

Parasitology Laboratory, Department of Veterinary Science
University of Nebraska

Associate Professor George W. Kelley Jr.

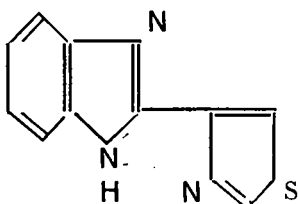
COMPARISON OF THIABENDAZOLE (1) AND METHYRIDINE (2) AS ANTHELMINTICS IN SHEEP

Yılmaz Tiğın*

and

George W. Kelley Jr.**

Thiabendazole is the generic name for 2-(4'-thiazolyl)-benzimidazole 1 with the following structure:



It is a white, odorless, tasteless, fine powder that is relatively insoluble in water (*Brown et al.* 4).

Almost all of the published works on thiabendazole have shown that this drug has a high degree of activity against many species of economically important gastrointestinal roundworms of sheep. Thiabendazole is especially active against worms belonging to the families *Strongylidae*, *Ancylostomidae*, and *Trichostrongylidae*. *Strongyloides* also are highly sensitive to action of thiabendazole. *Ames et al.* (1) found thiabendazole 95 % effective against gastrointestinal worms in sheep when given 60 mg/kg. Mk - 360 in low oral doses of 12.5, 25 or 50 mg/kg eliminated 80, 86 and 98 % of worms, respectively, whereas Phenothiazine in single oral dosages of 500 mg/kg removed 11 % the worms present in these sheep. Similar work showed that the doses of 12.5, 25 or 50 mg/kg MK-360 or Neguvan A (after copper sulfate administration) removed 44, 60 and 94 % and 31, 42, 76 %, respectively.

(1) Thiabendazole is produced by Merc, Sharp, and Dohme Ltd.

(2) Methyridine is a trade mark of Imrerial Chemical Industries, Ltd.

* Dr. Tiğın is an asistant professor on the Veterinary Faculty, Ankara University, Ankara, Turkey.

** Dr. Kelly is Associate Professor, Department of Veterinary Science, University of Nebraska, Lincoln, Nebraska, U. S. A

They also found MK - 360 much more affective than Ruelene. *Anderson et al.* (2) found Thiabendazole at least four times more affective than Phenothiazine. *Bailey et al.* (3) found Thiabendazole more affective than Dylox and Phenothiazine. *Cairns* (5) has made 3 trials to show the Comparative efficiency of Thiabendazole and Phenothiazine. The results of these trials indicated that Thiabendazole is more effective than Phenothiazine. He also found that optimum dose rate was between 40 and 95 mg/kg. No toxic effects had been observed. *Cuckler* (7) used Thiabendazole in sheep, goats, cattle, swine, dogs and chickens, and found the drug very effective in these animals against different roundworms and certain tapeworms as single oral doses of 12, 5, 25 or 50 mg/kg of body weight. With these doses he had removed 80, 85, and 98 % of worms respectively. He also noticed that Thiabendazole was especially effective in removing immature worms as well as adults. *Drudge and Elam* (9) have made two field trials, to understand the efficacies of single oral doses of Thiabendazole at 100 mg/kg, Ruelene at 125 mg/kg, and Phenothiazine at 550 mg/kg. They all were effective (exclusive of Strongyloides) 99.99, 97.6 and 80.3 % respectively. *Moniezia* was not effected by any of these compounds. In a second similar test (exclusive of Strongyloides) they found a reduction in 99.8, 94.2, and 91.9 %. Strongyloides eggs in E. P. G. were 97.5, -18, and 27.3 % respectively. *Gardiner and Craig* (10) found Thiabendazole almost completely effective in eliminating *H. contortus*, *C. ovina*, and immature stages of all species, living in gastro - intestinal tract. The drug was especially active against immature forms of Trichostrongyles, and highly effective against adults of the small abomasal and intestinal worms (*Ostertagia* and *Trichostrongylus*). *Gordon* (11) used a dosage rate of 50 mg/kg Thiabendazole and found it very effective against gastrointestinal roundworms in Australia, except *Trichuris* spp. *Hebden* (14) obtained the same results (11) and also found Thiabendazole more effective than Phenothiazine in sheep in Australia. He used a dosage rate of 50 mg/kg and found that, up to 20 times dosage the drug was not toxic. *Muller* (17) has made a trial on sheep in South Africa, with a dose of 50 mg/kg of Thiabendazole and a reduction in the E. P. G. by more than 98 %, with the exception of *Bunostomum phlebotomum*. The treated animals showed an average gain of 2.4 lb. over the control lambs during the three - week experimental period. *Ross* (19) found Thiabendazole effective against immature gastrointestinal parasites and migrating larvae. It is non - toxic and easy to administer.

Promintic (Methyridine) is 2 - (β - methoxyethyl) pyridine, a colorless, sweet - smelling liquid which possesses high anthelmintic activity against the whole range of intestinal nematodes effecting sheep and cattle. It is presented as a 90 % v/v sterile solution for administration by subcutaneous injection. A temporary odema, which is marked at a dose of 40 ml. or more develops at the site of the injection. This reaction can be minimized if doses in excess of

20 ml. are divided and given at more than one site. (Imperial Chemical Industries, Ltd., Pharmaceuticals Division).

Gracey and Kerr (12) have given 200 mg/kg. Methyridine and found a 9 - fold reduction of eggs comparison with the controls. 8 treated and 6 control lambs have been slaughtered. Average worms count in the control lambs were almost 6,000. It was only 412 in those given Methyridine. *Cooperia*, *H. contortus*, *Bunostomum* were completely eliminated. Treated animals gained 3,1 1/2 Lbs. body weight in a period of 40 days. No toxic effects were observed. One of the 8 treated animals had evidence of abscess formation at the site of inoculation and 3 others had a slight congestion. *Groves* (13) has given Methyridine 200 mg/kg subcutaneously. About one - third of the 50 ewes and 100 lambs which were treated at double of the standard doses (i. e. 375 - 400 mg/kg) showed slight incoordination and stumbling gait 30 to 60 minutes later. Seven of the poorer animals (3 lambs and 4 ewes) went down, and within 4 hours after treatment four of these were dead. Six animals showed slight lameness for up to 4 days, caused by local reactions at the site of the injection. Methyridine is effective against *Ostertagia* and *Trichostrongylus spp.* in the abomasus and *Trichostrongylus*, *Nematodirus* and *Cooperia spp.* in the intestine of cattle. 100 % of *Trichostrongylus axei* were eliminated from the abomasus of sheep. *Macrae* (16) used 200 mg/kg of the drug which produced a pronounced reduction in fecal egg counts in the ewe lambs. Despite the fact that some of lambs did not show a great depreciation in worm egg count, all of the sheep showed weight gain. *Waley* (20), (18) gave 200 mg/kg Methyridine orally or subcutaneously. Orally was slightly more active than subcutaneously. The treatment gave excellent results against the intertinal worms. Less excellent but still useful results were obtained against worms in the abomasum. *Walley* (21) treated sheep and cattle subcutaneously or orally. In both ways he gave the same dose (200 mg/kg). He got almost the same results. (Very effective against gastrointestinal parasites). *Young* (22) treated sheep 2 months after dosing with phenothiazine and buphenium salts. 88 of most affected lambs of the flock were weighed and treated with Methyridine by injection of the drug at the rate of 1 cc. per 10 lb. body weight (200 mg/kg). E. P. G. showed that it decreased Strongyle 77.5 %, and *Nematodirus* eggs 100 %. Two rams which had previously been dosed with phenothiazine, had continued to lose condition. Fecal egg counts showed 3,900 and 200 Strongyles E. P. G., respectively, although both were in a similar advanced clinical state. Each was injected with methyridine at the rate of 1 cc per 10 lb. body weight (200 mg/kg). Fecal egg counts were made 5 days after treatment, and showed worm egg production reduced to 1,000 E. P. G. in the one, and increased to 700 E. P. G. in the other.

M a t e r i a l a n d M e t h o d s

During the summer of 1962 we selected 23 sheep to test newer drugs, Thiabendazole and Methyridine, as anthelmintics. This flock of 23 sheep was divided into three groups. One group received no anthelmintic and left as controls. Each sheep of the second group received 1 gr. Thiabendazole, and the third group was treated with Methyridine 200 mg/kg (1 ml. for each 10 lb. body weight).

We dividet these 23 sheep into three grops as below:

Thiabendazole group	Methyridine group	Control group
5 lambs	5 lambs	4 lambs
3 ewes	3 ewes	3 ewes

We tried to attain aqual E. P. G. in each group for the beginning. Some of these sheep belonged to the University of Nabraska, the others were purchased. The University's sheep were rather better conditioned at the beginning of the trial.

We started to make E. P. G. 24 days before treatment. Differential egg counts and larvae cultures before and after tratment (Table 1a, 2a) indicated that Haemonchus contortus was dominant. Total egg and larvae counts are shown below:

Average number of eggs in each gram of feces of three groups of sheep on differebt treatments

Days after treatment	Thiabendazole (1)	Methyridine (2)	Control
24 days Before	632	671	645
3 days before	1,950	3.444	4.739
On the Day of Treatment	4.339	2.919	7.139
5 Days after Treatment	94	2.041	3.640
10 Days After Treatment	102	810	7.287
20 Days After Treatment	319	888	7.766

Average number of larvae in each gram of feces of three groups of sheep on differert treatments

Days after treatment	Thiabendazole	Methyridine	Control
On the Day of Treatment	3.860	2.356	6.858
5 Days After Treatment	95	1.111	3.290
10 Days After Treatment	116	532	7.205
20 Days After Treatment	282	526	7.042

1 — Thiabendazole was given 1 gm per sheep ranging from 13 to 56 mg/kg body weight.

2 — Methyridine was given as 200 mg/kg body weight.

All eggs were counted by Stoll dilution technique (E. P. G.). When the eggs were counted, larvae were also cultured from the same feces. For this, we got all the feces at the same time and from anus. For larvae culture we got 2 gr. feces, then put them between two gauzes and spread with the help of a spatula. After putting these gauzes in small jars, we added water to get them in a moist condition. Then these jars were put in an incubator. From time to time during the next ten days, these cultures were examined, and we added previously boiled water if it was necessary. At the end of this period (at least 10 days), the cultures were placed in separate Baermann funnels. In most cases the cultures were placed in the Baermann funnels in the morning and the contents of the funnels drawn off the next 24 hours. Then larvae were transferred into 10 cc. tubes. From each tube we counted three times of 1/2 cc. content. One-half cc. content was put on a slide. The larvae were killed by heating. For identification we used mostly Dicmans and Andrew's (8) paper.

TABLE I a.
LARVAE REDUCTION (%) PER GRAM OF FECES

	55 Days After Treatment			10 Days After Treatment			20 Days After Treatment		
	Thia-benda-zole group	Methy-ridine group	Cont-rol group	Thia-benda-zole group	Methy-ridine group	Cont-rol group	Thia-benda-zole group	Methy-ridine group	Cont-rol group
Cooperia spp.	84,27	79,21	-100	86,36	81,45	-100	94,32	89,24	-100
Haemonchus contortus	95,73	52,24	33,97	95,65	58,06	-84,56	85,25	88,51	31,63
Ostertagia spp	88,58	45,75	9,89	98	51,17	-161,58	83,86	62,37	42,56
Oesophagos-tomum spp.	56,76	79,62	-92,44	81,99	75,80	-41,33	91	82,67	-652
Trichostron-gylos spp.	90,31	75,53	67,06	96,04	82,42	23,91	100	94,13	41,99
Strongyloides	100	81,25	88,22	27,50	-529	-83,76	-97,20	-745	-488
Nematodirus spp.	100	67,83	89,59	100	79,32	45,89	100	90,23	42,44
Total Reduc %	97,53	52,82	52,02	94,35	77,41	-5,05	92,69	77,67	-2,68

From each group 3 sheep were slaughtered on the 10 th, 12 th, and 20 th day of the treatment. We removed the gastro-intestinal tracts of the animals, took off the abomasum, opened in a bucket and washed the wall into the same bucket, filled the bucket with water, and left the washing for settling. After a while we collected the settled material. Same technique was used for the small intestines, but during the washing, we scraped the small intestines between the thumb and finger. We put the abomasum and duodenum into the digestion solution. Large intestines and caecum were also opened into bucket, washed thoroughly and screened to examine whipworms and nodular worms. These contents were taken to the laboratory and hot A. F. A. was poured on the m for preservation and fixation. These contents were put in graduated cylinder,

Comparison of Thiabendazole and Methyridine

TABLE 2 a.

EGGS REDUCTION (%) PER GRAM OF FECES

	5 Days after Treatment			10 Days after Treatment			20 Days after Treatment		
	Thiabendazole group	Methyridine group	control group	Thiabendazole group	Methyridine group	Control group	Thiabendazole group	Methyridine group	Control group
Cooperia spp.									
Trichostrongylus spp.	94.38	57.80	21.30	98.75	53.37	12.30	98.61	91.58	19.50
Haemonchus, Oesophagostomum, Ostertagia spp.	97.88	20.97	48.99	97.10	79.71	12.40	94.80	88.26	31.21
Nematodirus spp	100	87.80	83.74	100	82.40	56.92	100	91.21	45.53
Trichuris	-40	71.82	-66.60	70	60.91	-346	90	8.19	13.34
Strongyloides	100	99.43	-85.54	100	99.43	73.84	76.60	49.35	-81.30
Total reduction %	97.79	30.08	49.01	97.33	71.90	-1.91	93.23	69.23	-8.78

1 — Thiabendazole 1 gram per sheep (8 in group)

2 — Methyridine 1 cc per 10 pounds (200 Mg /Kg body weight 8 in group)

3 — Without treatment (7 in group)

water added to 1, 000 cc, and the were taken 3 times 25 cc aliquots to count worms . Large intestines and caecum contents were not made aliquots. all the worms in contents were counted. This counting job was made under a dissecting microscope. These worms were put in 70 % alcohol and then a few drops of glicerine were added. After the alcohol evaporated these worms identified under the microscope. Identified worms are shown on table 1b, 2b, 3b, 4b, 5b

We administered Methyridine, 1 cc for each 10 lb. body weight, (200 mg /kg) subcutaneously. No toxic effect was observed. But when we slaughtered treated animals we saw abscess formation on the site of the injection. We injected methyridine to 8 sheep and 3 of them were slaughtered (10-12-20 days after treatment).

Total worms from the abomasum, small intestine, and large intestines are shown on table 1b, 2b, 3b, 4b, 5b

Egg and larvae counts (table 1a, 2a) showed that Metyridine is effective 20. 97 - 99.43 % against gastro - intestinal parasites. Twenty days after the treatment a reduction in *Haemonchus*, *Cooperia*, and *Trichostrongylus spp.* egg counts were found as 88.26, 91.58, 91.58 % respectively. Total egg count reduction was found 69.23 %.

We conducted two trials with Thiabendazole. One of them was comparative treatment with Methyridine, and other only Thiabendazole treatment. At the first treatment we gave 1 gram Thiabendazole to each sheep (13-66 mg/kg body weight, depending on the sheep's body weight). Egg count shows us that it is effective against gastro-intestinal parasites of sheep at the rate of 94.38 to 100 % five days after the treatment with the exception of Trichuris. This efficacy is shown on tables 1a and 2a. 10-12-20 days after the treatment three of the treated sheep were slaughtered. The total worms are shown on tables 1b, 2b, 3b, 4b

Average number of worms recovered from the abomasum, based on necropsy of three sheep from each group

Treatment	Average Number of Worms
Thiabendazole	874
Methyridine	1.991
Control	4.838

Average number of worms recovered from small intestines based on necropsy

Treatment	Average Number of Worms
Thiabendazole	22
Methyridine	78
Control	430

Average number of worms recovered from large intestines and cecums, — based on necropsy

Treatment	Average Number of Worms
Thiabendazole	14
Methyridine	40
Control	24

Table 1b. Number of worms recovered from abomasums, based on necropsy

	Thiabendazole group*	Methyridine group*	Control group*
Haemonchus Contortus	2586	5815	14039
Ostertagia circumcincta	12	120	266
Trichostrongylus axei	26	40	119
Total	2624	5975	14514
Average	874.61	1991.6	4838

* Each group three sheep.

Comparison of Thiabendazole and Methyridine

Table 2b. Number of worms recovered from small intestines, based on necropsy

	Thiabendazole group	Methyridine group	Control group
Trichostrongylus colubriformis	53	151	320
Haemonchus contortus	—	11	26
Nematodirus spathiger	—	46	760
Cooperia curticei	13	13	159
Strongyloides papillosus	—	—	26
Unidentified larva	—	13	—
Total	66	234	1291
Average	22	78	430.3

Table 3b Number of worms recovered from large intestines and cecums based on necropsy

	Thiabendazole group	Methyridine group	Control group
Oesophagostomum columbianum	7	30	14
Trichuris ovis	6	8	9
Haemonchus contortus	1	2	1
Total	14	40	24
Average	4.66	13.33	8

Table 4 b. Number of worms recovered from abomasum after digested

	Thdiabenazole group	Methyridine group	Control group
Haemenchus contortus	—	42	49
Ostertagia circumcincta	4	3	1
Trichostrongylus axei	—	2	—
Total	4	97	50
Average	1.3	15.66	16.6

Table 5 b. Number of worms recovered from small intestine (first 12 feet) after digested

	Thiabendazole group	Methyridine group	Control group
Nematodirus spathiger	—	—	1
Haemonchus contortus	—	—	1
Total	—	—	2
Average	—	—	0.6

At the second trial we used 2 grams Thiabendazole for each sheep (56-71 mg/kg). We found the drug 97 - 100 % effective against gastro - intestinal parasites of sheep. (Table 1c, 2c.) we killed these sheep 12 and 27 days after the treatment, and collected the worms from the abomasums, small and large intestines. The total worms recovered are shown on tables 1d, 2d, 3d, These trials showed us that Thiabendazole is more effective than Methyridine. (Tables 1a, 2a).

Second trial :Thiabendazole was given as 2 gram per sheep ranging 56 to 71 mg/kg body wt.

Eggs per gram of feces of two groups of sheep

Days after Treatment	Thiabendazole	Control
2 Days Before Treatment	2,114	553
On the Day of Treatment	3,949	276
7 Days After Treatment	126	1,060
9 Days After Treatment	79	461
12 Days After Treatment	86	346
27 Days After Treatment	325	399

Average number of larvea per gram of feces of two groups of sheep

Days after Treatment	Thiabendazole	Control
On the Day of Treatment	3,575	265
7 Days After Treatment	103	1,061
9 Days After Treatment	58	470
12 Days After Treatment	62	367
27 Days After Treatment	320	407

Comparison of Thiabendazole and Methyridine

Average number of worms recovered from the abomasum, based on necropsy of 4 sheep on Thiabendazole group, 3 sheep control Group

Treatment	Average Number of Worms
Thiabendazole	30
Control	43

Average number of worms recovered from small intestins, based on necropsy

Treatment	Average Number of Worms
Thiabendazole	68
Control	238

Average number of worms recovered from large intestins and cecums, based on necropsy.

Treatment	Average Number of Worms
Thiabendazole	6
Control	57

Table 1d. Total worms recovered from abomasums after necropsy

	Thiabendazole* group	Control** group
Haemonchus contortus	106	77
Ostertagia circumcincta	5	14
Trichostrongylus axei	7	36
	118	127
Average	29,5	42,5

* Thiabendazole group was 4 sheep and 2 grams were given to each ranging from 56 to 71 mg/kg body weight.

** Control group was 3 sheep.

Table 2 d. Number of worms recovered from small intestines after necropsy

	Thiabendazole group	Control group
Trichostrongylus colubriformis	159	354
Nematodirus spathiger	89	23
Cooperia curticii	16	262
Haemonchus contortus	—	2
Strongyloides papillosus	—	38
Unidentified larvae	7	35
Total	271	714
Average	67.7	238

Table 3 d. Number of worms recovered from large intestines and caecums

	Thiabendazole group	Control group
Oesophagostomum columbianum	7	170
Trichuris ovis	15	—
Chabertia ovina	—	1
Total	22	171
Average	5.5	57

TABLE I c.

EGG REDUCTION (%) PER GRAM OF FECES

	7 days after treatment		9 days after treatment		12 days after treatment		27 days after treatment	
	Thiabendazole group	Control group	Thiabendazole group	Control group	Thiabendazole group	Control group	Thiabendazole group	Control group
Cooperia Trichostrongylus spp	95.21	-55.55	96.36	11.12	98.96	66.66	89.25	-100
Haemonchus Ostertagia Oesophagostomum	96.01	-52	98.14	-92	97.69	60	92.17	-140.80
Bunostomum	100	—	100	—	100	—	100	—
Nematodirus	100	—	100	—	100	—	38.47	-100
Trichuris	53.85	—	30.77	—	57.15	—	-185	—
Strongyloides	34.29	-502.81	99.60	49.71	9.60	-105	97.84	45.78
Total	96.81	-284.05	98.02	-66.88	97.84	-25.36	91.78	-44.56

* Group was 4 sheep and was given 2 grams Thiabendazole to each sheep

** Group was 3 sheep.

Comparison of Thiabendazole and Methyridine

TABLE 2 c.
LARVAE REDUCTION (%) PER GRAM OF FECES

	7 days treatment		9 days after treatment		12 days after treatment		27 days after treatment	
	Thia-benda-zole group	Cont-rol group	Thia-benda-zole group	Cont-rol group	Thia-benda-zole group	Cont-rol group	Thia-benda-zole group	Cont-rol group
Cooperia spp	63.34	-6.66	94.45	-24	96.12	-13.33	63.89	-186
Haemonchus contertagia spp.	97.65	-37.33	98.24	-89.95	98.10	59.66	91.92	-104
Ostertagia spp	94.64	-100	98.38	-86.66	99.19	-16.60	95.13	-116
Oesophagostomum spp.	83.08	-100	100	-92.50	100	-50	-61.53	-275
Trichostrongylus spp.	78.80	-116	94	-16.6	97.20	58.39	74	-58.3
Strongyloides	93.43	-629	100	72.53	99.86	-144.2	96.60	34.34
Nematodirus spp.	100	—	100	—	100	—	42.50	-100
Total	97.14	-300	98.38	-77.09	98.28	-38.30	91.04	-53.39

Results And Discussion

According to our experiments we found Thiabendazole (1 gram per sheep ranging 13 to 56 mg/kg body weight) more effective against gastro-intestinal worms of sheep than Methyridine (200 mg/kg). Larvae counts showed that 5 days after the treatment, total larvee reduction percentages were: in Thiabendazole, Methyridine, and control groups, 97.53; 52.82; and 52.02; 20 days after the treatment, 92.69; 77.67; -2.68 respectively. (Table 1a.)

At the same trial, egg counts showed that 5 days after the treatment egg reduction in each gram of feces were: Thiabendazole, Methyridine, and control groups 97.79; 30.08; and 49.01; and twenty days after the treatment 93.73; 69.23; and -8.78 respectively (Table 2a).

At thesecond trial we gave 2 grams Thiabendazole to each sheep (56-71 mg/kg body weight), and obtained better results than 1 gram Thiabendazole given for per sheep. Percent of larvae reduction 7 days after the treatment in Thiaben dazole and control groups were: 97.14 and -300%, and 27 days after the treatment 91.04 and -53.39% respectively. on the egg counts the results were similar. 5 days after the treatment egg reduction in each gram of feces were: in Thiahendazole and control groups 98.81,

and - 284.05 % and 27 days after the treatment 91.78 and - 44.56 % respectively (Table 1c, 2c)

Summary

The newer anthelmintics, *Thiabendazole* and *Methyridine* were studied in the field trials in Lincoln, Nebraska. These trials showed that *Thiabendazole* as a single oral dose is more affective than *Methyridine* against gastro - intestinal parasites of sheep except *Trichuris* and *Moniezia*. At the first trial we used 1 gram *Thiabendazole* per sheep in one group (13 - 56 mg/kg body weight) and 200 mg/kg body weight *Methyridine* in the other. 1 gram *Thiabendazole* in sheep was found to be 92.69 % effective against gastro-intestinal parasites while in the second group *Methyridine* was 77.67 % effective. At the second trial, sheep were treated with 2 grams *Thiabendazole* (56-71 mg/kg body weight). The drug was found to be 97.14 % effective against gastro - intestinal parasites in 7 days and 91.78 % in 27 days

Ö z e t

Anthelmentiklerden Thiabendazole ve Methyridine'nin Mukayesesi

Yeni antelmentiklerden olan *Thiabendazole* ve *Methyridine*, Amerikada Nebraska eyaletinin Lincoln şehri Veterinary Departman'ı tecrübe koyunlarında denenmiştir. Bu denemeler *Trichuris* ve *Moniezia*'lar hariç, diğer mide - barsak parazitlerine karşı *Thiabendazole*'un bir defalık oral dozunun *Methyridine*'den daha tesirli olduğunu göstermiştir.

Birinci denemede 23 koyun 3 gruba ayrılmış, birinci gruptaki her koyun 1 gram *Thiabendazole* (her canlı kilo ağırlığı 13 - 56 mgr. olmak üzere), ikinci gruptaki koyunlar (her kilo canlı ağırlığa 200 mgr. olmak üzere) *Methyridine* ile tedavi edilmişler. Üçüncü gurubtaki koyunlar ise kontrol olarak bırakılmışlardır. 20 gün sonra yapılan larva sayımlarına göre 1 gram *Thiabendazole* verilen koyunlarda ilacın mide - barsak nematodlarına karşı etkisi % 92, 62, *Methyridine*'in ise % 77, 67 oranında bulunmuştur. İkinci denememizde 7 koyun iki guruba ayrılmış, birinci gurupta bulunan 4 koyun 2 gram *Thiabendazole* (1 kilo canlı ağırlığa 56 - 71 mgr. olmak üzere) ile tedavi edilmiş, ikinci gurupta bulunan üç koyun kontrol olarak bırakılmıştır. İlâç verildikten 7 gün sonra iki gram *Thiabendazole*'un mide - barsak nematodlarına karşı % 97, 14 ve 27 gün sonra ise % 91, 78 oranında etkidığı anlaşılmıştır.

References

- 1 — Ames, E. R., et al.: "*Thiabendazole*" (Mk - 360)". Merck, Sharp, and Dohme Research Laboratories. Confidential. Unpublished Data. (Jan., 1961)

- 2 — **Anderson, G. O., et al.:** "*The comparative anthelmintic efficacy of thiabendazole and phenothiazine for lambs.*" Mtg. Est. Sect. Soc Animal Prod.; Pennsylvania State University. Aug. 22 - 23, 1961. 811). Merk, Sharp, and Dohme Research Lab. Vet. Abs. Vol. 2, 1216. (1961).
- 3 — **Bailey, W. S., et al.:** "*Observations on the use of Thiabendazole in sheep and cattle.*" J. Parasitol. 47 (suppl. 40, 41, (Aug. 1961).
- 4 — **Brown, H. D., et al.:** "*Antiparasitic drugs. IV. 2 - (4 - thiazolyl) - benzimidazole. A new anthelmintic*" J. Am. Chem. Soc. 83: 1769, (April, 1961).
- 5 — **Cairns, G. C.:** "*The efficiency of thiabendazole (MK - 360) as an anthelmintic in sheep.*" New Zealand. Vet. J. 9: 147 - 152. (1961).
- 6 — **Campbell, W. C., et al.:** "*The anthelmintic activity of MK - 360*" Merk, Sharp, and Dohme. Res. Lab. Confidential. Unpublished data. (Sept. 7, 1960).
- 7 — **Cuckler, A. C.:** "*Thiabendazole, a new broad spectrum anthelmintic.*" J. Parasitol. 47 (Suppl): 36 - 37, (August, 1961).
- 8 — **Dikmans, G., and Andrews J. S.:** "*A comparative Morphological Study of the Infective Larvae of the Common Nematodes Parasitic in the Alimentary Tract of Sheep.*" Amer. Micros. Soc. Trans, Lii pp. 1 - 25. (1933).
- 9 — **Drudge, J. H., and Elam, G.:** "*Comparison of Thiabendazole, Ruelene, and Phenothiazine for Anthelmintic Activity in sheep.*" J. Parasitol. 47 (suppl) 39 - 40. (Aug. 1961).
- 10 — **Gardiner, M. R., and Craig, J.:** "*Drugs for worm control. I. sheep drenching trials with MK - 360.*" The J. of Agr. of Western Australia. Vol. 2, No. 9 (Sept. 1961).
- 11 — **Gordon, H. Mcl.:** "*Thiabendazole: A highly effective anthelmintic for sheep.*" Nature, Vol. 191, No. 4796, 1409 - 1410. (1961).
- 12 — **Gracey, J. F.: and Kerr, J. A. M.:** "*Some observation on the action of methyridine in lambs.*" Vet. Rec. 73: 171-172. (Feb. 25, 1961).
- 13 — **Groves, T. W.:** "*A summary of anthelmintic and toxicity results from field trials with metyridine*" . Vet. Rec. 73: 196 - 201. (March 9, 1961).
- 14 — **Hebden, S. P.:** "*The anthelmintic activity of MK - 360.*" Australian Vet. J. 37: 264 - 269, (July. 1961).
- 15 — **Kates, K. C. and Shorb, D. A.:** "*Identification of Eggs of Nematodes Parasitic in Domestic Sheep.*" Am. J. Vet. Res. Vol. IV. No. 10. 54 - 60. (January, 1943).
- 16 — **Macrae, R. R.:** "*A clinical evaluation of methyridine in Vetererinary practise.*" Vet. Rec. 73: 193 - 196. (March 9, 1961).

- 17 — Müller, G. L.: "*Field trials on Thiabendazole (MK - 360) as an anthelmintic for sheep; with a note on the assessment of diagnostic methods*". J. S. Agr. Vet. Ass. XXXII: 175 - 180, (1961).
- 18 — Oytun, H. Ş.: *Genel Parazitoloji ve Helmintoloji*. Üçüncü tab'ı Ege Matbaası, Ankara. (1961.)
- 19 — Ross, D. B.: "*The influence of thiabendazole, a new anthelmintic, on weight gain in lambs*". Vet. Rec. 73: 1455. (Dec. 23, 1961).
- 20 — Walley, J. K.: "*Promintic - a new anthelmintic for sheep and cattle*". Vet. Rec. 73: 20 (Jan., 1961).
- 21 — Walley, J. K.: "*Methyridine - a new anthelmintic for sheep and cattle*". Vet. Rec. 73: 159 - 168. (Feb. 25, 1961).
- 22 — Young, J.: "*Observation on the use of methyridine as an anthelmintic in practice*". Vet. Rec. 73: 192 - 193. (March 4, 1961).