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Popular Article

Pesticide poisoning in Livestock: An Update

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Abstract

Indiscriminate use of several pesticides by the farmers now raising an alarming situation with increased field reports of poisoning among livestock in current scenario. Tackling of any type of poisoning cases among livestock in field condition always warrants an urgent attention. There is an imperative to have an awareness regarding this among Livestock keepers as well as treating veterinarians about pesticide poisoning.

Introduction

The widespread use of pesticides in agriculture has led to an intense rise in pesticide toxicity cases among livestock. Animals raised close to farmland are at increased risk of pesticide exposure and its harmful effects. Pesticides are chemical agents used to control pests, including insects, rodents, fungi, and unwanted plants, in agricultural environments. Most cases of pesticide poisoning in animals arise from accidental exposure or improper usage. In cattle, poisoning is often associated to major types of agro-chemicals such as insecticides, herbicides, fungicides, fertilizers, and rodenticides. In India, there is scarce literature related to epidemiological investigative data pertaining to pesticide poisoning which needs to be taken care of by the animal scientist in coming days. Most of the field veterinarians as well as para-veterinarians also not so aware about the proper treatment protocol of pesticide poisoning in livestock which needs an update.

Classification of Pesticides

Pesticides are classified according to the pest they can kill, their mode of entry, WHO recommendation as well as their mode of action which is described in detail in the below mentioned table: -

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Mode of Entry	Mode of action	On the basis of pest organism, it kills	WHO Recommendation
Contact Systemic Stomach Fumigants Repellents	Physical, Protoplasmic Respiratory Nerve Chitin	Acaricide Insecticide Herbicide Molluscicide Larvicide etc Rodenticide Virucide etc	Extremely Hazardous Highly Hazardous Moderately Slightly

Sources of pesticide Poisoning

The primary sources of pesticide poisoning in animals are as follows: -

1. **Feed, Fodder, and Water**
   - *Contaminated Feed and Fodder:* Animals consuming freshly sprayed fodder, feeds, or pesticide-contaminated concentrates (such as pesticide-treated grains unfit for human consumption) are at risk of pesticide poisoning. Foraging on freshly treated crop fields and pastures is also a common source of pesticide toxicity.
   - *Accidental Ingestion:* Pesticide poisoning can arise if animals accidentally consume pesticide containers or storage sacks.
   - *Contaminated Water:* Drinking water from pesticide-contaminated ponds, often due to effluents from agricultural fields or spraying, poses a significant risk. Furthermore, using empty pesticide containers as water troughs can also lead to pesticide toxicity.
2. **Accidental Licking**
   - *Ecto-parasiticide:* Animals may lick ecto-parasiticide applied to their skin for the treatment of ticks, mites, and other parasites. Ingesting these chemicals can result in pesticide toxicity. Additionally, these substances can be absorbed through mucous membranes, eyes, or broken skin.
   - *Freshly Sprayed Surfaces:* Animals might also unintentionally lick freshly sprayed walls or surfaces, leading to potential adverse health effects from pesticide exposure.
3. **Intentional/Malicious Poisoning**
   - Farm animals may be intentionally poisoned when pesticides are mixed into their feed, fodder, or water, leading to deliberate pesticide toxicity.

Clinical Signs: Symptoms of pesticide exposure typically begin within minutes to hours but can occasionally be delayed by more than two days. The dose and route of exposure play a significant role in determining the severity and progression of poisoning. In acute cases, early signs often include

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respiratory distress and collapse, which can rapidly escalate to life-threatening paralysis of the respiratory muscles. Animals affected by pesticide poisoning may exhibit a variety of clinical symptoms such as excessive salivation, loss of coordination (ataxia), constricted pupils (miosis), frequent urination, diarrhoea, vomiting, abdominal pain (colic), muscle tremors, weakness, seizures, and difficulty breathing (dyspnoea). Because these pesticides are fat-soluble, they accumulate in the animal's adipose tissue after ingestion or exposure. They are only slightly excreted through urine, and their elimination through faeces is slow. The main route of excretion is through the milk in lactating animals. Consequently, the removal of pesticides from a contaminated animal is a slow and extended process.

Treatment Protocol for Pesticide Poisoning: When animals are exposed to pesticides, the following steps should be implemented such as :-

1. *Identify and Remove the Source of Contamination:* Start by checking the feed, water, and insecticide applications to identify the source of contamination. Immediately stop using any materials that are found to be contaminated.
2. *Administer Activated Carbon:* In cases of acute pesticide poisoning, administer 2 to 2.5 kg of activated carbon to cows. Prepare a slurry by combining 2 to 3 parts water with 1 part activated carbon.
3. *Manage Convulsions:* If cows experience convulsions, the veterinarian may administer intravenous phenobarbital or another barbiturate. After intravenous treatment is stopped, continue phenobarbital orally at a dose of 10 mg per kg of body weight daily (about 5 g or one tablespoon). This treatment should last for 6 weeks or until pesticide levels in the milk are below permissible limits. Phenobarbital can be mixed with the grain ration. Milk should not be sold until at least 7 days after discontinuing phenobarbital.
4. *Ongoing Activated Carbon Administration:* Continue administering 1 kg of activated carbon per day for a 550 kg cow. It can be mixed with silage or grain to make it easier for the cow to consume. Some dairy cooperatives add activated carbon at a 10% concentration to concentrates, which is then pelleted for feeding.

Besides all these treatment protocols, symptomatic treatment in the field situation is having its own importance in minimizing the possible life threatening conditions. It is customary to start the treatment as soon as possible in poisoning cases without much delay once ascertaining the circumstantial evidence. Clinical investigations by taking blood, serum as well as feed or fodder examination also will be much helpful in diagnosing the poisons which suggest different treatment protocol to minimize the casualty. Post-mortem examination of dead animals if any must be

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thoroughly done by expert pathologists which may give all conclusive clue about different types of poisoning.

Conclusion

Intensified crop husbandry coupled with ever decreasing cropping land warrants maximum use of pesticides, insecticides etc which assessed by the livestock thus up-scaling occurrence of poisoning cases in field. Recent literature bridges the knowledge gap among animal owners as well as field vets to update their knowledge on different sources of poisoning as well as clinical signs and treatment protocols which definitely be helpful in minimizing the life risks of animals in poisoning cases during treatment.

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