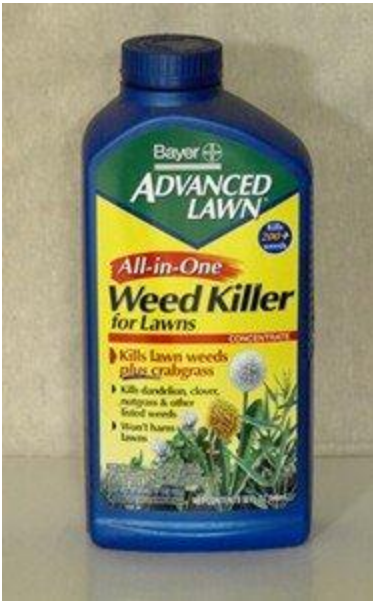


## TOXICOLOGY



**Herbicides:** are chemicals used for kill or remove herbs (weeds) that interfere with agricultural production.

The risk of these chemicals to animals may arise from consuming the treated forages or water, also they might cause increase in concentration of cyanide and nitrate in plant especially younger one.

Certain herbicides are of interest in veterinary medicine because of their toxicity, widespread use, or historical significance.

### Types of herbicides:

- 1- **Inorganic herbicides** : include arsenicals and chlorates. Most of these agents are banned from use; those not banned from use are used infrequently.
  - 2- **Organic synthetic herbicides** : are most commonly used in modern agriculture.
- Herbicides are the most commonly used pesticides chemicals in agriculture.
  - Post emergent herbicides are applied directly to growing plants ; whereas pre-emergent herbicides are incorporation in soil to prevent germination.
    - **Phenoxy herbicides (chlorophenoxy herbicides):** are chlorinated phenoxy derivatives of fatty acids contains one to three chlorine atoms and some time methyl group (e.g. : 2,4 dichlorophenoxyacetic acid (2,4- D) ; 2,4,3 trichlorophenoyacetic acid ( **MCPA**) ; silvex ) **it consider one of highly toxic herbicide for animals and human being.**
  - Rapidly absorbed from the stomach and intestine while dermal absorption is lower and less complete
  - Rapidly distributed to the liver , kidney and brain
  - Toxicity symptoms mostly neurological because they pass through BBB and cause damage to the CNS (depression , tremors , ataxia , weakness) , also some GIT (rumen stasis, anorexia , diarrhea , ulceration of oral mucosa)& CVS disturbance.

- Treatment mostly by general and supportive treatment with diuretics.
- Symptoms of diarrhea and rumen atony should be treated
- Specific antidotes are not available
  - Dipyridyl herbicides ( e.g. paraquat , diquat)
  - **Amide herbicide** : ( e.g. **thiamide** , allidochlor , diphenamide , propanil ).
- They are moderately toxic to animals & humans.
- Toxicity occur due to formation of methemoglobin in blood that not capable to transport oxygen to tissue leading to hypoxia with cyanosis & hemorrhage in tissue.
- Treatment : general & supportive with injection of methylene blue as antidote with oxygen therapy.
  - **Dinitro herbicide** : e.g.(2,4 dinitrophenol ; dinitro-orthocresol ; **dinoseb**)
- Highly toxic herbicide
- Mode of toxicity : by inhibit ATP synthesis due to uncouple oxidative phosphorelation , also they cause methemoglobinemia
- Symptoms of toxicity develop very rapidly that consist of disturbance in GIT , CVS , cataract , skin & hair colored yellow –orange while urine colored yellow green.
- Treatment : generally & supportive treatment with rehydration fluid & giving Na methyl thiouracil.
  - **Triazine** : (e.g. **atrazine** ; propazine , atriazole)
- Highly to moderately toxic.
- They cause excitation to smooth muscle of GIT & respiratory also odema and hemorrhage into different tissues
- Treatment : general and supportive treatment
  - **Dipyridyl** : e.g. **paraquat** & Diquat
- The dipyridyl structure is unique among herbicide
- Dipyridyl compounds are : nonvolatile,water soluble, rapidly and completely inactivated in soil by bacterial activity, strongly bound to clays in soil.
- Used extensively with variation in toxicity, susceptibility between spp. Animals and poultry.

- Absorption is limited ( less than 20% of an ingested dose is absorbed & less than 10% is absorbed through the skin)
- Toxicity mainly due to its accumulation mainly in lung ( 10 times that of other tissues) causing respiratory damage.
- The lungs are most affected.
- Mechanism of toxicity : due to formation of oxidative radicals leading to tissue Damage by lipid peroxidation
- Treatment : general & supportive therapy, specific antidote are not available , but biochemical antagonists have been recommended
  - 1)-superoxide dismutase
  - 2)-acetylcysteine
  - 3)-Vitamin E & C