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Research Article

Acute oral toxicity study of polyherbal formulation AV/KPC/10

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Abstract

The current study was designed to study acute oral toxicity study of polyherbal formulation AV/KPC/10 (M/S Ayurvet Limited, Baddi, India) according to OECD guidelines. For new substances it is the recommended stepwise testing approach for developing scientifically sound data on the safety of the substance. Three wistar rats (2 females and 1 male) were used for the study. AV/KPC/10 in single oral dose (2000mg/kg) supplemented to all rats. The parameters like general appearance, behavior, body weight, mortality and necropsy were studied. No changes in general appearance and mortality was observed. AV/KPC/10 was found to be safe at dose of 2000mg/kg.

Keywords: AV/KPC/10, OECD guidelines, Necropsy

1. Introduction

Traditional and alternative medicine is extensively practiced in the prevention, diagnosis, and treatment of various diseases[1][2]. Despite the widespread use of plants for treatment of several ailments there is a little known about their toxicity and safety. The evaluation of the toxic action of the plant extracts or herbal formulations is important in order to consider them safe before used as medicines[3]. A key stage in ensuring the safety of drugs is to conduct toxicity tests in appropriate animal models[4]. The acute oral toxicity test aims at establishing the therapeutic index, i.e. defined as the ratio LD_{50}: ED_{50}. In general, the narrower this margin, the more likely it is that the drug will produce unwanted effects, the greater the index the safer the compound. However, the term acute oral toxicity is most often used in connection to lethality and lethal dose determinations[5]. The objective of the current experiment was to study the Acute Toxicity of AV/KPC/10 (*M/S Ayurvet Limited, India*), an herbal formulation containing herbs viz. *Phyllanthus niruri*, *Tephrosia Purpurea*, *Glycyrrhiza glabra* etc. recommended for the treatment of ketosis in cattle.

2. Materials & methods

Acute Toxicity study of "AV/KPC/10" was performed following OECD Guideline 423 in the Department of Pharmacology and Toxicology, College of Veterinary & Animal Sciences, Bombay Veterinary College, Mumbai, Maharashtra, India

2.1 Experimental animals

The animals for the current study were approved by Institutional Animal Ethical Committee of Bombay Veterinary College, approval no: BVC/IAEC/50/2012. Wistar rats (2 females and 1 male) of age 9 weeks and average weight of 250 gms were used for the study.

2.2 Experimental design

The rats were acclimatized to their surroundings 5 days prior to the test by separating them from the rest of the animals and allotting different cages to them. The rats were identified by color marking. Rats had free access to standard commercial rat feed, except on the day prior to dosing. Water was provided *ad libitum*. The rat feeding needle was used to dose the animals. Weights were recorded prior to dosing (2ml/animal/single oral dose) (2000 mg/kg) on day 7 and prior to sacrifice on

day 14. All the procedures were carried out at ambient temperature (27°C).

3. Results and discussion

3.1 General appearance and behavioral observations

The appearance and behavioral parameters of animals after drug administration is indicator of the toxicity of the test drug[6][7]. The behavioral patterns of animals were observed first 6 h and followed by 14 h after the administration. No significant changes were observed in wellness parameters used for evaluation of toxicity. Skin, fur, eyes, mucous membrane, behavioral pattern, salivation and sleep pattern parameters of the treated animals were found to be normal (table 1). No toxic symptom or mortality was observed in any animal. All treated animals lived up to 14 days after the administration of AV/KPC/10.

Table 1: Clinical observations of rats at 2,000 mg/kg dose of AV/KPC/10

Signs	Rat 1	Rat 2	Rat 3
Skin and Fur	Normal	Normal	Normal
Eyes And mucous membranes	Normal	Normal	Normal
Behavior	Normal	Normal	Normal
Somatomotor activity	Normal	Normal	Normal
Tremors/ convulsions	Absent	Absent	Absent
Salivation	Absent	Absent	Absent
Diarrhoea	Absent	Absent	Absent
Death	No	No	No
Other symptoms	Nil	Nil	Nil

3.2 Body Weights

An increase in body weight of the animal after test drug administration is indicator of its toxic effect[8]. Table 2 showed the change observed before and after the administration of the AV/KPC/10. Although, the body weights of all the rats were increased after the oral administration of AV/KPC/10. But, the changes of the body weights were found to be statistically insignificant. Insignificant increase in body weight of test animals indicates that the administration of the AV/KPC/10 had no toxic effect on animals.

Table 2: Effect of AV/KPC/10 on the body weight of rats at 2,000 mg/kg dose

Rat	Weight in grams		
	Day 1	Day 7	Day14
1	230	240	230
2	270	300	300
3	250	270	280

3.3 Necropsy

All limit test animals were euthanized at study termination (day 14) and necropsied. Body cavities (cranial, thoracic, abdominal and pelvic) were opened and examined. No lesions were observed in all rats.

Rat number	Observed lesions
1	Nil
2	Nil
3	Nil

3.4 LD_{50} Value

An LD_{50} value is the dose at which 50 percent of the test animals can be expected to die[9][10][11]. As per calculations from Acute Oral Toxicity (Category 5 as per OECD guidelines 420, 423 & 425 for acute Toxicity Studies) the LD_{50} value of AV/KPC/10 was found to be more than 2000 mg/kg body weight.

4. Conclusion

All the three animals survived by the end of the study; Clinical signs symptoms and gross necropsy did not reveal any major findings. The LD_{50} of the AV/KPC/10 was greater than 2000mg/kg (Category 5 as per OECD guidelines 420, 423 & 425 for acute Toxicity Studies) and hence it is practically nontoxic.

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