

# THERAPEUTIC EFFICACY OF ANDROGRAPHIS PANICULATA AGAINST HEPATOPATHY IN DOGS

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## Introduction

*Andrographis paniculata* is an ingredient of several licensed polyherbal preparations used as hepatoprotectants in India (Das *et al.*, 2003). However, studies on the effects of the crude extracts of this plant alone against liver dysfunction in dogs are scanty. Hepatic disorder in dogs, either drug-induced or sequelae to infectious diseases, is sometimes encountered during pet animal clinical practice. Keeping the above facts in forefront, the present study was designed to evaluate the efficacy of *A. paniculata* plant against hepatopathy in dogs.

## Materials and Methods

Clinical, biochemical and ultrasonographic examinations were undertaken in the dogs presented in the Teaching Veterinary Clinical Complex of the faculty for differential diagnose of hepatopathy. Serum biochemical analysis include estimation of glucose, total protein, albumin and alkaline phosphatase (ALP).

Six dogs of different signalment were screened and included in the therapeutic study. Owners of the patients were prescribed to purchase the dried stems of *A. paniculata* from the local market. The quantity of stem required was calculated @ 0.5g per kg b.w. and subsequently immersed overnight in 20 ml of drinking water. Such aqueous extract was administered orally to each dog daily with/without food. Fresh water extract was prepared following the procedure described above and given to the dogs daily for 10 days. Parenteral glucose and electrolytes were co-prescribed to anorectic dogs for 2-3 days as initial supportive therapy.

Besides, clinico-biochemical and ultrasonographic examinations, liver biopsy was performed for light and electron microscopic examination on pre-treatment and 15 days after the entire course of the therapy with *A. paniculata*. The liver biopsy samples kept in 0.5 ml of 0.1M phosphate buffer saline were sent to the Department of Anatomy, All

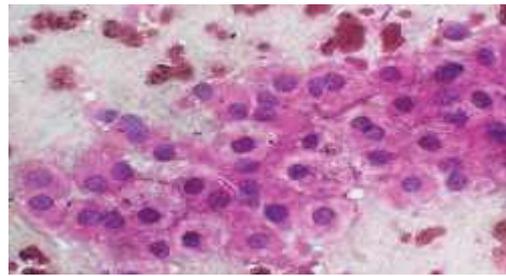
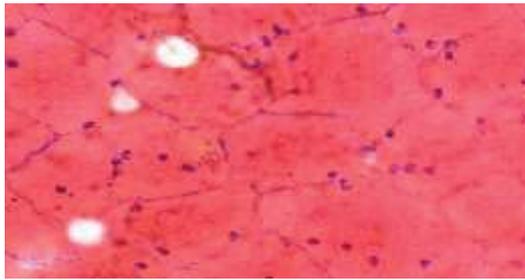
India Institute of Medical Sciences, New Delhi at 4°C for electron microscopic study.

## Results and Discussion

Clinical signs recorded in the six selected dogs with hepatic dysfunction were inappetence, depression, jaundice, vomition and diarrhea. These findings were in agreement with Rogers *et al.* (1977). Serum analysis revealed a decrease in glucose (45.25- 54.62 mg/dl), total protein (4.21- 4.94 g/dl), albumin (2.71-2.88 g/dl) and increase in alkaline phosphatase (70.8-89.5 IU/L) concentration. Similar opinion was also forwarded by Hall (1996) and Vijaya Kumar *et al.* (2004). Ultrasonogram showed an increase in echogenicity i.e., more hyperechoic parenchyma with prominent hepatic portal vessels. This corroborated with the findings made by Varshney and Hoque (2001) and Vijaya Kumar *et al.* (2004). Histopathological picture of liver biopsies in light microscope showed marked centrilobular hepatic necrosis with deposits of fiber on cell outline and fatty degeneration of cells (Fig. 1&2). Similar features were reported by Rutgers *et al.* (1997). Transmission electron microscopic studies on liver biopsy showed few clumped masses of glycogen, mitochondria of variable shape and size, dilated bile canaliculi, zig-zag shaped nucleus and increased number of glycogen particles (Fig 3 -5).

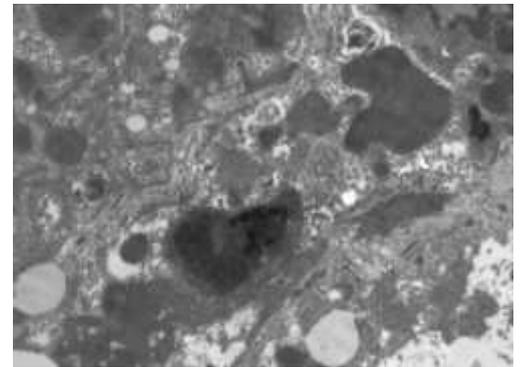
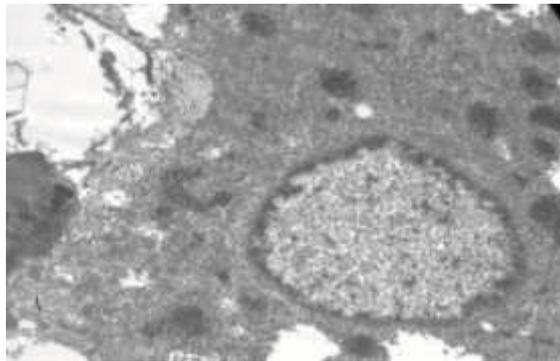
Disappearances of clinical signs in a progressive manner were recorded following administration of plant extract *A. paniculata* and all the six dogs became clinically normal within seven days of treatment. The mean values of biochemical constituents with respect to total protein, albumin, glucose and alkaline phosphatase in treated dogs 15 days after therapy changed significantly which varied between 6.22 – 7.14 g/dl, 3.11 – 3.98 g/dl, 65.25 – 84.62 mg/dl and 45.6 – 50.6 IU/L, respectively. These values were within the reference range of healthy dogs as documented by

**Light microscope photographs of liver biopsy of dogs (Hematoxylin and Eosin stain x 450)**

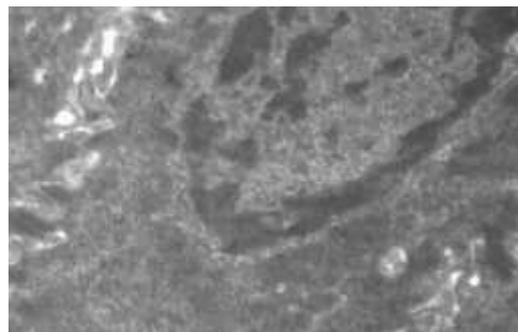
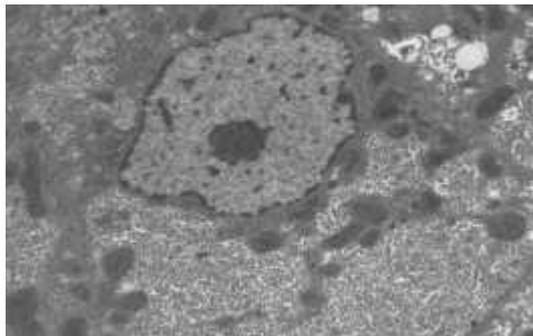


**Fig 1.** Marked centrilobular hepatic necrosis and **Fig 2.** Hexagonal and polygonal hepatic cells heavily deposited fibers on cell outline in a 4 ½ with prominent nucleus and nucleolus in a 6 years old cocker spaniel dog with hepatic disorder. Years and 8 months old GSD bitch after therapy with aqueous extract of *Andrographis paniculata*

**Transmission Electron Micrograph of hepatic biopsy specimen taken before and after treatment with aqueous extract of *Andrographis paniculata*.**



**Fig 3.** Clumped glycogen of variable shape, size and trunked mitochondria in a 3 ½ year Golden retriever bitch affected with hepatic disorder. **Fig 4.** Dilated bile canaliculi in a 5 ½ year old doberman dog affected with hepatic disorder.



**Fig 5.** Zig-zag shaped nucleus and increased number of glycogen particles in a 5 years and 10 months old Damatian dog affected with hepatic disorder. **Fig 6.** Normal liver cell structure in a 6 years and 8 months old GSD bitch recovered after hepatic dysfunction with aqueous extract of *Andrographis paniculata*

Coles (1986). Ultrasonographic picture showed mosaic nature of the liver parenchyma. Hexagonal and polygonal hepatic cells with prominent nucleus and nucleolus indicated status of a healthy liver tissues ( Fig.2). (Fig. 6). The transmission electron microscopic findings

revealed regeneration of hepatocytes . Similar ultra structure observations were also stated by Rutger, *et al.* (1995).

*A. paniculata*, commonly known as King of bitters, belongs to the family Acanthaceae. The plants as a whole or its

diterpenoid active principle andrographolide are known to have hepatoprotective, proenzymatic, choleric, antioxidant and bitter tonic actions (Trivedi and Rawal, 2001). Hence, It would not be unwise to use this plant alone or in combination with other medicinal plants having synergistic action for therapeutic as well as prophylactic use against liver disorders.

### Summary

A therapeutic trial conducted to assess the efficacy of *Andrographis paniculata* against hepatopathy in dogs revealed that administration of water extract of the dried stem of *A. paniculata* @ 0.5g per kg b.w. daily for 10 consecutive days were efficacious with respect to clinical, biochemical, ultrasonographic and histopathological alterations.

### Acknowledgement

Authors are thankful to the Dean, College of Veterinary Science and Animal Husbandry, Orissa University of Agriculture and Technology, Bhubaneswar for providing facilities to carry out the study.

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