

ABCD

Rabon® 7.76 Oral Larvicide Premix

To prevent the development of Horn Flies, Face Flies, House Flies and Stable Flies in the manure of treated cattle; House Flies in the manure of treated swine, House Flies and Stable Flies in the manure of treated horses and House Flies in the manure of treated mink.

Active Ingredient	By Weight
Tetrachlorvinphos: (CAS #22248-79-9)	7.76%*
Other Ingredients	92.24%**
Total	100.00%

* RABON Insecticide – Contains 35 grams of RABON per pound.

**Refers only to ingredients which are not larvicidal.

Keep Out of Reach of Children

CAUTION

See side panel for additional precautionary statements.

Net Weight 40 Pounds

KMG-Bernuth, Inc.
Houston, TX. 77036

EPA Reg. No. 61483-48
EPA Est. No. 4691-KS-01

PRECAUTIONARY STATEMENTS Hazards to Humans and Domestic Animals

CAUTION

Harmful if swallowed or absorbed through the skin. Causes moderate eye irritation. Avoid contact with eyes, skin or clothing. Prolonged or frequently repeated skin contact may cause allergic reaction in some individuals.

Personal Protective Equipment

Mixers and Handlers must wear:

- long-sleeved shirt and pants
- shoes and socks
- chemical resistant gloves

User Safety Requirements

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

User Safety Recommendations

Users should wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

Users should remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

Users should remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

FIRST AID

If swallowed	<ul style="list-style-type: none"> • Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by a poison control center or doctor. • Do not give anything by mouth to an unconscious person.
If on skin or clothing	<ul style="list-style-type: none"> • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.
If in eyes	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
HOT LINE NUMBER Contains an organophosphate that inhibits cholinesterase.	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-821-7467 for emergency medical treatment information.	
NOTE TO PHYSICIANS	
This product is a cholinesterase inhibitor. If symptoms of cholinesterase inhibition are present, atropine sulfate by injection is antidotal. 2-PAM is also antidotal and may be administered, but only in conjunction with atropine.	

Environmental Hazards

This pesticide is toxic to fish. Do not contaminate water when disposing of equipment wash water.

Warranty and Limitation of Damages

Seller warrants that this material conforms to its chemical description and is reasonably fit for the purposes stated on the label when used in accordance with directions under normal conditions of use and Buyer assumes the risk of any use contrary to such directions. **Seller makes no other express or implied warranty, including any other express or implied warranty of Fitness or of Merchantability, and no agent of Seller is authorized to do so except in writing and with specific reference to this warranty.** In no event shall Seller's liability for any breach of warranty exceed the purchase price of the material as to which a claim is made.

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Storage & Disposal

Do not contaminate water, food or feed by storage or disposal.

Storage: Store in a dry place in original container.

Disposal: Completely empty bag into mixing equipment. Then dispose of empty bag in a sanitary landfill or by incineration or if allowed by State and local authorities by burning. If burned, stay out of smoke. Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

General Information

To prevent the development of horn flies, face flies, house flies, and stable flies in the manure of treated cattle; house flies in the manure of treated swine; house flies and stable flies in the manure of treated horses; and house flies in the manure of treated mink.

Rations containing this product may be fed up to slaughter and to lactating dairy cows without withholding the milk from market during or after treatment.

Start feeding RABON larvicidal feeds early in the spring before flies begin to appear and continue feeding throughout the summer and into the fall until cold weather restricts fly activity.

When fed, this product passes through the digestive system into the animal's manure where it kills fly larvae on contact shortly after fly eggs hatch.

It prevents the development of fly larvae in the manure of treated animals, but is not effective against existing adult flies.

In some cases, supplemental fly control measures may be needed in and around cattle lots and barns to control adult house flies and stable flies which can breed not only in manure but in other decaying vegetable matter or silage on the premises.

In order to achieve optimum fly control, this product should be used in conjunction with other good management and sanitation practices.

This product will mix uniformly in feeds when standard mixing procedures are followed. Thus, usual problems that are common to all feed preparation and which cause stratification, such as excessive free-fall or excessive handling, are to be avoided. It is recommended that appropriate preblending techniques be employed to assure adequate distribution throughout the feed mix. The premix should be preblended with ground grain, protein supplements, mineral mixes, etc. before being added to roughages such as chopped hay or silage. Mixing time should be adequate to assure uniform dispersion. Optimum performance can be assured only if this product is dispersed uniformly with the feedstuff at the recommended level. Common feed mixing equipment (i.e. vertical mixer, horizontal blender, mixer/feed truck) may be used to prepare formulated feeds.

General Precautions and Restrictions

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. Feeds prepared with this product should not be pelleted nor be mixed with feeds containing predominantly pellets. Further, this product should not be mixed in liquid feed supplements.

Application Instructions

This product may be fed to cows, swine, and mink up to slaughter and to lactating cows.

Cattle

In a Concentrate Feed – Roughage Fed Separately

This product can be used to prepare concentrate feeds that will provide 70 mg of RABON per 100 pounds of body weight daily.

To prepare a larvicidal concentrate feed, mix this product according to the amount of concentrate to be fed per animal per day. Use the following table as a guide for determining the proper mixing rate.

Pounds of Concentrate Consumed per Animal per Day	MIXING GUIDE		Pounds of RABON 7.76 Oral Larvicide Premix per Ton of Concentrate
	RABON in the Concentrate mg/lb	%	
0.5	1584	0.35	90.0
1.0	792	0.18	45.0
1.5	528	0.12	30.0
2.0	396	0.087	22.5
5.0	159	0.035	9.0
10.0	79	0.018	4.5
15.0	53	0.012	3.0
20.0	39	0.0087	2.3
25.0	32	0.0069	1.8
30.0	26	0.0059	1.5

Feed the appropriate larvicidal concentrate indicated to cattle weighing between 400 and 1200 pounds. For larger cattle weighing between 1200 and 1700 pounds, increase the amount of premix per ton of concentrate to 1 ½ times that indicated.

Cattle

In a Complete Ration – No Other Roughage Fed

This product can be used to prepare rations that contain 26.4 mg of RABON per pound of complete ration.

To prepare a larvicidal ration, mix 1.5 pounds of this product per ton of complete mixed ration containing both grain and roughage.

Full-feed this larvicidal complete ration to feeder cattle weighing from 400 to 1400 pounds or to dairy cattle at a rate to sustain milk production, but not less than 2.6 pounds of the ration per 100 pounds of body weight daily.

Swine

All swine should be treated.

Pigs (weaners to market weight): Mix 1.3 pounds of this product per ton of meal type feed and offer free choice. This is equivalent to 22.7 mg of RABON per pound of feed.

Sows, Boars and Breeding Gilts: Mix 2.6 pounds of this product per ton of meal-type feed and offer 4 to 6 pounds of feed per animal per day. This is equivalent to 45.4 mg of RABON per pound of feed.

Horses

In a Concentrate Feed

This product can be used to prepare concentrate feeds that will provide 70 mg of RABON per 100 pounds of body weight daily. All horses in the stable area should be treated. This product is not to be used on horses destined for slaughter.

To prepare a larvicide concentrate feed, mix this product according to the amount of concentrate to be fed per animal per day. Use the following table as a guide for determining the proper mixing rate.

Pounds of Concentrate Consumed per Horse Per Day	MIXING GUIDE			
	Pounds of RABON 7.76 Oral Larvicide Premix Per Ton of Concentrate			
	250 lb. Horse	500 lb. Horse	1000 lb. Horse	2000 lb. Horse
2.5	4.0	8.0	16.0	32.0
5.0	2.0	4.0	8.0	16.0
10.0	1.0	2.0	4.0	8.0
15.0	0.7	1.4	2.7	5.4

As a Topdressing

Add this product daily to the grain or concentrate portion of the horse's diet to provide 70 mg of RABON per 100 pounds of body weight. This is equivalent to the following: ½ tablespoon for a 250 lb. animal; 1 level tablespoon for a 500 lb. animal; 2 level tablespoons (8.8 g) for a 1000 lb. animal or 4 tablespoons for a 2000 lb. animal.

All horses in the stable area should be treated. This product is not to be used on horses destined for slaughter.

Mink

When fed to mink, RABON passes through the digestive system into the droppings where fly larvae are killed on contact shortly after the fly eggs hatch. This product can be mixed in mink feeds to prevent the development of house flies but should not be used as the sole method of control. It is recommended that appropriate preblending techniques be employed when mixing to assure an adequate distribution of RABON throughout the feed mix.

Preblend with soybean meal, alfalfa meal, mineral mix, etc. before being added to other ingredients. Common feed mixing equipment (i.e.: vertical mixers, horizontal blenders) may be used to prepare formulated feeds.

Add this product to the total feed at a rate that will ensure that each animal will consume 3 mg of RABON per kg of body weight (1-2 mg/pound) per day. Use the following table as a guide.

Food Consumption (lbs.) Daily Per Animal	MIXING GUIDE FOR MINK		
	Amount of RABON 7.76 to Mix in Food		
	500 lb.	1000 lb.	2000 lb.
0.10	318 grams	1.4 lbs.	2.8 lbs.
0.25	114 grams	227 grams	1.0 lbs.
0.33	90 grams	180 grams	360 grams
0.50	59 grams	118 grams	236 grams
0.75	40 grams	80 grams	160 grams
1.00	35 grams	70 grams	140 grams

Start feeding Mink larvicidal feeds early in the spring before flies begin to appear and continue feeding throughout the summer until cold weather restricts fly activity. Supplemental adult fly control measures may be needed in and around the animal facilities and feed building to control adult flies, especially house flies that can breed in many kinds of organic matter.

In order to achieve optimum fly control this product should be used in conjunction with other good management and sanitation practices.

Rabon[®] Oral Larvicide Technical Bulletin

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INTRODUCTION

RABON[®] Oral Larvicide Manufacturing Base (designated hereafter as RABON Oral Larvicide or ROL) is intended only for formulation into an insecticide/larvicide for the following: (1) uses as a feed additive in the feeds for cattle (beef & dairy, including lactating), swine, horses and mink to prevent the development of fecal flies; (2) uses for which EPA has accepted the required data and/or citations of data that the formulator has submitted in support of registration; and (3) uses for experimental purposes that are in compliance with US EPA requirements. Formulators using this product are responsible for obtaining EPA registration of their formulated product if such registration is required.

RABON Oral Larvicide is a low toxicity vinyl organophosphate compound designed to prevent the development of fly larvae in the manure of treated cattle. When used as directed it will aid in the control of horn flies (*Haematobia irritans*), face flies (*Musca autumnalis*), house flies (*Musca domestica*), and stable flies (*Stomoxys calcitrans*) which breed in manure. ROL can be used in the manufacture of complete feeds, concentrates, protein supplements, mineral supplements, and liquid feed supplements provided recommended guidelines are followed. ROL rations may be fed to breeding cattle, lactating dairy cattle, or growing-finishing cattle, either in dry lot or on pasture.

RABON Oral Larvicide is registered with the U.S. Environmental Protection Agency as a pesticide and is approved as a feed additive for cattle, horses, swine and mink. Refer to the Code of Federal Regulations; 40 CFR 186.950. It permits RABON use in the feed of beef and dairy cattle and horses at the rate of 0.07 grams, or in the feed of swine at the rate of 0.05 grams, per 100 pounds of body weight per day. EPA has also registered ROL for use in mink feed for fecal fly control at the rate of 3 mg/kg of body weight per day. Residue tolerances are established from oral and/or dermal applications (See 40 CFR 180.252) at 1.5 ppm in the fat of cattle and hogs, 0.5 ppm in fat of horses and at 0.5 ppm in milk fat. There is no withdrawal time required for slaughter of cattle and swine, and no milk withdrawal for lactating dairy cattle.

Numerous studies have been conducted to assure the efficacy and safety of RABON Oral Larvicide. It has also been tested in toxicology, residue and environmental fate studies for safety to man and the environment. This bulletin presents a technical overview of RABON Oral Larvicide. Additional information is available from Boehringer Ingelheim Vetmedica, Inc.

MODE OF ACTION

The active ingredient in RABON Oral Larvicide is Tetrachlorvinphos (designated hereafter as TCVP), an organophosphate, which acts by contact and has moderate persistence. TCVP is particularly active against the larvae of lepidopterous (butterflies and moths) and dipterous (flies, gnats and mosquitoes) pests and is effective against certain coleoptera (beetles) when applied directly on the pest.

Controlled laboratory and field studies have been conducted throughout the United States over several years. ROL is presently restricted to use in cattle, swine, horses, and mink.

When fed to animals, ROL passes through the digestive tract, and reaches the feces in sufficient concentration to kill fly larvae. Minimal amounts are absorbed and it does not appear in the meat or milk of cattle above established residue tolerances.

Manure becomes larvicidal approximately two days after the cattle have begun consuming ROL and will remain larvicidal three days after consumption stops. In addition, it has been shown that ROL will survive long enough in aging manure to control fly larval development until the manure pat becomes naturally uninhabitable to fly larvae. Manure pats may remain lethal after six weeks of aging under optimal conditions. Although lethal to fly larvae, ROL does not interfere with beneficial insects that aid in the breakdown of manure.

PRODUCT DESCRIPTION

Name: RABON® Oral Larvicide Manufacturing Base –
EPA Registration Number 61483-49

Active ingredient: 97.3% RABON by weight

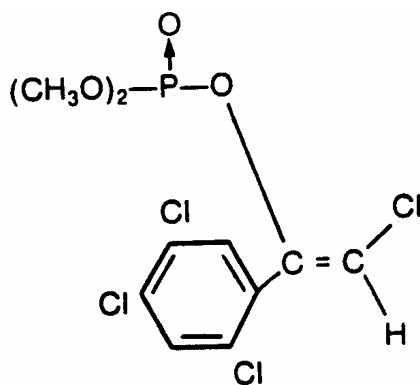
Chemical Common Name: Tetrachlorvinphos

Generic Name: 2-chloro-1-(2,4,5-trichlorophenyl) vinyl dimethyl phosphate

Trade Name: RABON (previous SD8447, STIROFOS®, GARDONA®)

Chemical Class: Organophosphate

Structural formula:



CAS Registry Number: 22248-79-9

Empirical formula: C₁₀H₉Cl₄O₄P

Molecular weight: 365.98

Appearance: Uniform, off-white granules

Bulk density: 50-55 lb/cu. ft.

Odor: Mild, musty

Packaging: 160 lb. polyethylene-lined fiber drum

Stability and shelf life: May be stored at least two years under normal use conditions in the unopened, undamaged original container.

RABON ORAL LARVICIDE FLY CONTROL PROGRAM - CATTLE, SWINE AND HORSES

RABON Oral Larvicide prevents the development of horn flies, face flies, house flies, and stable flies in the manure of treated animals but does not affect existing adult flies. Since flies tend to migrate and can breed in areas other than manure, the use of a feed additive larvicide should be considered as only a part of the total fly control program. Periodic spraying of buildings and/or animals with other insecticides may be necessary in order to control invading adult flies.

Start feeding ROL early in the spring before flies begin to appear and continue feeding throughout the summer and into fall until cold weather restricts fly activity. The proper feeding period will vary with climate and should be determined by the emergence date of flies in previous years for your area.

In order to achieve optimum fly control, ROL should be used in conjunction with other good management and sanitation practices. All potential fly breeding material such as manure, old hay, and silage which contains overwintering fly pupae should be removed from the premises. Manure should not be allowed to accumulate around barns, fences, or under feed bunks during the fly breeding season. If adult flies are already present when a feeding program is initiated, it is desirable to use other control measures to reduce the population of existing adult flies.

In some cases, supplemental fly control measures may be needed in and around dry lots, calf pens, and barns to control adult house flies and stable flies which can breed not only in livestock manure but in other decaying vegetable matter or silage on the premises.

TOXICOLOGY IN LABORATORY ANIMALS

ACUTE ORAL TOXICITY - The acute oral toxicity of TCVP was evaluated in rats. The LD₅₀ value was found to be 995 mg/kg.

ACUTE DERMAL TOXICITY - The acute dermal toxicity of TCVP was evaluated in albino rabbits. The LD₅₀ value of TCVP was found to be greater than 2000 mg/kg when administered once to the shaved, intact skin of male and female albino rabbits.

ACUTE INHALATION TOXICITY - Male and female rats were exposed to air saturated with vapors of TCVP during a one-hour period. No deaths and no adverse effects were noted during this period or during the following three-week holding period. The animals were then sacrificed and examined for gross pathological and histopathological effects. None were noted.

Similarly, guinea pigs exposed in inhalation chambers to a 10% TCVP emulsion at a concentration of 1810 µg/liter/minute showed no clinical signs of intoxication either during the one-hour exposure period, the 14-day observation period, or at the subsequent necropsy.

ACUTE INTRAPERITONEAL TOXICITY - The acute intraperitoneal LD₅₀ of TCVP in aqueous suspension is greater than 5000 mg/kg in guinea pigs.

SUBACUTE TOXICITY - A two-week range finding study was carried out with rats fed dietary levels of 15, 45, 135, 400, 1200, 3600 and 10,800 ppm TCVP. Weight gain was depressed in males at the highest level only and in females at 3600 and 10,800-ppm levels. No gross pathological changes were observed in those animals from the 3600 and 10,800-ppm groups sacrificed at the end of the two-week exposure period.

In a three-month feeding study, TCVP was fed to rats at dietary concentrations of 0, 12.6, 50, 200, 800, and 3160 ppm. Health was not affected at any level. A slight depression in growth rate was evident in females only at 800 and 3160 ppm. However, these changes were accompanied by decreased food consumption and might well have been due to changes in palatability of food rather than direct effect of the compound itself. At autopsy no pathological lesions associated with exposure were found.

In a three-month feeding study, beagle dogs received dietary concentrations of 0, 50, 200, 800 and 3200 ppm TCVP. At dietary intakes of 800 ppm and below, all animals remained in good health throughout the experiment. Male animals exposed to 3200 ppm showed a loss of condition that was not accompanied by any significant weight loss. Hematological tests showed the only adverse effect was a slight anemia in male dogs receiving 3200 ppm in their diet. No effects were noted on erythrocyte or brain cholinesterase activity at any level of intake. Plasma cholinesterase activity was depressed at the two higher levels of intake only.

CHRONIC TOXICITY/CARCINOGENICITY - A 104-week dietary combined chronic toxicity/carcinogenicity study was performed in rats dosed with TCVP at concentrations of 100, 1000, or 2000 ppm. There were no treatment-related ophthalmoscopy findings, hematology findings, necropsy findings, histology findings, neoplastic findings, clinical signs, or deaths observed at any dose level.

A one year oral toxicity study was performed in dogs with TCVP at dosage levels of 6.25, 500, and 1000 mg/kg/day. There were no treatment related clinical signs and no apparent treatment related effect on survival, body weights or food consumption. No test article related lesions were observed at the ophthalmological, macroscopic, or microscopic examinations. The no observable effect level (NOEL) for toxicity of TCVP was determined to be 6.25 mg/kg/day under the conditions of this study.

DEMYELINATION - A demyelination study was carried out in adult fowl with TCVP. In the preliminary phase of the experiment the acute oral toxicity of undiluted TCVP to adult fowl was found to be between 1.5 g/kg and 2.0 g/kg. In the actual demyelination experiment, single oral doses of 1.5 g/kg or repeated daily doses of 300 mg/kg totaling 1.5 g/kg caused no neurotoxic effects in fowl.

POTENTIATION - A study of potentiation of TCVP was conducted on non-fasted adult male rats. The acute oral toxicity to rats of paired combination of TCVP and 24 reference chemicals was determined. Combinations of TCVP and Ciodrin, DDVP, Delnav, Diazinon, Dibrom, Dipterex, Di-Syston, EPN, Ethion, Folex, Schradan, Systox, and Trithion were considered negative for potentiation. TCVP paired with Bidrin, Co-Ral, Dimethoate, Guthion, Malathion, Methylparathion, Parathion, Phosdrin, Phosphamidon, Ronnel, and Sevin were considered as positive for potentiation. The potentiation response of TCVP was marginal with Co-Ral but marked with Malathion.

REPRODUCTION - A three-generation reproduction study was conducted with rats fed TCVP at concentrations of 100, 333, and 1000 ppm. Two litters were produced in each generation. The number in litters, mean litter size, and percent survival in all TCVP groups were comparable to or better than controls.

TERATOLOGY - A teratology study in rabbits was conducted in 1982 and in laboratory rats in 1987 with TCVP. In both studies it was determined that TCVP was not teratogenic.

TOXICOLOGY IN DOMESTIC ANIMALS

SWINE - No adverse effects were noted after feeding RABON Oral Larvicide in cattle ration at the rate of 15 mg/kg/day to barrow piglets for 31 days. No gross changes in the barrow's behavior or general condition were noted. Weight gains, feed conversion and general condition of the pigs were unchanged or improved. Feed additive regulations permit feeding of ROL to swine at the rate of 0.05 grams per 100 pounds of body weight per day. No adverse effects have been noted from numerous feedings.

SHEEP - Lambs were fed ROL in a cattle ration appropriate for fattening lambs at 15 mg/kg/day for 30 days. Dry matter consumption, feed conversion ratio and individual growth response was as good or better in the treated lambs as in the controls. EPA registration of ROL for sheep has not been requested.

HORSES - Fifteen horses of mixed age, sex, breed, and size were fed 90 and 450 ppm ROL for 30 days. Each of the horses maintained a good appetite, showed no distaste for the compound, and gained weight during the 30-day treatment period. One mare receiving 450 ppm ROL was 5 months pregnant when the test was started, continued through the test with no ill effects, and foaled a healthy colt at full term. Feed additive regulations permit feeding of ROL to horses at the rate of 0.07 grams per 100 pounds of body weight per day for fecal fly control.

POULTRY - Rabon is registered with the EPA for use on and around poultry for control of ectoparasites. ROL has been fed to cockerels at doses ranging from 50 to 800 ppm in the diet. The general health of all birds remained normal over the two-week period. ROL has been fed to hens at doses of 400 and 800 ppm. No significant differences in mortality rate, plasma cholinesterase, and body weight were observed between control and treatment groups. The mean feed consumption of the 800 ppm group was lower. Both treatment groups produced fewer eggs than control hens. EPA registration of ROL for poultry has not been requested.

TOXICOLOGY IN CATTLE

Rabon Insecticide was first registered for the control of flies as a residual wall spray on livestock buildings in 1967. Additional registrations have since been granted for topical use of Rabon containing products on cattle and poultry. Many formulations of Rabon have been tested for safety on various breeds of cattle ranging in age from young calves to mature cattle. Rabon can be applied at doses many times that recommended for use as an oral larvicide when applied topically as a spray or dust.

ACUTE ORAL TOXICITY - The acute oral LD₅₀ of RABON Oral Larvicide in cattle is not established. Acute Oral LD₅₀ values have been obtained for a few species of laboratory and domestic animals and wildlife. In most cases, as in cattle, it has not been possible to feed doses high enough to obtain accurate LD₅₀ values.

Cattle were fed feedstuffs containing various concentrations of ROL to determine what concentration they would consume. Steers receiving a 25% or 50% concentration refused to consume any feed. Steers receiving rations containing 10% Rabon began to eat but quickly stopped after consuming about 0.5 kilograms. It was impossible to produce mortality in mature cattle by force feeding ROL even as high as a 50% mix during experimental testing.

**WEIGHT GAINS AND FEED CONSUMPTION OF STEERS FED
0.0, 0.5 OR 1.0% RABON IN THE RATION**

RABON In Ration (%)	Mg/lb Body Wt/ Day ^a	Ration Consumed lb/day	Weight Gain lb
0.0	0	18	49
0.5	63	15	33
1.0	114	13	-15

^a Based on mean weights and feed consumed.

CHRONIC ORAL TOXICITY - Young, suckling calves (1 to 2 weeks of age) were fed milk replacer which contained 0.0, 0.05, 0.1 or 0.5% RABON Oral Larvicide. After 56 days, the calves receiving 0.5% ROL displayed depressed feed consumption and lower weight gains than the calves receiving the other levels. The calves resumed normal gains when they were returned to feed without ROL. No other adverse effects were noted.

**FEED CONSUMPTION AND WEIGHT GAIN OF CALVES
CONSUMING HIGH LEVELS OF RABON ORAL LARVICIDE**

Level of RABON In Feed (%)	Feed Consumption lb	Weight Gain lb
0.0	150	131
0.05	152	133
0.1	134	127
0.5	125	112

Young suckling calves with a non-functioning rumen can be intoxicated by large doses of ROL (50 times the recommended dose), and care must be taken, therefore, not to add ROL to the fluid milk portion of the diet.

Mature cattle can consume up to 0.4% ROL in their diet for extended periods of time without adverse effects. The only effect noted in cattle from chronic consumption of excessive amounts of ROL is a decrease in food consumption.

**FEED CONSUMPTION AND WEIGHT GAIN OF MATURE CATTLE
CONSUMING EXCESSIVE AMOUNTS OF RABON ORAL LARVICIDE**

Level of ROL In Feed (%)	Feed	Feed Efficiency	Feed Consumption/ Weight Gain
	Consumption lb	Gain lb	
0.0	1071	191	5.61
0.1	1144	194	5.91
0.2	1159	198	5.86
0.4	1021	163	6.27

EFFECT ON BEEF PRODUCTION - RABON Oral Larvicide does not adversely influence the weight gain, rate of gain, feed efficiency, or carcass quality of feedlot fattened heifers or steers.

EFFECT OF RABON ORAL LARVICIDE ON THE PERFORMANCE OF FEEDLOT STEERS

No. of Steers	ROL In Ration	Approx. mg/100 lb. body wt.	Initial Weight lb	Final Weight lb	Total Gain lb	Feed Consumption lb	ADG lb	FE lb
24	0.0	0	491	899	408	2068	3.09	5.1
24	0.009	140	491	896	405	1956	3.07	4.8
24	0.027	420	502	903	401	1935	3.04	4.8

Treatment period – 132 days

Recommended feeding level is 70 mg/100 lb. body weight.

**EFFECT OF RABON ORAL LARVICIDE ON THE PERFORMANCE OF
FEEDLOT HEIFERS SIMULTANEOUSLY FED MGA**

No. of Heifers	ROL mg/100 lb. body wt.	Total Gain lb	ADG lb
30	0	205	2.25
30	140	198	2.18

Treatment period – 91 days

Recommended feeding level is 70 mg/100 lb. body wt.

EFFECT OF RABON ORAL LARVICIDE ON CARCASS GRADES OF FEEDLOT STEERS

No. of Steers	% ROL In Ration	Approx. mg/100 lb. body wt.	Grade (%) Choice	Grade (%) Good
24	0.0	0	7 (30)	17 (70)
24	0.009	140	13 (54)	11 (46)
24	0.027	420	10 (42)	14 (58)

Treatment period – 132 days

Recommended feeding level is 70 mg/100 lb. body wt.

EFFECT ON MILK PRODUCTION - Feeding RABON Oral Larvicide to dairy cows during their entire lactation does not influence milk quantity or quality.

EFFECT OF RABON ORAL LARVICIDE ON DAIRY COW MILK PRODUCTION AND MILK COMPOSITION

No. Cows	ROL In Ration %	Approx. mg/100 lb. body wt.	44 Week Production lb	Weekly Production lb	Dry Matter %	Ash %	Fat %
10	0.0	0	15,816	360	11.8	6.4	3.7
10	0.009	140	15,689	357	11.8	6.4	3.8

Treatment period – 150 days, commencing after the second estrus.

Recommended feeding level is 70 mg/100 lb. body wt.

EFFECT ON FERTILITY - RABON Oral Larvicide does not influence the frequency or duration of estrus, conception, duration of gestation or calving. The calves born to cows fed ROL at excessive levels for 150 days or more are healthy and normal.

EFFECT OF RABON ORAL LARVICIDE ON COW REPRODUCTION

Criteria	Control	Treatment
Number of services to conception	1.7	1.7
Number of days to conception	115	121
Length of gestation	281	282
Calf birth weight, lb	99	103

RABON dosage: 140 mg/100 lb. body wt. (2X recommended feeding level.)

Treatment period: 150 days

No. cows/treatment: 9

When young or mature bulls were fed ROL at 10 times the recommended dose for periods in excess of 150 days, no detrimental effect due to the compound was noted on semen quality and quantity, or on body measurements (body weight and testicular size and consistency).

EFFECT OF RABON ORAL LARVICIDE ON BULL FERTILITY

Criteria	Yearlings		2 Year Olds	
	Control	Treatment	Control	Treatment
Weight Gain, lb	152	163	57	90
Testes circumference, Cm	34	33	35	34
Ejaculation volume, ml	5.23	5.66	5.33	6.26
Sperm motility, %	59	58	55	60
Sperm concentration, 10 ⁶ /ml	567	605	483	560
Total sperm, 10 ⁶	2842	3279	2518	3523
% normal sperm	83	81	84	83

RABON dosage: 700 mg/100 lb. body wt. (10X recommended feeding level.)

Treatment period: 22 weeks

No. bulls/treatment: 6

SAFETY TO WILDLIFE/ENVIRONMENT - Since Rabon degrades readily, it is unlikely that the environment will become contaminated from feeding RABON Oral Larvicide. However, the possibility exists that wildlife may have access to treated cattle feed. This would not constitute a hazard due to the low toxicity of Rabon to birds, fish, and invertebrates.

ACUTE ORAL TOXICITY OF TCVP TO WILD BIRDS

Species	LD50 (mg/kg)
Ring-Necked Pheasant	2000
Mallard Duck	>2000
Chukar Partridge	>2000
Starling	>100
Redwing Blackbird	>100

In a two-week study, Japanese quail were fed TCVP at dietary levels of 0, 50, 200 and 800 ppm and showed no effects at any given level on body weight, feed consumption, egg production, or reproduction.

The use of ROL containing manure will have no adverse effect on the soil, the soil inhabitants, the plants grown in the soil, or on the ground water under the soil. Should manure containing ROL reach adjacent waterways, no adverse effect from ROL would be felt by the species inhabiting this aquatic environment. Rabon is toxic to fish at exaggerated doses as determined by research. However, these exaggerated concentrations in water would never be reached under normal use conditions.

LC50 VALUES OF RABON TO CERTAIN FISH (PPM)				
Species	24 hr.	48 hr.	72 hr.	96 hr.
Harlequin Fish	5.80	4.30	—	—
Silver Salmon	1.25	1.07	1.07	1.00
Rainbow Trout	0.81	0.68	—	0.38
Bluegill Sunfish	0.29	0.18	—	0.05
Spot Leiostomus	Ir ^a	Ir ^a	—	—

^a Irritated but not killed at 1 ppm.

RABON Oral Larvicide does not affect beneficial insects such as dung beetles or other insect predators that normally inhabit the manure.

PERFORMANCE

RABON Oral Larvicide has been evaluated in complete feeds, blocks, loose minerals and protein mixes in numerous formal field trials dating back to the mid-1960's. Excellent control of horn flies, face flies, house flies and stable flies has been reported by research and extension service personnel in 14 states. Control was determined by comparing animals treated at various rates to untreated control animals.

RABON Oral Larvicide continues to be an extremely effective way to stop the development of fly larvae in manure from fed animals. When used in an integrated program involving good sanitation and herd management, the necessity of using insecticidal sprays or dusts can be greatly reduced. The overall success of individual farm oral larvicide programs is influenced by factors such as manure management, farm location and the degree of fly control on surrounding farms.

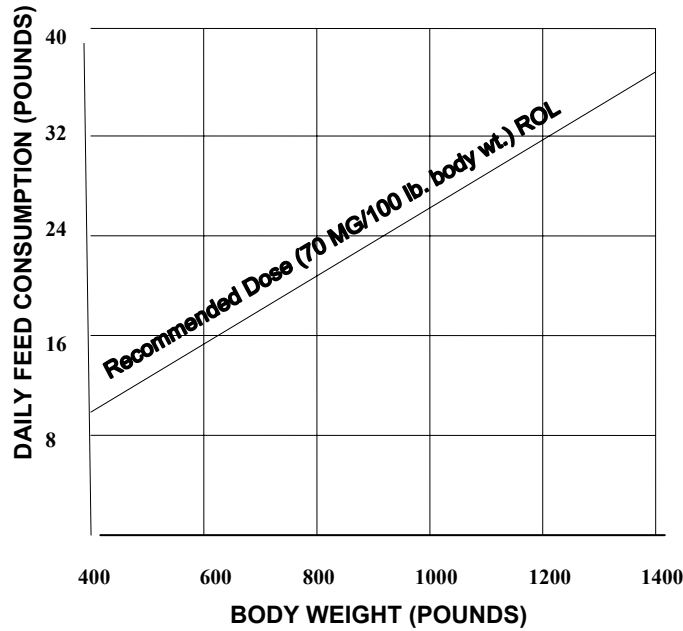
FEEDING LEVELS AND USE LABELS

CONTROLLED FEEDING - For effective fly control, it is important to insure that all cattle on the premises receive adequate levels of RABON Oral Larvicide on a daily basis. The recommended feeding level of ROL to cattle is 70 mg per 100 pounds of body weight daily. The amount of ROL consumed by individual animals on a daily basis may vary, but fly larvae control will not be affected.

A practical feeding regimen can be planned whereby a single feed can be fed to all animals within a like group. Examples are illustrated below.

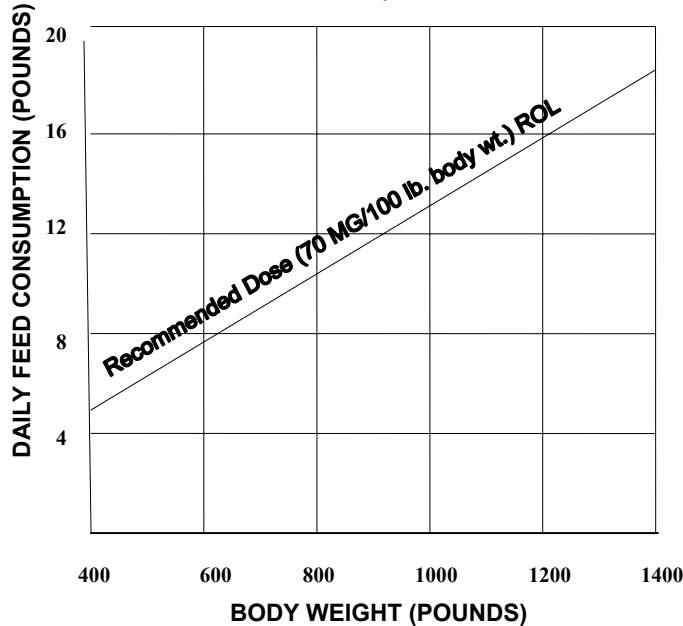
Growing-Finishing Beef Cattle - A single complete feed containing 26.4 mg of ROL per pound of feed can be fed to all steers and/or heifers, weighing from 400 to 1400 pounds, within a group. As long as the daily feed consumption of the larvicidal feed approximates that shown in the following figure, cattle will be receiving the larvicide at an acceptable level.

DAILY CONSUMPTION OF COMPLETE RATION (CONTAINING 26.4 MG RABON PER POUND OF FEED) REQUIRED FOR FLY LARVAE CONTROL



Lactating Dairy Cows - A single concentrate food containing 66 mg ROL per pound of feed fed along with roughage can be fed to all lactating cows within the herd. As long as the daily feed consumption of the larvicidal feed approximates that shown in the following figure, the cows will be receiving ROL at an acceptable level.

DAILY CONSUMPTION OF DAIRY FEED (CONTAINING 66 MG RABON PER POUND OF FEED) REQUIRED FOR FLY LARVAE CONTROL



Hand-Fed Beef or Dairy Cattle - A common practice in many cattle operations is to hand-feed a supplement at a given level per head daily. A single supplement, which contains 792 mg ROL per pound of supplement and which is fed at the rate of one pound per head daily, can be fed to cattle weighing between 400 and 1200 pounds. Cattle weighing between 1200-1700 pounds should be fed this supplement at the rate of 1 1/2 pounds per head daily.

SAMPLE LABEL – The following table provides guidelines for preparing various feeds to contain RABON Oral Larvicide. The table is followed by a current Rabon® 7.76 Oral Larvicide Premix label to be used as an example.

MIXING DIRECTIONS FOR PREPARING RABON ORAL LARVICIDE PRODUCTS FOR CATTLE

Feed Product	Daily Feeding Rate	RABON in Supplement		Ratio Supplement to Feedstuffs	Use Level of RABON in Feed		Pounds RABON Oral Larvicide 97.3%/ Ton Product
		mg/lb	%		mg/lb	%	
Complete Feed	2.6 lbs/cwt	--	--	--	26.4	0.0059	0.12
Supplement or Premix for Preparing Complete Feeds	—	132	0.029	1:4	26.4	0.0059	0.6
	—	264	0.059	1:9	26.4	0.0059	1.2
	—	528	0.12	1:19	26.4	0.0059	2.4
	—	1056	0.24	1:39	26.4	0.0059	4.8
	—	2112	0.47	1:79	26.4	0.0059	9.6
Concentrate Fed with Roughage	1.0 lbs/cwt	--	--	--	66	0.015	0.3
Supplement or Premix For Preparing Concentrate Feeds	—	330	0.072	1:4	66	0.015	1.5
	—	660	0.15	1:9	66	0.015	3.0
	—	1320	0.29	1:19	66	0.015	6.0
	—	2640	0.59	1:39	66	0.015	12.0
	—	5280	1.17	1:79	66	0.015	24.0
Supplement for Hand Feeding	2.0 lbs/head*	396	0.087	--	--	--	1.8
	1.5 lbs/head*	528	0.12	--	--	--	2.4
	1.0 lbs/head*	792	0.18	--	--	--	3.6
	0.5 lbs/head*	1584	0.35	--	--	--	7.2
Mineral Mix	4.0 oz/head*	3168	0.70	--	--	--	14.4
	3.0 oz/head*	4224	0.93	--	--	--	19.2
	2.0 oz/head*	6336	1.40	--	--	--	28.8
	1.0 oz/250 lbs	2700	0.60	--	--	--	12.3
	1.0 oz/500 lbs	5400	1.19	--	--	--	24.6
	1.0 oz/750 lbs	8100	1.79	--	--	--	36.9

Note: Calculations presented in this table serve as guidelines in preparing feeds which contain RABON Oral Larvicide. Some calculation inconsistencies occur in the table due to rounding.

* An animal weight of 1165 lbs. was used for these calculations.

SELF-FEEDING CATTLE SUPPLEMENTS - RABON Oral Larvicide can be effectively used in self-fed supplements to prevent the development of house, stable, face, and horn fly larvae in the manure from treated cattle when fed on a daily basis at the rate of 70 mg/100 lb. body weight. The ability of ROL to perform when used in self-fed supplements is dependent on the daily consumption of the supplement by cattle. The consumption of self-fed supplements is greatly influenced by the palatability of the supplement, management of the supplement (i.e. feeding location, number of cattle per block or mineral station, etc.), pasture conditions and time of year.

The mean daily consumption of a self-fed supplement must be known or determined prior to formulating a supplement. Rabon is then added to the supplement at a rate which will provide 70 mg Rabon per 100 pounds of body weight daily to the animal being fed.

Daily consumption of ROL is not necessary to maintain effective control of fly larvae development. Manure from steers receiving 70 mg/100 lb. body weight Rabon on a four-day-on, two-day-off treatment, or a three-day-on, three-day-off treatment basis exhibited consistently excellent fly emergence control. Manure from steers receiving Rabon on a two-day-on, three-day-off treatment gave unacceptable control. Under field conditions it would be expected that consumption would be greater than the daily recommended dose and, therefore, adequate.

Excellent fly emergence control can be expected when ROL is administered in self-fed supplements regardless of forage type and conditions. It must be kept in mind that changes in pasture or forage will influence the consumption of a self-fed supplement.

PALATABILITY - RABON Oral Larvicide is palatable to cattle in all types of feedstuffs. The following table shows that RABON does not influence the consumption of various self-fed supplements.

CONSUMPTION OF FREE CHOICE SUPPLEMENTS WITH AND WITHOUT RABON^a Oral Larvicide (ROL)		
Free Choice Supplement Type	Consumption, g/day	
	Without ROL	With ROL
Mineral block	136	105
Protein block	617	688
Energy block	907	823
Loose mineral mix	53	127
Molasses-mineral block	320	275
Overall mean consumption	407	403

^aResults from several experiments in which the individual and group animal consumption was measured.

MANUFACTURING AND BLENDING

RABON Oral Larvicide will mix uniformly in feeds when good manufacturing procedures are followed. Numerous mixing and stratification studies were performed at various locations in typical feed manufacturing facilities. A summary of the data obtained appears in the following table. Mixer coefficients of variation (Cv) were in the range of 2-8%; and system Cv's on the order of 5-24% were observed.

**MIXING PROPERTIES OF RABON[®] ORAL LARVICIDE
WITH VARIOUS TYPICAL BEEF FEED PRODUCTS**

Product Category	Mixer-Coefficient of Variation	System ^a Coefficient of Variation
RABON 7.76 Oral Larvicide (premix) – Wheat Red Dog diluent	2.2%	5.1 %
RABON 7.76 Oral Larvicide (premix) - Ground yellow corn diluent	7.4%	7.4%
Complete Beef Fattening Feed (RABON concentration - 0.005% wt)	8.2%	23.9%
Feed Additive Protein Supplement (Rabon concentration - 0.1% wt)	5.4%	6.6%
Protein Block (RABON Concentration - 0.075% wt)	4.0%	3.2%
Mineral Block (RABON concentration - 0.3% wt)	2.9%	3.3%

^a System - i.e. allowing feed to dump from mixer, be transported via normal feed with conveyance equipment and into hoppers where product is bagged, put in bulk bins or blocked.

Furthermore, the adequacy of mixing has been confirmed under field conditions where a variety of feed mixing equipment was utilized (see following table). In all instances, cattle feedstuffs were produced which consistently provided for 85-100% control of fly larval development.

Naturally, it is impossible to recommend specific mixing times, etc., due to the differences in equipment and feed mills throughout the country. Generally speaking, mixing times should be adequate to assure uniform dispersion of ROL in the feedstuff. It is recommended that appropriate pre-blending techniques be employed in the manufacture of larvicidal feeds. The usual problems that are common to all feed manufacturing techniques, which can cause stratification, such as excessive free-fall or excessive handling, are to be avoided. Mixing trials should be performed for each feed texture at each manufacturing location to determine optimum manufacturing conditions.

Feeds prepared with ROL should not be pelleted unless tests are conducted to assure adequate Rabon levels after pelleting. ROL should not be mixed with feeds containing predominantly pellets because of particle size difference. Further, ROL should not be mixed in liquid feed supplements unless tests are conducted to assure suspendibility and stability of the formulation.

**EVIDENCE OF RABON ORAL LARVICIDE MIXABILITY IN CATTLE
FEEDSTUFFS PREPARED WITH VARIOUS TYPES OF EQUIPMENT**

Type Feed-Mixing Equipment	Type Feedstuff Mixed	Biological Control % Inhibition	RABON Conc. In Feed (ppm)	
			Theoretical	Actual
Horizontal Ribbon Blender	Grain Concentrate	>90	—	—
Model 351 Vertical New Holland Mixer	Protein Supplement	>90	—	—
Recycle Batch Mixer-1000# No Cap	Ground Corn	>90	750	736
Recycle Batch Mixer-1000# Cap	Ground Corn	>90	—	—
Horizontal Batch Mixer- Paddle Type	Dairy Concentrate	>85	—	—
Oswalt Auto Mix Bulk Feed Truck	Complete Cattle Feed	95	—	—
Hand Mixed	Loose Mineral Mix	89	—	—
Simpson Roller Grinder Mixer	Loose Mineral Mix	—	3.80%	3.63%
Single Spiral Vertical Mixer	Dairy Concentrate	—	93	79
		—	100	98
		—	150	139
		—	333	326
		—	400	368
Single Spiral-Vertical Mixer	Complete Cattle Feed	—	—	—
50 kg Hobart Mixer	Premix for Top Dressing	>95	—	—
500 and 2000# Marion Horizontal Batch Mixer Paddle Type	Complete Cattle Feed	>95	—	—
	Dairy Concentrate	>95	—	—
	Free-Choice	>95	—	—
	Supplement	>95	—	—
Hand Mixed	Ground Grain Premix	90	—	—
Mobil Truck Mixer	Ground Grain and Silage	100	28	26
			33	29
Mobile Wagon Mixer	Ground Grain and Silage	95	—	—
KSU Horizontal Ribbon Blender	Complete Cattle Feed	96	—	—
Horizontal Batch Mixer- Paddle Type	Protein Supplement	99	—	—
Weigh Hopper to Horizontal Ribbon Blender to Sacks	Ground Corn and Silage	>90	—	—

LIQUID FEED SUPPLEMENTS

Approval was first received in 1994 for an EPA registration for the use of RABON Oral Larvicide (ROL) in liquid feed supplements. Since then, Boehringer Ingelheim Vetmedica, Inc. has received an increasing number of inquiries regarding the use of RABON Oral Larvicide in liquid feed supplements. The following summary is intended to assist those manufacturers with incorporating ROL into liquid feed formulations.

CHARACTERISTICS OF LIQUID FEED SUPPLEMENTS - A great diversity of suspension formulations exists in the liquid feed industry. The degree of variability in formulation content is often dependent upon which market the liquid feed supplement is going to be used in (i.e., pasture beef, dairy cattle or the feedlot market). Variation in moisture, sugar, mineral and protein content as well as the intended consumption rate, all affect the composition of the finished product. Therefore, liquid feed supplements often do not possess the same physical and chemical characteristics. One of the most important physical characteristics with respect to ROL in liquid feed supplements is the viscosity, which can vary dramatically. Viscosity of a given liquid feed supplement plays an important role in keeping insoluble particulate matter such as ROL in suspension.

SUSPENDABILITY OF ROL IN LIQUID FEED SUPPLEMENT - A number of suspending agents is available for use in the liquid feed supplement industry. While clays are generally considered inexpensive, a 7% level of attapulgite clay has provided acceptable suspendability of ROL in a 32% liquid protein supplement. This level, however, exceeds the current 2.5% maximum level permitted in suspensions according to FDA Regulation 582.1. It has been demonstrated that a 2.5% and 4.0% level of attapulgite clay will not suspend ROL based on previous studies.

Kelflo™ (Merck & Co., Inc.) is a high quality xanthan gum that has been specifically formulated as a suspending and stabilizing agent in liquid feed supplements. Solutions of Kelfo exhibit good flow behavior and excellent suspension stability. When shearing is applied (mixing, pumping, spraying, transport, lick wheel movement), the viscosity decreases, resulting in a free-flowing liquid. When these mechanical actions are removed, the original at-rest viscosity is restored so that suspension stability is maintained. Xanthan gum is routinely used for a 3 lb/ton liquid feed supplement by some manufacturers to suspend Rumensin and Bovatec.

Laboratory studies at Boehringer Ingelheim Vetmedica, Inc. have shown that hydrated xanthan gum at various concentration levels will suspend ROL in liquid feed supplements. As a general rule, liquid feed supplements with viscosities of 400-600 centipoise (cP) require three (3) pounds of xanthan gum per ton of liquid feed supplement to provide positional stability of ROL and increase the viscosity of the final product above 1900 cp.

It is important to note that xanthan gum must be fully hydrated in liquid feed supplements prior to the addition of ROL. For this reason, we recommend that xanthan gum be added to liquid feed supplements during the manufacturing process at least 24 hours prior to the addition of ROL. For liquid feed supplements with low viscosities (i.e. 30-55 cP), 9-12 lbs. xanthan gum/ton liquid feed supplement may be required to suspend ROL.

GUIDELINES - The following steps are recommended for the successful use of ROL in liquid feed supplements:

1. The liquid feed supplement manufacturer should determine the viscosity of the liquid product being considered for ROL inclusion. The viscosity should be performed using a Brookfield viscometer at 20 rpm, spindle No. 3 for 2.5 minutes at 68-72 °F. The viscosity reading will establish the feasibility of adding ROL to the liquid feed supplement. The target viscosity for the successful suspension of ROL is 1900 cp.
2. For liquid feed supplements with viscosity readings of 400-600 cP at 20 rpm, the addition of 3 lb xanthan gum/ton liquid feed supplement should reach the target viscosity.
3. For liquid feed supplements with very low viscosities, 9-12 lbs. xanthan gum/ton liquid feed may be required. Manufacturers interested in suspending ROL in such low viscosity liquid feed supplements should conduct suspendability studies.
4. The addition of xanthan gum to the liquid feed supplement must occur during manufacturing process 24 hours prior to the addition of ROL to fully hydrate the gum. To prevent premature settlement of ROL, ROL and xanthan gum should not be added to a liquid feed supplement at the same time.
5. ROL could be added to liquid feed supplements (previously charged and hydrated with the proper level of xanthan gum) at the distributor level provided adequate mixing of the ROL has occurred.
6. ROL remains chemically stable when mixed and stored in products with low pH values (6 or less).
7. It is encouraged that field trials are conducted to determine the suspendability and chemical stability of ROL in liquid feed supplements. This will provide a more accurate assessment of ROL stability in the suspension.
8. Typically, liquid feed supplements containing ROL should be fed within 8 weeks after the addition of ROL. Individual field trials can more accurately define this time period.
9. Lick tanks should be emptied prior to refilling to ensure accurate dating of the product. Chemical stability and efficacy of the product in the field will be severely compromised if fresh product is mixed with outdated material.
10. Liquid feed supplements with ROL must be accompanied with approved labeling directions. Custom mixes must also be accompanied with feeding directions, a statement specifying the composition of mixture, and a copy of the ROL end-use labeling.
11. ROL can be added to liquid feed supplements containing feed additives such as Monensin, Bovatec and Tylosin.

REGULATORY ISSUES - In March 1987, the Environmental Protection Agency (EPA) assumed regulatory authority of feed-through pesticides such as ROL in animal feed products. This permitted the use of ROL in medicated feeds regardless of the drug component(s). Furthermore, the presence of ROL in the feed does not alter the regulatory status of the drug.

Feeds formulated only with ROL (no drugs) that are inventoried and offered for sale through retail channels, require EPA registration. However, feeds with ROL added as a custom mix do not require EPA registration provided they meet the definitions of a custom mix feed.

STABILITY

RABON Oral Larvicide is an extremely stable product. There was no measurable decomposition of the active ingredient when the product was exposed to elevated temperatures (100 °F and 120 °F) for extended periods of time. It may be stored a minimum of two years under normal use conditions in the unopened container.

Stability studies were performed on numerous typical cattle rations and the data are presented in the following table. ROL was found to be stable (<10% decomposition) for up to three months in complete feeds, up to six months in protein-type supplements, and for up to one year in mineral-type supplements when all were stored under normal use conditions. It exhibits its best stability in mineral-based products. Storage of feedstuffs containing natural protein and/or urea at elevated temperatures (ca 100 °F) for extended periods does have a detrimental effect on the stability of ROL. It is recommended that complete feeds and protein supplements stored under such high heat conditions be fed within 4-8 weeks of manufacture.

STABILITY OF RABON ORAL LARVICIDE IN TYPICAL FEED PRODUCTS

Product Category	RABON Content % w	Storage (°F)	% Retention of Initial Activity at Indicated Month of Storage								
			0.5	1	2	3	4	5	6	9	12
RABON Oral Larvicide	97.3	73	---	---	100	---	100	---	100	---	100
		100	---	---	100	---	100	---	100	---	100
Premix (Wheat Red Dog Diluent)	7.76	73	---	98	98	---	102	---	97	---	101
		100	---	104	97	---	101	---	101	---	98
Beef Fattening Complete Feed	0.005	73	97	95	82	101	---	---	---	---	---
		100	91	84	73	80	---	---	---	---	---
Protein Supplement	0.05	73	96	102	89	98	107	98	93	---	---
		100	92	96	76	70	67	65	50	---	---
Protein Supplement	0.10	73	97	100	98	95	105	92	98	---	---
		100	105	100	87	79	68	52	56	---	---
Trace Mineral Salt	0.50	73	100	95	106	90	107	107	102	---	98
		100	---	99	104	94	98	101	100	---	99
All Purpose Loose Mineral	1.5	73	---	99	---	106	111	101	85	---	---
		100	---	111	---	110	97	92	92	---	---
Loose Mineral	3.5	73	---	100	101	---	95	---	98	---	---
		85*	---	94	98	---	91	---	89	---	---
		100	---	93	87	---	83	---	81	---	---
Molasses/Salt Rock	0.06	73	---	100	---	101	92	103	92	88	---
		85*	---	89	---	87	81	72	---	88	---
		100	---	88	---	79	77	77	74	67	---
Protein Block	0.075	73	---	95	---	88	81	82	85	83	---
		85*	---	101	---	90	84	75	76	71	---
		100	---	87	---	69	63	63	56	47	---
Molasses/Mineral Block	0.33	73	---	103	100	95	100	101	100	---	---
		85*	---	106	97	103	103	106	100	---	---
		100	---	102	100	94	94	91	88	---	---
All Purpose Mineral Block	0.30	73	---	105	---	101	100	102	94	89	---
		85*	---	105	---	104	104	100	91	94	---
		100	---	96	---	88	93	---	82	76	---

*at 85 percent relative humidity

ANALYTICAL METHODS

The analytical methods for determining TCVP content are straightforward and relatively simple. Any laboratory, which is capable of performing routine analytical determinations with a gas-liquid chromatograph, should be able to use these procedures. Methods are available depending upon the type of product in which ROL is mixed. They are:

Product	Method No.	Title
Animal feeds below 0.4%	27-028-00	Determination of Rabon in Oral Larvicide Animal Feeds at Low Levels Using Flame Photometric Detector.
Animal feeds as low as 0.4%	27-029-00	Determination of Rabon in Oral Larvicide Animal Feed Premixes
Liquid Feeds	DDD-049-Original	GC Method for Rabon in Liquid Feed

NOTE: These methods are available from Boehringer Ingelheim Vetmedica, Inc. upon request.

SAMPLING - The importance of securing a proper sample cannot be over-emphasized. We highly recommend the AOAC¹ sampling procedures and the guidelines outlined in the AFMA publication, "Feed Manufacturing Technology",² be used for feedstuffs containing RABON Oral Larvicide. The following are recommended sampling procedures for feeds containing RABON Oral Larvicide.

Feed Additive Concentrates and Supplements - Use AOAC sampling procedure, i.e. from lots of one to ten bags, sample all bags; from lots of 11 or more, sample 10 bags. A slotted feed trier is to be used for sampling. Take a 1 pound core from each bag sampled, except that for lots of one to four bags, take enough diagonal cores from each bag to total at least five cores. Analyze a minimum of three of the samples taken and average the results. If the product is fine enough to pass a sieve with circular 1 mm diameter openings, no grinding is necessary. If not, grinding and after-blending of each sample are recommended prior to analysis.

Complete Feeds - Most beef and dairy rations are coarse, heterogeneous, complex mixtures, and great care must be taken to insure proper sampling. A minimum of 3 x 5 lb. samples should be taken. Each 5 lb. sample should be the composite of several cores taken randomly from the bulk storage bin. The samples must be ground and after-blended. Duplicate determinations from each of the 5 lb. samples are recommended. Average the results obtained on the 3 x 5 lb. samples, and use this value to judge the acceptability of the product.

Blocks - Take 100 gram core samples from a minimum of 2 blocks, composite and blend. Analyze this sample using 27-028-00 or 27-029-00. (Use 27-028-00 when blocks contain less than 0.4% RABON).

¹ Association of Official Analytical Chemists, 'Official Methods of Analysis' (14th ed.), p. 152 (para. 7.001 and 7.002), Washington, D.C.

² McElhenny, R.R. (editor), 'Feed Manufacturing Technology', American Feed Manufacturer's Industry, Inc. (1985), pp 336-346.