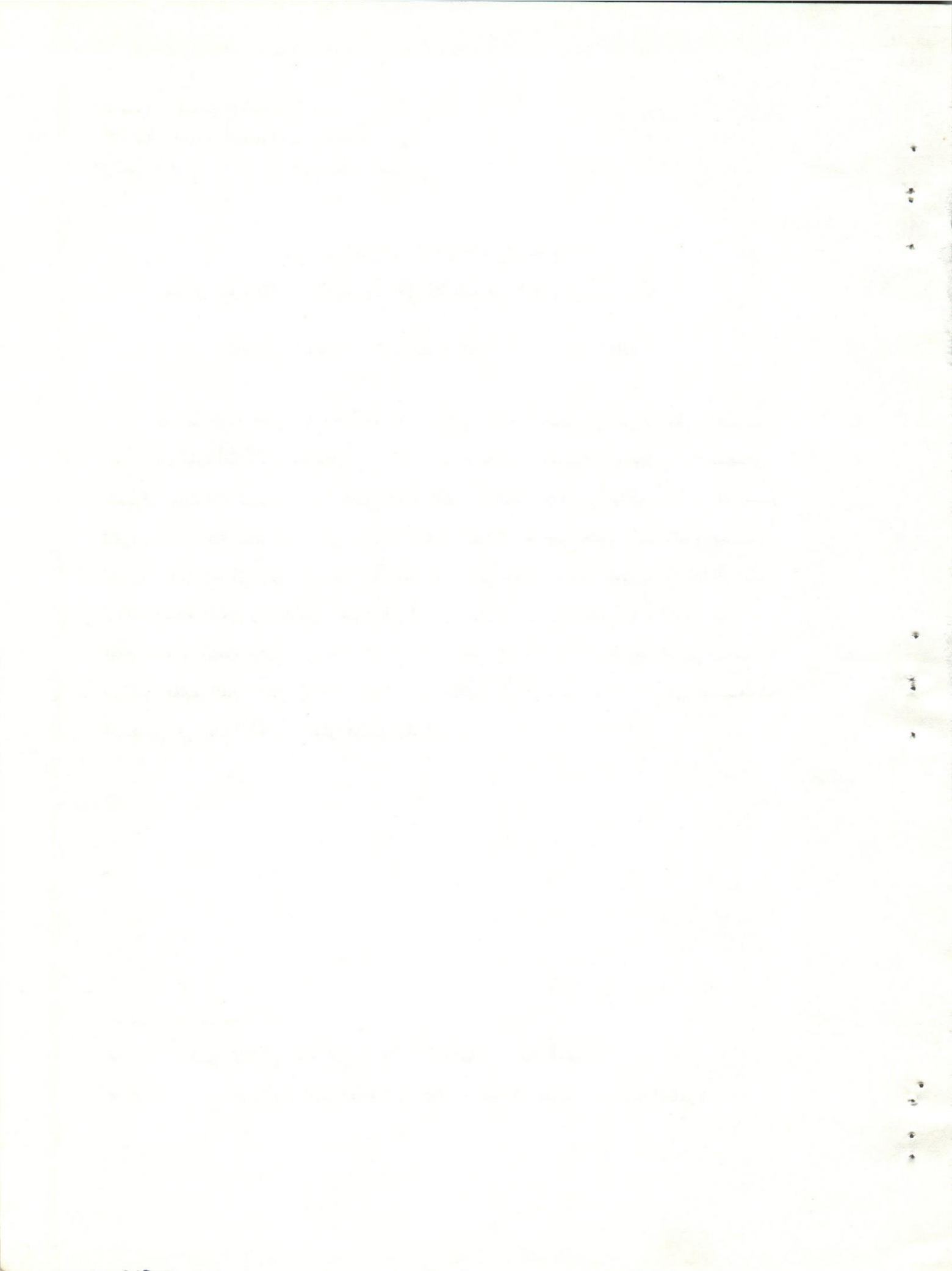
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تأثير بيركلورات الامنيوم على انتاج اللبن
وبعض الصفات الهيماتولوجية في الابقار الفريزيان

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استعملت لهذه الدراسة ١٠ أبقار فريزيان حلابة أعطيت عن طريق الفم واحداً جرام بيركلورات الامنيوم لكل ١٠٠ كيلو جرام من وزن الحيوان يوميا ضمن غذاء الحيوان ولمدة ٥ شهور . تم تسجيل كمية اللبن الناتجة يوميا وأخذت عينات لبن لتقرير بعض مكوناته وفي نفس الوقت أخذت عينات دم وتم فحص الهيماتولوجي . أظهرت النتائج أن بيركلورات الأمنيوم أدت الى حدوث زيادة معنوية في انتاج اللبن كذلك نسبة الدهن وانخفاض معنوى في الجلوبيولين . ومن ناحية أخرى اثبت تحليل الدم حدوث زيادة طفيفة في عدد كرات الدم الحمراء والبيضاء والهيموجلوبين ونسبة تركيز خلايا الدم بالدم وكذلك زيادة نسبة خلايا الليمفوسايت بالاضافة الى حدوث انخفاض في نسبة خلايا النيتروفيل بالدم .

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**THE EFFECT OF AMMONIUM PERCHLORATE ON MILK PRODUCTION
AND BLOOD PICTURE OF FREISIAN COWS**
(With Two Table)

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SUMMARY

The effect of ammonium perchlorate supplementation in a dose of 1gm/100 kg body weight was studied on 10 Freisian cows for 5 months. Milk yield was studied and milk samples were taken to determine some milk constituents. At the same time blood samples were taken for the examination of the blood picture. Our results showed that giving ammonium perchlorate caused significant increase in milk yield with relative increase in its fat%. Variation in the other milk constituents were within the normal limits, except the significant decrease of immuno-globulin. Examination of the blood revealed the presence of significant increase in the total count of RBCs, WBCs, Hb contents, PCV% and lymphocytes%. In addition to these, there was relative decrease in the percentage of neutrophils.

INTRODUCTION

Nowadays ration additives play a major role in increasing the animal weight. Workers in the field of nutrition are always cautious from the side effect of any new preparation. Fortunately ammonium perchlorate is successfully used as a ration additive as far as it has no harmful effect except in a dose over 4gm/100 kg body weight (HERFINDAL and HIRSCHMAN, 1975). Generally perchlorate is a monovalent anion competes with iodide for transport into the thyroid gland and thereby depresses both iodide uptake and degree of hormone formation (WYNGAARDEN, et al. 1953). Many trials have been made on the use of ammonium perchlorate for induction of hypothyroidism in animals (SHIGAN, 1963; SALOON, et al. 1968; MIKHAILOV, et al. 1971; AMER, 1973; MILOKOV, et al. 1977; MIKHOILOV, et al. 1979, 1982 and ARKIPOV, 1984). In addition clinicians and workers in the field of nutrition are always searching for suitable cheap compound capable of increasing anabolic processes without side effects which may affect the health of the animal. For this, ammonium perchlorate is studied by many authors and proved to be suitable cheap ration additive for increasing the productivity of the animals (WARNEL and IGBAR, 1971; TKACHOK, 1974; RAGHIB and MOTTELIB, 1976 and ARKIPOV, 1984).

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It has been reported by MIKHAILOV (1973) that giving dairy cows ammonium perchlorate 5 mg/kg body weight results in an increase in the milk yield during the whole milking season by about 5% without alteration in its fat percent.

MOTTELIB and RAGHIB (1976) stated that addition of ammonium perchlorate to the ration of sheep in a daily dose of one mg for every kilogram body weight caused significant changes in the blood cellular elements. That changes were found as an increase in both Hb and total RBCs count. In addition there was a transient drop in neutrophilic percent with a significant rise in the percentages of lymphocytes, eosinophils and basophils.

The aim of the present work is to study the effect of oral administration of large dose from ammonium perchlorate (one mg for each 100 kg body weight) on the milk production and blood picture of Freisian cows under the Egyptian climatal conditions just after calving.

MATERIAL and METHODS

The study was carried on 12 clinically healthy Freisian cows in the Experimental Station of Animal Production Department, Faculty of Agriculture, Assiut University, for 5 months after calving. The cows were fed according to the standard recommended by GHONEIM (1958); from DECEMBER, 1985 to APRIL, 1986.

All cows were fed indoors on 20-30 kgs of Egyptian clover (*Trifolium Alexandrinum*) daily and concentrate mixture consists of: 30% cotton seed meal, 29% wheat bran, 38% crushed maize, 2% lime stone and 1% common salt. The starch values of the mixture was about 63.5.

Cows were divided into two groups: experimental and control. Ammonium perchlorate was given daily to the experimental cows in a dose at 1g/100 kg body weight in their ration for a period of 5 months beginning from calving.

Milk and blood samples were taken from control and experimental groups as follows:

1- Milk samples:

From each cow a representative composite milk sample for four successive milking was taken. Butter fat was determined in duplicate by Gerber's method. Total nitrogen was determined by the Kjeldahl method. Total protein percentage was obtained by multiplying the total nitrogen by a constant factor 6.38. Milk protein fractions were determined by the paper electrophoresis.

Blood samples:

At the end of the experimental period, whole anticoagulated blood samples were obtained from each cow in the two groups in clean dry sterile vials containing a mixture of potassium ethylene diamine tetra acetate (EDTA) at a concentration of 3 mg for each ml of blood. Whole anticoagulated blood samples were used for the following determination:

- 1- Haemoglobin (Hb) content (in gram percent) using Sahli's haemometer.
- 2- Total RBCs and WBCs count/mm³ diluted by normal saline and Turk's solution respectively and using improved Neubaur haemocytometer.
- 3- Differential leucocytic count which was calculated after staining the blood films. Taken from each cow with Giemsa stain, using the 4-field Meander method (GOLES, 1967).
- 4- Packed cell volume (PCV) using Jannetzki centrifugate micro-haematocrit. The results were read by means of special scale in-percent.

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The results were analysed statistically using the student's "t" test, (SNEDECOR, 1956).

RESULTS

The effect of ammonium perchlorate on the milk yield and milk constituents is shown in Table 1.

Table 1 showed that a significant rise in milk yield per month with slight increase in milk fat percentage of cows receive receiving ammonium perchlorate, Furthermore the beta-lactoglobulin percentage was slightly increased with the oral administration of the drug. At the same time the immunoglobulin fractions was significantly decreased. (P 0.05).

Table (1)
The effect of ammonium perchlorate on the milk yield
and its protein fractions of Freisian cows

Milk data	Mean Values	
	Group A	Group B
Average milk yield per month	281+17.5*	326+14.8***
Fat %	3.81+0.02	3.88+0.02**
Protein gm %	4.05+0.01	4.04+0.02
Casein gm%	3.40+0.01	3.45+0.01
Milk albumin %	5.56+0.31	5.46+0.32
Beta-lacto-globulin %	43.60+0.57	45.00+1.50
Alpha-Lactoalbumin %	20.08+0.57	20.30+0.80
Immuno-globulin %	30.76+1.53*	25.93+1.15

A = Control

B = Experimental

* = Mean + Standard error

** = Significant at 5% level

*** = Significant at 1% level

Concerning the blood picture as shown in table (2) it was found that Hb content was slightly increased (P 0.05) in the experimental group with a parallel increase in the total RBCs, WBCs and PCV. Regarding the leucocytic differential count, the percentages of lymphocyte, eosinophils and monocytes were slightly increased while that of polysegmented neutrophils was decreased, All these differences were not significant.

Table (2)
The effect of ammonium perchlorate on the blood
picture of Freisian cows

Blood picture	Mean Values	
	Group A	Group B
Hb content (in gram %)	11.3+1.02	12.1+1.16
RBCs, (x 10 ³ /mm ³)	7.6+1.81	7.9+1.63
PCV %	36.6+1.96	37.1+1.86
WBCs (x 10 ³ /mm ³)	6.4+0.98	6.8+0.88
Band cells %	9.3+0.01	9.4+0.02
Polysegmented cells %	39.1+2.62	36.1+2.13
Lymphocytes %	49.8+2.71	51.6+2.92
Eosinophils %	5.8+0.61	6.3+0.53
Monocytes %	4.3+0.31	5.1+0.18
Basophils %	0.6+0.03	0.5+0.01

A = Control

B = Experimental

+ = Standard error

DISCUSSION

The decrease in the activity of the thyroid gland eventually results in an increase in the anabolic processes, with a consequent expected increase in the productivity of the animal as far as this inhibition is temporary and within the optimum level; KODRIAVTSEV (1969). This was clearly evident from the increase of milk yield in the cows which were given ammonium perchlorate. This agreed with the results obtained by THACHOK (1974) in cattle, but in our work the increase in the milk yield was slightly more than those obtained by THACHOK (1974). This may be attributed to the increased dose of ammonium perchlorate, from the economical point of view the cost of the given preparation of compared with cost of the obtained increase in the milk yield, it would be found that it is eventually beneficial to use such preparation for increasing the productivity of the animals. Nowadays ammonium perchlorate is used in animal farms as one of the ration additives in many countries in the world (YAKEMMKO, 1970; FINSHTAIN, 1971; SALOON, 1971; KHENKINA, 1972; MIKHAILOV, 1973; THACHOK, 1974; MILKOV, *et al.* 1977; MIKHAILOV, *et al.* 1982 and ARKIPOV, 1984). It is of interest to mention that the obtained increase in milk yield is accompanied by an improve in both fat and casein percentages which become 3.88% and 3.45% respectively.

On the other hand, the electrophoretic analysis of milk serum proteins declared that supplementation of the animal with ammonium perchlorate did not greatly alter the milk proteins as far as the variations were within the normal limits.

Concerning the blood picture it can be concluded that the increase in the total RBCs count and the amount of Hb in the experimental group was due to the increase in the anabolic processes which consequently needs much RBCs and Hb. This findings agreed with Telegina (1962). ESAEV (1970); THACHOK, (1974) and MOTTELIB and RAGHIB (1976).

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The increase in the total WBCs count was within the normal physiological limits. This goes hand by hand with the results obtained by AMER, (1973) and MOTTELIB and RAGHIB (1976) in sheep. Definit explanation for this decrease would not be achieved, yet it may be due to certain alteration in the process of leucocytic cell formation. With regard to the change in percentages of different types of WBCs in the blood it could be attributed mainly to the increase in the anabolic processes resulting from the decrease of the activity of the thyroid gland as a result of giving ammonium perchlorate. This was clearly evident from the significant rise of lymphocytes percentage and the decrease in the polysegmented phagocytic cells. Again this agreed with the result obtained by MIKHAILOV, et al. (1979) in cattle and sheep.

In view of the obtained results it could be concluded that giving ammonium perchlorate to Freisian cows in a dose of 1 g/100 kg body weight daily for each animal, for 5 months living under the Egyptian climatic conditions favoured economically the milk production of these dairy cows. In addition, no deleterious effect was observed as a result of giving ammonium perchlorate and on the contrary the animals were clinically healthy. Furthermore, the results showed the economical importance of using this compound as ration additive to the highly producing Freisian cows under the Egyptian climatic conditions.

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