

Anticoccidial Drugs
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II- Chemical anticoccidials_Classes :

- **SULPHONAMIDES**

- (Sulphadimidine, sulphaquinoxaline, sulphadimethoxine, sulphachloropyrazine).

- **VITAMIN - ANTAGONISTS:**

- Amprolium hydrochloride.
- Diaveridine and pyrimethamin.

- **QUINOLONES** : Methylbenzoquate and Decoquinatate.

- **PYRIDINES**: Clopidol.

- **GUANIDINES** : Robenidine.

- **DINITROBENZAMIDES** : Dintolmid (Zoaline).

- **BENZENE ACETONITRILES** : Diclazuril and clazuril

- **CARBANILIDES** : Nicarbazin.

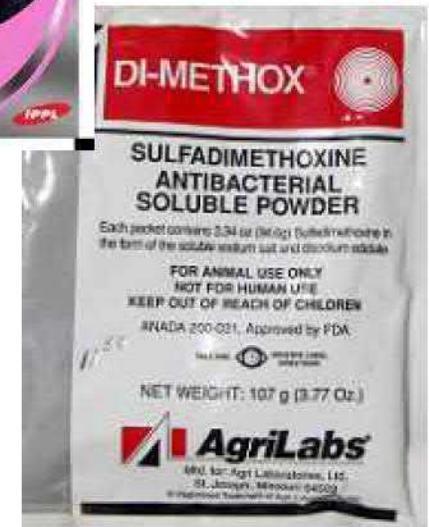
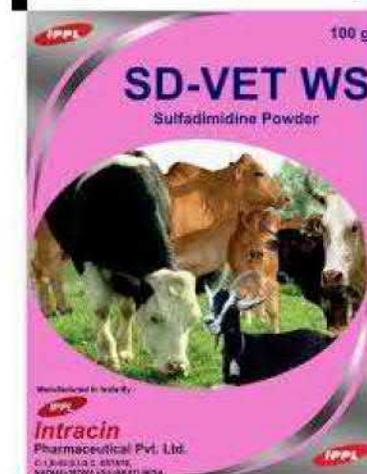
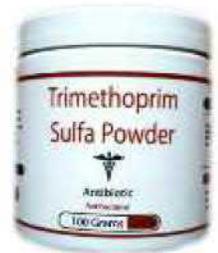
- **SYMMETRICAL TRIAZINONES** : Tolreazuril (Bycox).

SULPHONAMIDES

- Include: Sulphadimidine, sulphaquinoxaline, sulphadimethoxine, sulphachloropyrazine.

- **Action :**

- Sulphonamides are the first synthetic anticoccidials used successfully in coccidiosis treatment.
- They possess synthetic antibacterial and anticoccidial actions.
- They are very effective against intestinal than caecal coccidiosis
- Systemic types of sulphonamides are useful in hepatic coccidiosis in rabbits.

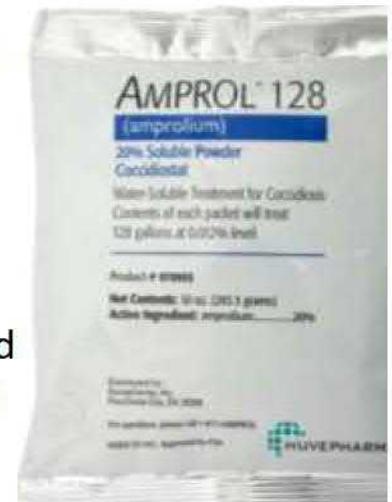
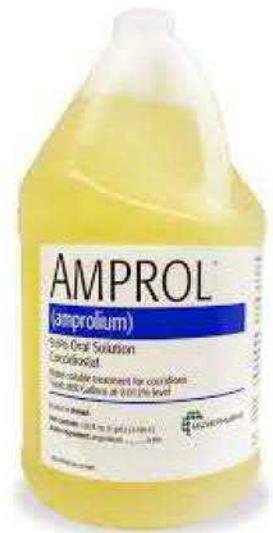


- **Mechanism of action :**
- Sulphonamides interfere with utilization of para-aminobenzoic acid (PABA) which is essential for the formation of folic acid and subsequently the formation of ribonucleic acid (RNA) of Eimeria species (coccidiostatic action).
- They produce their action by destroying schizonts containing merozoites.
- **N.B. :**
- Vitamin antagonists potentiate the action of sulphonamides because these drugs interfere with various parts of PABA- folic acid pathway

- **Disadvantage:**
- They are narrow spectrum (intestinal coccidiosis), therefore they must be combined with other antioocidials as diaverdine, Pyrimethamine and amprolium
- They prolong blood clotting time due to interference with Vit K synthesis.
- Continuous feeding of cockerels on sulphonamides cause hyperplasia of semineferous tubules .
- Sulphonamoids should not be used in layers because they inhibit carbonic anhydrase enzyme that is responsible for egg shell formation resulting in soft shelled eggs.
- Their effects is antagonized by methionine which added to poultry rations.
- They are precipitated in acidic urine forming crystalurea.

2-VITAMIN - ANTAGONISTS :

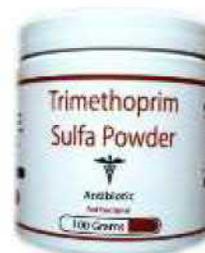
- **(A) Amprolium hydrochloride (Amprol) :**
 - Amprolium is an analog of **thiamine**, and is a quaternary compound.
 - Amprolium is chemical anticoccidial agent can be mixed with poultry feed or administered in drinking water.
 - **Therapeutic uses.**
 - Amprolium is the only anticoccidial agent that can be used in laying birds and cattle for both the prevention and treatment of outbreaks.
 - (a) It is effective against the first generation of trophozoites and schizonts.
 - (b) Amprolium is rarely used alone, because *E. maxima*, *E. mivati*, and other species are resistant to it; combination with antifolate drugs increases the efficacy of amprolium against these organisms in chickens.
 - It is effective only against *E. tenella* and *E. acervulina*, therefore, it is used as mixture with Ethopabate which added a good effect against *E. burnetti* and *E. maxima*.
 - In concentration of (125 ppm Amprol + 4 ppm Ethpabate)
 - Amprolium has been used for treatment of coccidiosis in chickens, turkeys and ruminants.



- **Mechanism of action :**
- Amprolium prevents the utilization of thiamin (Vit. B₁) by Eimeria species in the early first generation schizonts and merozoites
- Pharmacokinetics
 - (a) Amprolium is poorly absorbed after oral administration.
 - (b) No preslaughter withdrawal period is necessary

(B) Diaveridine and Pyrimethamine

- - They are used as coccidiostates and given alone or in combination with sulpha drugs e.g. sulphadimidine, sulphaquinoxaline, sulphadimethoxine.
- - They have a synergistic action with sulphonamides, where sulphonamides prevent the utilization of PABA to give dihydrofolate, and diaveridine or pyrimethamine prevent conversion of dihydrofolate to tetrahydrofolate by inhibition of dihydrofolate reductase enzyme



VITACOX PLUS WSP

(Sulphadimidine - sulphaquinoxaline - diaveridine - vitamins)

COMPOSITION:

Contains per g:	
Sulphadimidine sodium	400 mg
Sulphaquinoxaline sodium	150 mg
Diaveridine HCl	50 mg
Vitamin A	15,000 IU
Vitamin K3	5 mg

INDICATIONS:

Vitacox Plus WSP is effective as prevention and treatment against the following diseases:

Poultry	- Intestinal coccidiosis - Mixed coccidial and bacterial infections - Pullorum disease - Fowl typhoid - E. coli infections
Cattle, lambs, piglets	- Enteritis caused by coccidial and bacterial infections
Rabbits	- Intestinal coccidiosis and bacterial infections

CONTRA-INDICATIONS:

Do not administer to animals hypersensitive to one of the sulpha drugs or diaveridine.

INCOMPATIBILITY WITH OTHER DRUGS:

Do not combine with other anti-bacterial, coccidiostatic or coccidiocidal drugs.

SIDE EFFECTS:

Anaemia, leucopenia and thrombocytopenia.
Overdosing can cause bleedings, kidney damage, diarrhoea, immunosuppression, peripheral neuritis.

DOSAGE AND ADMINISTRATION:

For oral administration via drinking water.

General dose : 100 g per 100 litres of drinking water or 1 gram per 10 kg bodyweight, during 3 days and again for 2 days after an interval of 1 day with fresh water (3 - 1 - 2 method).

Medicated drinking water should be used within 24 hours.

WITHDRAWAL PERIOD:

Meat	Ruminants, piglets	: 14 days
	Rabbits, poultry	: 8 days
Eggs		: 4 days

STORAGE:

Store in a dry, dark place between 2 °C and 25 °C.

Store in closed packing.

Keep medicine away from children.



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VETERINARY USE ONLY

NETWEIGHT: 100 g



Manufactured by:
KEPRO B.V. - Maagdenburgstraat 38 - 7421 ZE Deventer - Holland
info@kepro.nl www.kepro.nl

- Contains per g:
Sulphadimidine sodium 400 mg
Sulphaquinoxaline sodium 150 mg
Diaveridine HCl 50 mg
Vitamin A 15,000 IU
Vitamin K3 5 mg

(C) Ethopabate:

- - It is used effectively for **prophylaxis** and **treatment** of clinical outbreaks of intestinal than cecal coccidiosis.
- - It acts on first generation schizonts by preventing differentiation of merozoites.
- - It is used in combination with Amprolium.



Amprolium - Ethopabate

Product Information

AMPROL PLUS[®]

(amprolium with ethopabate)

Type A Medicated Article

AMPROL PLUS (amprolium, ethopabate) is intended for use as an aid in the prevention of coccidiosis (1) in broiler chickens and (2) in replacement chickens where immunity to coccidiosis is not desired.

ACTIVE DRUG INGREDIENTS: Amprolium 25%
Ethopabate 0.8%

INGREDIENTS: Corn Gluten Feed and Soybean Oil

SEE DIRECTIONS ON BACK PANEL

Manufactured by:
HUVEPHARMA, INC. St. Louis, MO 63116
Distributed by:
HUVEPHARMA, INC. Peachtree City, GA 30269
For questions, call 1-877-4AMPROL

Huvepharma, Inc.
500 Westpark Drive, Suite 230
Peachtree City, GA 30269



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Net Wt.: 50 lb (22.68 kg)

3- QUINOLONES :

a- Decoquinatone b- Methylbenzoquinatone

- **a- Decoquinatone**
- Decoquinatone is a quinolone and is lipophilic
- Decoquinatone is approved for use in cattle, sheep, goats, and broilers for the prevention of coccidiosis. It is not effective to treat clinical coccidiosis.
- It is usually used as a feed additive.
- It is effective against all species of coccidia on the sporozoites stage.
- **Use is limited** because of its tendency to induce drug resistance (due to its action on such an early stage of the asexual cycle).
- **Mechanism of action.**
 - It halts the development of the sporozoites or trophozoites of coccidia by inhibiting the electron transport system within parasite mitochondria.
 - **Contraindication:**
- **- Decoquinatone is unsuitable for turkeys, laying and breeding birds**
- - A 3 day withdrawal period is required for meat



FOR VETERINARY USE ONLY

DECOQUINATE 6% PREMIX



25KG/BAG

Decoquinatone

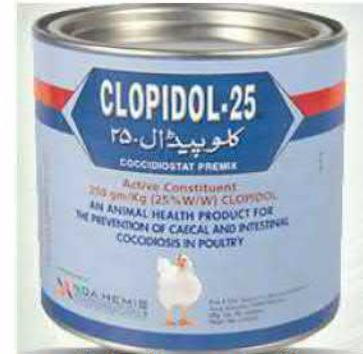


3- QUINOLONES :

a- Decoquinate b- Methylbenzoquate

- **b- Methylbenzoquate**
- - It acts as coccidiostate by antagonizing the invasion of sporozoites in the first day of life cycle of *Eimeria* species.
- It is used at 8.35 ppm in **a combination with clopidol** for prevention of coccidiosis in chickens and turkeys.
- **Dose** : Clopidol 100 ppm.Plus Methyl benzoquate 8.35 ppm in feed continuously

4- PYRIDINE



- **CLOPIDOL**
 - Chemistry. Clopidol is a pyridinol derivative and is lipophilic
 - Therapeutic uses
 - (a) It is used as a feed additive to prevent coccidiosis in broilers and replacement chickens and rabbits
 - (b) It is effective against all species of coccidia on the sporozoites stage.
 - **Use is limited because** of its tendency to induce drug resistance (due to its action on such an early stage of the asexual cycle).
 - Clopidol is broad spectrum anticoccidial agent being active against different Eimeria species as : *E. tenella*, *E. necatrix*, *E. brunette*, *E. maxima*, *E. acervulina* and *E. praecox*
 - A withdrawal period of 5 days is required before slaughtering.
- **Mechanism of action:**
 - Clopidol prevents the development of the first generation schizonts, through its inhibiting action on the development of sporozoites and trophozoites in the 1st asexual cycle
 - Clopidol may work similarly to quinolones.

5- QUANIDINES :

- **ROBINDINE**
- Therapeutic uses.
 - Robenidone is approved for use in chickens to prevent outbreaks of coccidiosis.
 - It is effective against all Eimeria species
 - Effective against intestinal and caecal coccidiosis in poultry and rabbits.
- **Mechanism of action**
- It inhibits the oxidative phosphorylation of Eimeria species and although its activity is primarily coccidiostate against the first generation of schizonts and some coccidiocidal effect against second generation of schizonts.
- **Action**
- Effective control of all turkey, chicken and intestinal coccidian of rabbits has been achieved with continuous medication in feed Control as preventive in chickens and turkeys.
- **Contraindication:**
- Robenidone should not be mixed with other anticoccidials, and not ne feed to laying hens
- A withdrawal period of 5 days is required before slaughtering.
- **Adverse effects.**
 - Robenidone imparts **an unpleasant taste to the flesh** of broilers, if therapy is not terminated 5 days before slaughter.
 - The taste is imparted to eggs when birds are fed at dosages equal to or greater than 66 ppm.
 - The ability of humans to taste robenidone is apparently genetically linked.

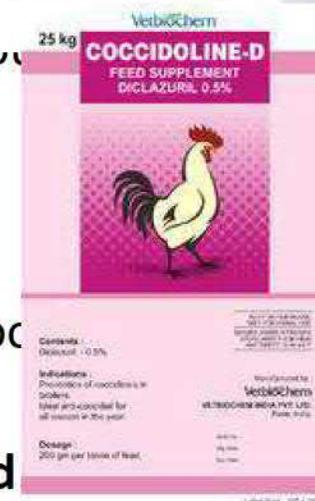
6- CARBANILIDES :

- **NICARBAZIN**
- - Therapeutic uses. Nicarbazine is approved for use in chickens to prevent **coccidiosis outbreaks**.
 - (a) It is effective against all Eimeria species.
 - (b) Its peak activity is on second-generation trophozoites. - It acts by suppression the development **of second generation-schizonts**.
- - It causes stress problems when feed in hot whether and made medicated birds more susceptible to **heat stress**..
- -It is used as preventive against **cecal and intestinal** coccidiosis in broiler 125 ppm. in feed and also replacement flock up to 16 week of age.
- Adverse effects
- (a) Nicarbazine may bleach brown-shelled eggs, cause mottled egg yolks and poor hatchability, and impair egg production.
- (b) Medicated broilers may be more susceptible to heat stress.
- **Contraindication :**
- Nicarbazine is not allowed to be given to **laying hens and breeding** hens as it reduces the egg production and hatchability, however it does not affect semen quality in males.



7- BENZENE ACETONITRILE :

- **DICLAZURIL.**
- *Diclazuril is a safe potent coccidicidal drug* recently introduced in poultry market.
- Diclazuril is a broad spectrum anticoccidial.
- It is used **for prophylactic medication in feed** and re-introduced as **oral solution for treatment.**
- Mechanism of action. Diclazuril is effective against **schizonts** and **gametes** by inhibiting nuclear division.
- It is a very safe compound, being well tolerated by various species of birds.
- Diclazuril is poorly absorbed following the oral administration.
- Traces amount of the drug were determined in blood and tissues.
- The lower tissue level permits a **zero withdrawal period**
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Mechanism of action:

- Its anticoccidial activity is species specific i.e acting against zygotes of *E. maxima*; against gametocytes of *E. Burnettii* and Schizont and gametocytes of *E. acervulina* and *E. tenella*

Precaution and warning:

The homogenous mixing of Diclazuril to the feed stuff is necessary to achieve full effect .

The drug must be feed continuously to be fully effective, as birds in the field are picking up infections all the time.

Diclazuril is **compatible with all therapeutics and feed additives** , and produces such low tissue level that a zero-day withdrawal period is anticipated.

8- SYMMETRICAL TRIZINONES :

- **TOLTRAZURIL**
- Mechanism of action. Toltrazuril and ponazuril are effective against schizonts and gametes by inhibiting nuclear division.
- - Acts as coccidicidal for treatment of cecal and intestinal coccidiosis
- - It is used in drinking water for treatment in chicken, rabbits and turkeys.
- - Its acting is due to interfering with nuclear division of schizont and prevent differentiation into micro and macro gametocytes
- **Doses :** 25 ppm in water for 2 days.
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- **Precaution and warning:**
- -Toltrazuril appears to be compatible with current in feed anticoccidials and antibiotics.
- - It persists for very long time in tissues and **a withdrawal period of 19 days is required**

Coccidial outbreak in flocks receiving anticoccidials.

- **Causes:**
- Massive infection with a virulent strains of *Eimeria*.
- Incomplete mixing of the anticoccidial drugs.
- Presence of resistant strains
- To avoid the incidence of resistant stains, the prophylactic drug should be used as follows (method of application)
- **Shuttle program:** Different anticoccidial drugs are used in a single growth period
- **Rotation program:** One anticoccidial as ionophors drug is used in the growth period and changed by another anticoccidial as chemicals every two growth period.