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## Clinical management of accidental chlorpyrifos and cypermethrin poisoning in a she buffalo *Bubalus bubalis*: A case study

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**Abstract**

Organophosphorus and pyrethroid are the pesticides most often involved in serious poisoning in animals. A she buffalo was presented to the Referral Veterinary Polyclinic, IVRI, Izatnagar in recumbent stage with a history of incoordination, salivation and shivering which had accidentally ingested insecticide solution containing chlorpyrifos and cypermethrin. Clinical examination revealed profuse watery salivation, dyspnea, protrusion of tongue, muscle fasciculation, miosis along with hyperthermia and tachycardia. The animal was successfully managed by atropine sulphate along with supportive therapy and completely recovered after four days of treatment.

**Keywords:** Chlorpyrifos, cypermethrin, poisoning, *Bubalus bubalis*, atropine sulphate

**1. Introduction**

Chlorpyrifos and cypermethrin are commonly used to control pest in agriculture and accidental exposure of livestock to these compounds causes toxicity which is really a major concern. Chlorpyrifos, an OPC compound effect on the nervous system by inhibiting choline esterase which helps to split acetylcholine to choline and acetate [10]. Symptoms produced by OPC poisoning an animal because of cholinergic overstimulation are muscarinic (dyspnea, hypersalivation, sweating, increase gastrointestinal motility etc.) and nicotinic (tremor, convulsion etc.) response [4]. According to the WHO classification, pyrethroid comes under the fourth group of insecticide [13]. Cypermethrin, a type II pyrethroid causes hypersalivation and motor dysfunction in mammals. Besides the effect on sodium channels, these compounds also act on chloride channels to induce prolong depolarization [11]. The present study deals with the diagnosis and successful clinical management of chlorpyrifos and cypermethrin poisoning in a she buffalo.

**2. Materials and Methods**

Based on the history, circumstances of exposure and clinical presentation, clinically the case was diagnosed as an accidental organophosphate and pyrethroid poisoning.

**2.1 Case history**

A 3-year female buffalo was presented to Referral veterinary polyclinic-Indian veterinary Research Institute, Izatnagar with the complaint of accidental insecticide ingestion, profuse salivation, inappetence and frequent urination. A bottle of Shesnag 505 insecticide (Chlorpyrifos 50% and cypermethrin 5 %) also presented to the clinic (Fig 3) which was ingested by the animal.

**2.2 Clinical examination**

On clinical examination, buffalo had depressed mentation, hypersalivation, miosis, protrusion of tongue, muscle fasciculation, dyspnea, congested mucous membrane and lateral recumbency (Fig. 1 and 2). The physiological parameter was shown rectal temperature-103.1°F, heart rate- 110 beats per minute, respiratory rate-38 breaths per minute.

**2.3 Treatment**

Buffalo was treated by atropine sulphate @0.6 mg/kg BW (1/3<sup>rd</sup> given slow IV and 2/3<sup>rd</sup> S/C)

along with supportive therapy (Fig. 4) magnesium sulphate (10%) @ 0.5 mg/kg orally, Normal saline 2 L, Ringer's lactate 2 L, meloxicam @ 0.5 mg/kg BW IV, pheniramine

maleate 10 ml IM, inj. Belamyl (B-complex and Liver extract) 10 ml IM and rumenotoric bolus Ecotas @ 2 boli orally daily for 4 days.



Fig 1: Hypersalivation (Wet straw)

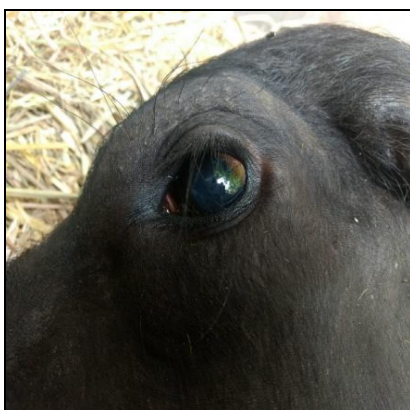


Fig 2: Miosis



Fig 3: Sheshnag 505 insecticide



Fig 4: Atropine and supportive therapy



Fig 5: After one hour treatment

### 3. Results

There was a significant improvement in clinical condition after one hour of treatment (Fig. 5) the animal began to raise up, profuse salivation was stopped, started to drink water, and body temperature came to normal (100.9° F). After four days of successive therapy, the animal came to normal appetite, body and recovered uneventfully.

### 4. Discussion

Different types of agrochemical poisoning in animals commonly occur either because of accidental insecticide ingestion or eating of forage recently sprayed with insecticide solution [9]. Chemical poisoning mainly because of organophosphorus compounds is highly detrimental for the life of the animal [1]. Pyrethroids are synthetic insecticide divided into two types (Type I and Type II). Cypermethrin is a type II pyrethroid having enhanced insecticide property than Type I pyrethroid compound and also more toxic to mammals [12]. Atropine sulfate is considered as an initial choice for treatment of acute OP poisoning. Atropine act by inhibiting the superfluous acetylcholine concentration at muscarinic receptor in OPC poisoning. Sweating, salivation, vomition, diarrhea in OP poisoning can be controlled by atropine [5]. Magnesium sulfate was found beneficial in OPC poisoning [7]. For pyrethroids poisoning activated charcoal along with saline cathartic (magnesium sulfate @ 0.5 mg/kg orally) are indicated due to its adsorptive property against toxicants [2]. Severe fluid therapy is indicated to check the hemoconcentration. Meloxicam, a NSAIDs, uses in pyrexia

which acts by inhibiting COX-2 [3]. Vitamin B-complex acts as a nerving tonic that managed electrical conduction in the nerve fibers [8] and is also the part of the many metabolic pathways. Symbiotic preparation (Ecotas bolus) helps to restore normal appetite and rumen motility [11].

### 5. Conclusion

Accidental chlorpyrifos and cypermethrin poisoning in animals are emergency conditions which required early diagnosis for successful treatment. These type of organophosphate and pyrethroid poisoning can be clinically managed by atropine sulphate @ 0.6 mg/kg BW (1/3<sup>rd</sup> slow IV and 2/3<sup>rd</sup> S/C) along with supportive therapy.

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