

## Antifilarial Effect of a Plant *Acacia auriculiformis* on Canine Dirofilariasis

Tanushree CHAKRABORTY, Santi Prasad SINHABABU and Nirmal Chandra SUKUL

*Department of Zoology, Visva-Bharati University,  
Santiniketan – 731 235, West Bengal, India*

**Abstract:** An ethanolic extract was obtained from the funicles of *Acacia auriculiformis*. The extract was allowed to evaporate and the residue thus obtained was administered orally to 4 pariah dogs naturally infected with *Dirofilaria immitis* at 150mg/kg/day for 45 days. The treatment resulted in 98% and 99% reduction in microfilarial density on day 45 and day 75, respectively following the onset of treatment. Microfilarial density rose gradually and the level of reduction in the sampling on day 165 was 59%. No toxic effect in the form of a change in movement, body weight and temperature was observed in the treated dogs. The prolonged maintenance of reduced level of microfilarial density may be ascribed to the partial elimination of adult worms.

*Key Words:* *Acacia auriculiformis*, Funicles, Ethanolic extract, *Dirofilaria immitis*

*Acacia auriculiformis* A. cunn (family-Mimosaceae) locally called 'Akashmani' is grown in forests and avenues throughout India. Ghosh *et al.*, (1993) showed filaricidal properties of two triterpenoid saponins Acaciaside A and Acaciaside B obtained from the funicles of this plant. The saponins when tested on *Setaria cervi* transplanted in rats were found effective against both microfilaria and adult worms. We have already reported filaricidal properties of *Andrographis paniculata* and *Zingiber officinale* (Dutta and Sukul, 1982; Datta and Sukul, 1987). Antifilarial effect of Solamargine, a steroidal alkaloid glycoside isolated from the ripe berries of *Solanum khasianum*, was reported earlier (Ghosh *et al.*, 1994). In the present study the ethanolic extract of the funicles of *A. auriculiformis* was tested on dogs naturally infected with *Dirofilaria immitis*. The ethanolic extract contains saponins. The purpose is to see if the desired objective is achieved without going through the complex and expensive procedure of purification of the active compound.

The funicles of *A. auriculiformis* were dried in the shed and ground. The powdered material was extracted with 90% ethanol at room temperature ( $27 \pm 3^\circ\text{C}$ ). The ethanolic extract obtained after the removal of the solvent under reduced pressure, was dried over anhydrous calcium chloride.

The albino rats were selected for the toxicity test. The rats were kept in cages with access to food and water ad libitum. The residue from the ethanolic extract was mixed with

water and administered orally into the rats at the rate of 1g/kg/day for 30 day. The treated rats were kept under observation for 30 days after the last dose.

Blood was sampled from naturally infected dogs, two males and two females, every week for a period of eight weeks and microfilarial concentration per 20mm<sup>3</sup> blood was determined for each sample. The blood film was allowed to dry, dehaemoglobinized in distilled water and stained with Giemsa stain. After determining microfilarial density for eight weeks, the dogs were administered orally with the residues of *A. auriculiformis* at 150mg/kg body weight/day. The treatment was given once daily for 45 days. Empty capsules were filled with the residue, kept inside a loaf of bread and then offered to the microfilaraemic dogs. Blood was first sampled on day 22 from the date of treatment and thereafter on day 45. Additional samplings were done at monthly intervals up to 165 days.

The treated rats did not show any apparent toxicity in terms of change in body weight, temperature, intake of food and movement.

The mean microfilarial count per 20mm<sup>3</sup> of blood in four dogs before treatment are shown in Table-1. The microfilarial concentration in the four dogs did not vary appreciably during the eight week period of observation. The mean of microfilarial densities is plotted against days of sampling and of treatment in figure-1.

The figure shows that there was a 98% reduction in microfilarial density following 45 days of treatment as compared to the pretreatment level. The microfilarial density showed 99% fall after 30 days of treatment. Thereafter, the microfilarial count started rising very slowly, and even 120 days after the last dose 59% reduction was maintained.

The marked reduction of microfilarial count after the treatment indicates that the plant extract is a very effective microfilaricide. This reduction can not be attributed to environmental temperature which varied from 30 to 35°C during pre- and post- treatment sampling period. The post treatment maintenance of the reduced level of microfilarial concentration in blood suggests that some of the adult worms might have been killed by the residue. This supports our earlier observation that the action of saponins isolated from *A. auriculiformis* on microfilariae and adult worms of *Setaria cervi* is direct and independent (Ghosh *et al.*, 1993). The treated dogs in this experiment could not be sacrificed for adult worms. Since this drug is water soluble, nontoxic and effective by oral administration it can be tried against human filariasis in future. While DEC and ivermectin would continue to remain as effective antifilarial drugs, plant substances may play an important role in the control of filariasis.

**Table. 1.** Pretreatment microfilarial count/20mm<sup>3</sup> blood at weekly intervals for 8 weeks

Dogs	1st week	2nd week	3rd week	4th week	5th week	6th week	7th week	8th week
Male	2583	2781	2589	2634	2542	2575	2639	2667
Male	2745	2537	2746	2775	2573	2809	2798	2813
Female	1754	1720	1794	1682	1747	1665	1784	1679
Female	2359	2126	2346	2358	2330	2428	2218	2435

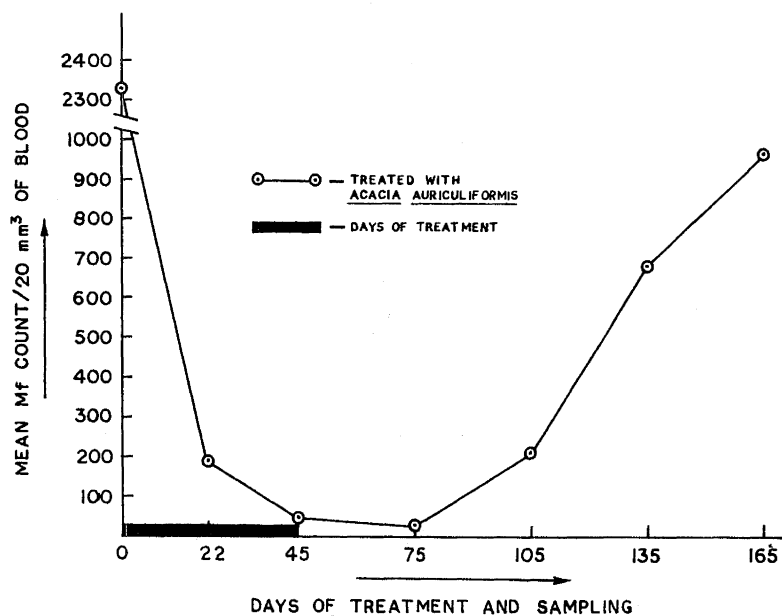


Fig. 1. Mean microfilarial count per 20 mm<sup>3</sup> of blood in dogs treated with the ethanolic extract of the funicles of *Acacia auriculiformis*. Dark line at the base shows days of treatment.

#### REFERENCES

- 1) Datta, A. and Sukul, N.C. (1987): Antifilarial effect of *Zingiber officinale* on *Dirofilaria immitis*. J. Helminthol., 61, 268–270.
- 2) Dutta, A. and Sukul, N.C. (1982): Filaricidal properties of a wild herb, *Andrographis Paniculate*. J. Helminthol., 56, 81–84.
- 3) Ghosh, M., Shinhababu, S.P. and Sukul, N.C. (1993): Antifilarial effect of two triterpenoid saponins isolated from *Acacia auriculiformis*. Ind. J. Exp. Biol. 31, 604–606.
- 4) Ghosh, M., Shinhababu, S.P., Sukul, N.C., Sahu, N.P. and Mahato, S.B. (1994): Antifilarial effect of solamargine isolated from *Solanum khasianum*. Int. J. Pharmacog., 32, 1–7.