

تأثير عقار (البانمنث) على النيواسكارس فيتيولورم في العجول الجاموس وكذلك الفئران التي تم عددها صناعيا

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المخلص العربي

تم دراسة تأثير (البانمنث) على الأطوار اليرقية ، والطور البالغ النيواسكارس فيتيولورم *
واستخدم هذا العقار بمقدار ٣٠ جم لكل كجم من وزن الجسم لمدة ٣ أيام متتالية وكان تأثيره
قويا على اليرقات *

وقد قدرت كفاءة العقار بواسطة عد اليرقات في الرثة وخلو الرثة من ظهور التغيرات المرضية *

هذا وقد وجد أن الجرعة المستعملة خلال فترة التجربة لها تأثير فعال على كل من الطور البالغ
واليرقات *

كما تبين أن هذا العقار ليس له تأثير على بيض الديدان التي تم طردها *

EFFICIENCY OF BANMINTH* AGAINST
NEOASCARIS VITULORUM IN BUFFALO-CALVES AND
EXPERIMENTALLY INFESTED MICE.

(With two Figures)

By

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SUMMARY

Anthelmintic efficiency of Banminth was studied on both the larval and adult stages of *N. vitulorum*. Baminth tartrate given to infested mice at a dose of 30 mg./kg. body weight for 3 successive days, showed an excellent activity against the migratory larvae. The efficiency was measured by counting neoscarid larvae recovered from lung tissue and the reduction in the severity of lung lesions. Moreover single dose of 30 mg./ kg. B.W. of the same drug was found to be effective against the adult stage, both the mature and immature worms, infesting buffalo-calves. It had no lethal effect on the eggs of expelled worms.

Neoscaris vitulorum (GOEZE, 1782, TRAVASSOS, 1927) is a helminth of cosmopolitean distribution specially in tropical and sub-tropical countries where it is reported as a serious pathogen of calves. In Egypt, it is commonly met with specially among buffalo-calves of which 70.99% are infested, probably as a result of prenatal infection (Tawfik, 1970).

In an endeavour to find a suitable anthelmintic for controlling this parasite attention was turned to the use of those which affect both the adult and larval stages. Therefore, Banminth was tried as it was said that it had certain effect against the migratory phases of parasites, besides the adult stages. This chemical was synthesized by Pfizer Chemists whose pyranal base was 1-methy 1-1,4,5,6-, tetrahydro 2-[2-(2-(2-thieny 1)] viny 1) pyrinium trans-isomer. Reports had indicated that it was highly effective against large number of gastro-intestinal nematodes of horses, cattle sheep, swine and dogs.

In the present investigation, Baminth was tested against both the migratory larval stage of *N. vitulorum* in mice and against the adult stage in buffalo-calves,

(*) Banminth a product of Pfizer Company

MATERIAL AND METHODS

Efficiency of Baminth Against the Migratory Larval Stage of Neoscaris vitulorum in Mice :

The experiment was conducted on four groups of laboratory bred Albino Swiss mice, each of 10 mice. Each mice was orally infected with 20,000 infective *N. vitulorum* eggs by means of a plastic syringe to its needle a rubber tubing was attached. The infective eggs were prepared by incubating those, collected from the distal portions of uterine tubes of dissected freshly obtained worms, at 26-28°C in petri-dishes containing a shallow layer of 2% potassium dichromate for 2 weeks.

On the 3rd day post-infection, mice of the first three groups received oral doses of Banminth (the tartrate salt prepared as a solution of the drug in water) at a rate of 10, 20 & 30 mg./kg. body weight respectively for 3 successive days. The fourth group was left as a nonmedicated control one. All mice were sacrificed on the fourth day after medication. Five lungs and five liver from each group were removed separately to study any gross pathological lesions present as well as their histopathological changes. Thin tissue slices were fixed in 10% formal-saline and embedded in paraffin wax. Sections of 6 μ were stained with haematoxylin and eosine. The other five pairs of lungs were cut into small slices separately, digested according to the method adopted by LAMINA (1964) and examined to calculate the number of worms present.

Efficiency of Baminth Against the adult Stage of N. Vitulorum infesting Buffalo-Calves :

In studying the effect of the drug at different dosage rates on faecal egg counts, 24 buffalo-calves aged 1-3 month and weighed 32-65 kg. were used. They were harbouring naturally acquired infestation of *N. Vitulorum*. Faecal examinations and egg counts (EPG) were made by the McMaster method after WETZEL (1951) at least for 7 successive days before dosing, as well as 10 days after giving the single dose of Banminth.

The calves were divided into four randomized groups of 6 calves each. Calves of the first three groups received a drench of aqueous solution of Banminth (the tartrate salt) at dosage rate of 10, 20 and 30 mg./kg. body weight respectively. The fourth group was left as a non-medicated control one. No special pre-or post-medical precautions were adopted.

Moreover, for the first six days after treatment, faeces passed by the experimental animals were collected every 24 hours and all the expelled worms were counted. Also, uterine eggs from the expelled worms were collected as well as eggs obtained from slaughtered non-treated control animals and incubated at 26-28°C. In petri -dishes containing 2% potassium dichromate solution for 2 weeks.

RESULTS

Effect of Banminth (at different doses) on the Macro- and Microscopic Lesions Induced by the Migrating N. Vitulorum larvae in mice

In the present study, both the pathological and histopathological reactions of the liver tissues could not be differentiated in between the four groups of mice under investigation. However, those of the lung tissues were highly characteristic for each group.

Group I : Infested mice received 3 successive doses of Banminth at a rate of 10 mg./kg. body weight :

The naked eye appearance of the lungs showed the presence of diffuse petechial spots and confluent ecchymotic areas of small size. Microscopically the lung tissue exhibited, as shown in fig 1, parasitic bronchopneumonia, in the form of epithelial desquamation of the bronchial walls, peribronchial aggregations of eosinophils and mononuclear cells and degeneration of the bronchial arterioles. In addition, the alveolar parenchyma showed large areas of consolidation in which the alveoli were filled with eosinophils and mononuclear cells. In the vicinity of these lesions, the alveoli showed emphysema and atelectasis .

Group II : Infested mice received 3 successive doses of Banminth at a rate of 20 mg./kg. body weight :

The gross pathological lesions of lungs were in the form of few scattered petechial spots over the lung area. The microscopic lesions were lesser than those of group I as shown in fig. II. Some bronchioles showed epithelial desquamation and slight leucocytic infiltration. While the lung parenchyma demonstrated few areas of emphysema and atelectasis.

Group III : Infested mice received 3 successive doses of Banminth at a rate of 30 mg./kg. body body weight :

Macroscopically, most of the lungs were apparently normal, however few petechial spots were seen in two cases. Moreover, the histological sections showed normal picture except for a few scattered leucocytic infiltration in the lung parenchyma.

Group iv : Infested, non-medicated control mice :

The macroscopic appearance of the lung revealed the presence of numerous petechial spots and confluent ecchymotic areas of large size. Typical lesions of parasitic bronchopneumonia were demonstrated in sections of the lung tissue. Inflamed areas involved the bronchi and the surrounding tissues were observed. The bronchial mucosa had been completely destroyed and their lumen were filled with cellular exudate containing eosinophils. Haemorrhage and focal granulomatous pneumonitis were also observed. Areas of emphysema and atelectasis were noticed surrounding these lesions.

Effect of Banminth on the Number of N. vitulorum Larvae Recovered from the Lung of Mice

Table I showed the number of *N. vitulorum* larvae recovered from lungs of infected mice on the fourth day after their treatment with triple doses of Banminth at different dosage rates.

TABLE 1. Number of *N. vitulorum* larvae recovered from lungs of infested mice on the 4th day after their treatment with Banminth

Group	Number of mice	Number of larvae	Mean group value
I. Infested mice received 3 successive doses of Banminth at a rate of 10 mg./kg body weight.	1	3018	2724.4
	2	1912	
	3	4802	
	4	2991	
	5	899	
II. Infested mice received 3 successive doses of Banminth at a rate of 20 mg./kg. body weight	1	151	105.2
	2	96	
	3	101	
	4	142	
	5	36	
III. Infested mice received 3 successive doses of Banminth at a rate of 30 mg./kg. body weight	1	126	77.0
	2	59	
	3	99	
	4	79	
	5	22	
IV. Infested non-medicated control mice.	1	6322	5586.8
	2	4910	
	3	5692	
	4	5101	
	5	5909	

Anthelmintic Efficiency of Banminth Against the Adult Stage of N. vitulorum in Buffalo- Calves

1- *Effect on the faecal egg count* : The effect of treatment with Banminth at different dosage rates on the faecal egg count of naturally infested buffalo-calves is shown in table II. The mean egg counts of the treated calves with Banminth at dose of 30 mg./kg. body weight had rapidly declined after dosing. All calves became negative for *N. vitulorum* after the third day and remained so till the end of the experiment. Within the first 24 hours post-medication, neoscarid worms were passed in the faeces of these calves. However, treatment with Banminth at a dose of 20 mg./kg. body weight resulted in a gradual decrease of the mean egg counts of infested calves which became negative by the 8th day post treatment. Expulsion of worms with faeces began on

TABLE 3. Effect of different doses of Banminth on the faecal egg count of *Neoscaris vitulorum* in buffalocalves.

Days	Mean number of eggs per gram faeces (EPG)			
	10 mg/Kg. B.W.	20 mg./Kg B.W.	30 mg/Kg B.W.	Control
1	9000	12700	10733	16267
2	10033	11867	13100	14000
3	9061	13733	14267	12833
4	10800	14300	13400	15167
5	10500	12233	15033	14333
6	12667	11500	15867	14733
7	13133	13767	16100	15467
8	13500 *	14700*	15233*	16133
9	11967	12333	13667	16300
10	12300	10000	6300	13900
11	12433	7767	00	14133
12	10833	6800	00	14267
13	12867	5133	00	13233
14	11200	4167	00	13000
15	10433	1100	00	14800
16	9400	00	00	12033
17	10067	00	00	8900
18	7567	00	00	10333
19	7133	00	00	10567
20	7600	00	00	10133

* oral administration of Banminth.

the 3rd day after treatment. On the other hand, a dose of 10 mg./ kg. body weight of Banminth had a slight effect on the faecal egg counts of infestee calves and no worms were collected from their faeces. The mean egg counts of the control animals were unaffected and no worms were found in their faeces.

11- *Effect on the number and type of worms passed in the faeces after treatment* : Table III displayed the effect of Banminth at dosage rates of 10, 20 & 30 mg/ kg. body weight on the number of mature or immature worms passed in the faeces of calves.

Of 33 worms passed in the faeces of calves received Banminth at a rate of 20 kg. body weight, 25 worms were intact and showed the characteristic features of ascarid worms while the other 8 worms were partially macerated. However, 30 worms were found to be mature specimens of both sexes and 3 were immature based on criterion of measuring their lengths. On the other hand, 58 mature worms and 25 immature ones were counted in faeces of calves treated with 30 mg / kg. body weight of Banminth. of these worms 19 were degenerated and the remaining were intact. Calves treated with 10 mg / Kg. body weight as well as the untreated animals did not pass any worms during this experiment.

TABLE III. Mean number of worms passed in the faeces of different groups of calves and type of worms.

Dose of Bamminth	Mean number and type of worms passed daily in the faeces of calves following dosing													
	1st day		2nd day		3rd day		4th day		5th day		6th day		Total	
	M.	Im.	M.	Im.	M.	Im.	M.	Im.	M.	Im.	M.	Im.	M.	Im.
10 mg./kg. B.W.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 mg./kg. B.W.	8	0	3	0	11	1	7	2	1	0	0	0	30	3
30 mg./kg. B.W.	18	17	21	2	19	6	0	0	0	0	0	0	58	25
Non-medicated	0	0	0	0	0	0	0	0	0	0	0	0	0	0

M. = mature worms.

Im. = immature worms.

III- *Effect on the development of eggs of expelled worms* :

Eggs, obtained from worms passed with the faeces of treated buffalo-calves as well as from *N. vitulorum* worms collected from slaughtered calves, developed normally and did not show any differences in their embryonation rate being 87-92% in either groups.

DISCUSSION

The present study indicated that Banminth when administered to mice infected with 20,000 *N. vitulorum* ova at dose rates of 20 to 30 mg./Kg. for three successive days showed a great efficacy in the destruction of the migratory larvae. This activity was measured by the reduction of the organic lung lesions and the low number of neoscarid larvae obtained from the lungs of treated mice as compared with those of the non-medicated control ones. However, Banminth was of low effect in similarly infected mice when treated with 10 mg./kg. body weight. Also, the present investigations showed that Banminth tartrate when administered as a single dose of 30 mg/kg. body weight to infested buffalo-calves (without previous fasting) could be considered as an inefficient anthelmintic against both mature and immature worms of *N. vitulorum*. This had been proved by the weekly examination of treated calves for 3 months later without showing eggs in their faeces. The decrease in the daily egg output counts and the negativity of faecal examinations for ten days followed by 3 months were taken as indications for judging the efficiency of the drug.

Banminth proved to have no effect on the development of embryos inside the eggs obtained from the expelled worms after treatment. Therefore, special methods for the disposal of the dung should be adopted, at least three days post treatment. However Schwartz (1922) stated that sunlight is lethal to *N. vitulorum* eggs after one hour exposure. Moreover, ENYENIHI (1969) found that relative humidity below 70% is destructive to the development of eggs after 7 days. In view of these two findings, it is probable that treated animals should be rotated in different stables for at least one week after dosing. Thus eggs voided as a result of treatment would be destroyed within the pre-infective stages of development, hence preventing infestation.

The anthelmintic efficiency of Banminth against both the larval and immature stage, besides the mature ones, of *N. vitulorum* enhanced its value particularly where strict systems of medication were required to reduce the quantity of infective material available to new generations of calves.

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EFFECT OF BANMINTH ON *N. VULCRUM*

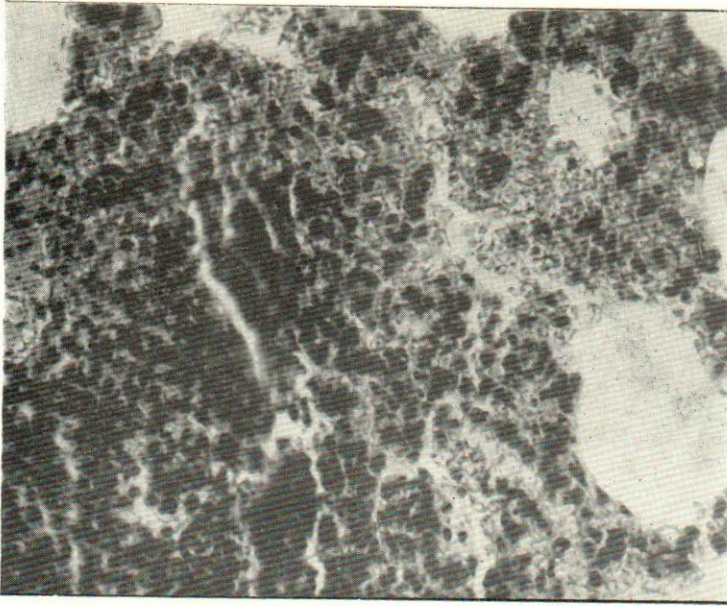


Fig. I— Lung of mice treated with 10 mg./kg. B.W. of Banminth showing heamorrhage and focal aggregation of monounuclear cells and eosinophils filling some of the alveoli.(720 X).

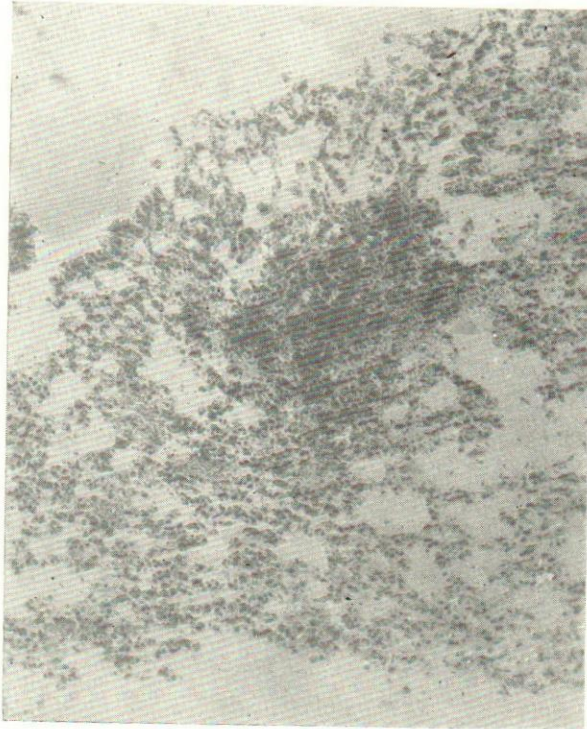


Fig. II— Lung of medicated mice with 20 mg./Kg. B.W. showing reduction in the severity of lesions than the above one. (180 X)

