Table 1 *Tropane alkaloid content (per cent dry weight) of Lycium barbarum in vivo and in vitro*

	Alkaloid content* (%)			
Alkaloid	Roots	Shoots	Fruits	Callus
Atropine	0.42 ± 0.07	0.93 ± 0.02	0.95 ± 0.04	0.74 ± 0.02
Hyoscyamine	0.25 ± 0.02	0.33 ± 0.02	0.29 ± 0.01	0.09 ± 0.05
Total alkaloid	0.67 ± 0.04	1.26 ± 0.02	1.24 ± 0.02	0.83 ± 0.03

*Mean and 95% confidence limits.

Mitra[1] and Khanna *et al.*[2] have estimated the atropine content of roots (0.45%) and seedling callus cultures (0.53%) of *A. belladonna* respectively. Hocking[3] showed the presence of alkaloids in roots (0.08–0.11%), stems (0.01–0.025%), leaves (0.04–0.08%), flower tips (0.07–0.10%), seeds (0.06–0.10%) and whole herbs (0.02–0.08%) of *H. niger*. Gaur[4] showed significant amounts of hyoscine (0.019%) and hyoscyamine (0.57%) in seedling callus cultures of *H. niger*. Tropane alkaloids have also been reported from the seeds (0.32%) of *D. innoxia*[5]. Prabhakar *et al.*[6] have described the commercial production of tropane alkaloids such as hyoscine from the leaves and seeds of *D. innoxia*, *D. metal* and *D. fastuosa*.

The present results show that yields of tropane alkaloids from tissue culture are lower than those from intact plant parts and are dependent on added growth factors in the medium.

The fruits of *L. barbarum* are widely eaten by camels and goats in the Indian arid zone. Studies on the effects of these alkaloids on these animals will be interesting.

L. barbarum growing in Indian arid zone is a new source of tropane alkaloid. The presence of high amounts of atropine in the fruits of the intact plant is of great commercial importance and merits the attention of the pharmacological industry.

The author is grateful to Prof. (Miss) P. Khanna, Department of Botany, University of Rajasthan, Jaipur, and to Dr T. N. Nag, Lecturer in Botany, Dungar College, Bikaner, for providing laboratory facilities and valuable guidance. The investigation was supported by financial assistance from CSIR, New Delhi.

3 February 1988; Revised 23 December 1988

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PRELIMINARY REPORT ON CARDIAC DEPRESSANT EFFECT OF *HEMIDISCUS HARDMANNIANUS* (BACILLARIOPHYCEAE)

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IN recent years, investigations of marine plants and animals for useful drugs have become increasingly important. At present no diatom has been shown to be a potential source of drugs other than antibiotics. *Hemidiscus hardmannianus* is a common diatom in the Indian seas. It was tested for possible cardiac activity.

H. hardmannianus was collected from the mouth of

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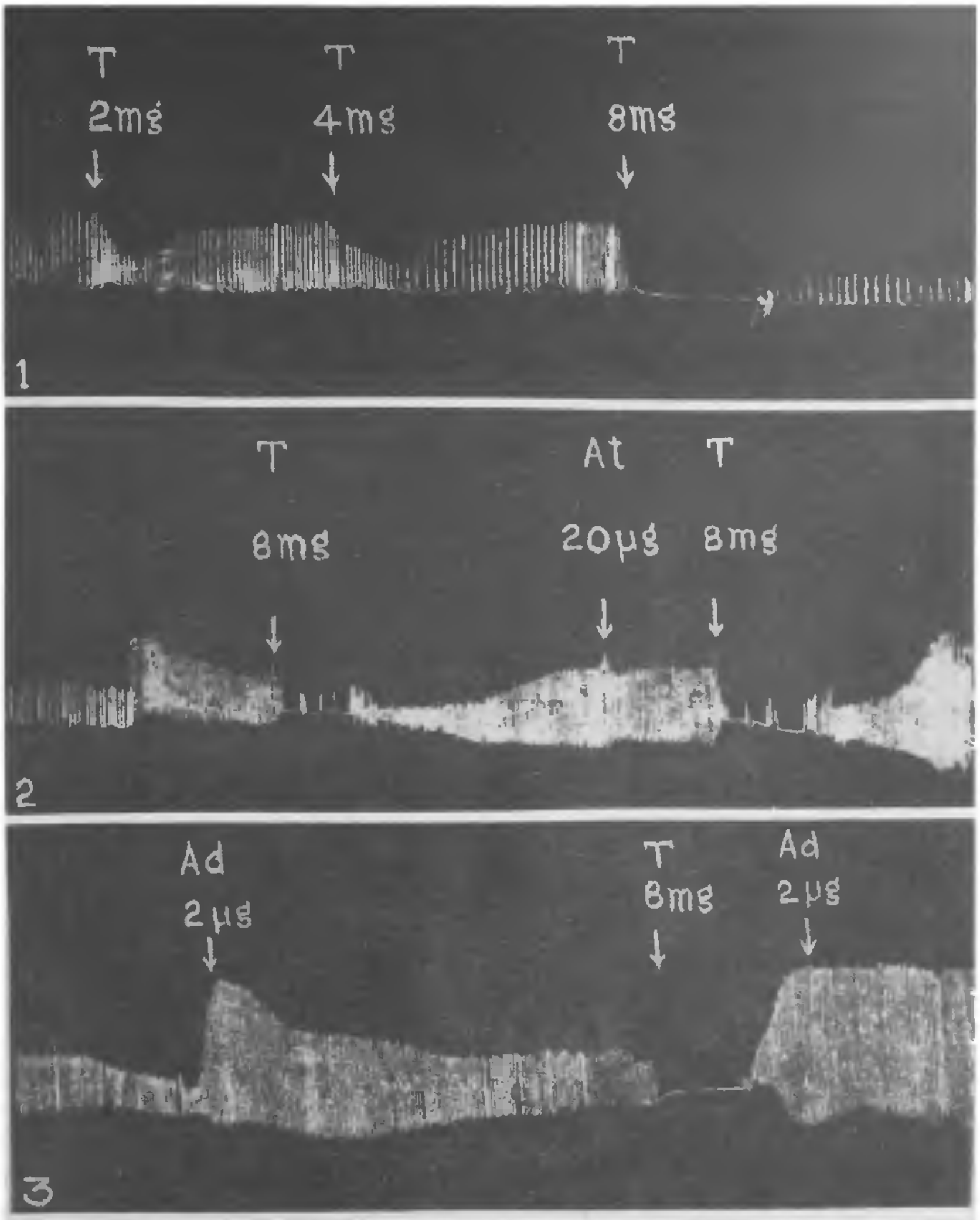

Figures 1–4. **1,** Dose-related cardiac depressant effect. **2,** Cardiac depressant effect of the test extract before and after atropinization. **3,** Blockade of adrenaline stimulation by the test extract. **4,** Propranolol blockade upon adrenaline stimulation. [Ad, Adrenaline; At, atropine; Pr, propranolol; T, test extract.]

the Vellar estuary (11°29' N; 79°46' E). The F/2 medium of Guillard[1] was used for culture of the diatom. The culture was maintained in 25‰ salinity at 29 ± 1°C under illumination of 4000 lux in a 12 h light and 12 h dark cycle. The cultured cells were harvested after they reached stationary phase (7th day). Cells (4.46×10^6) were extracted with hot methanol and the extractions were fractioned with diethyl ether, 1-butanol and water[2]. Only the water-soluble fraction, which was shown to be toxic[3], was used in the experiment. The water-soluble fraction was dialysed and the dialysate was evaporated to dryness in a vacuum evaporator.

Aqueous solution (10 mg/ml) of the substance was prepared for the isolated-heart experiment[4]. Frog's heart was isolated and perfused with Clark's frog Ringer solution[5] at pH 7.4. The effect of different concentrations of the test extract on the heart was recorded. The depressant effect of the test extract was compared with that of acetylcholine using atropine as the blocker. Similarly the depressant effect of the test extract was compared with that of propranolol, a beta-blocker, using adrenaline as the agonist. The experiment was repeated ten times. All the results were consistent.

The cardiac depressant effect of the test extract is dose-related (figure 1). The test extract produced cardiac depressant effect even after atropinization (figure 2), indicating a non-cholinergic nature of action. Figure 3 shows the effect of the test extract during the response to 2 μg of adrenaline. It is clear that the test extract produces initial inhibition followed by its own partial agonistic effect, and then blocks the effect of adrenaline-induced stimulation, unlike propranolol which has no partial agonistic action (figure 4). The test extract may be a beta-blocker with associated partial agonistic activity. Further investigation is in progress.

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MODULATION OF PROTECTIVE EFFECTS OF VITAMIN C IN AFLATOXICOSES

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WIDESPREAD infestation of food and feed by toxigenic strains of *Aspergillus flavus*[1,2] is known to cause mild to severe aflatoxicoses. The damage can be histopathologic[3,4], carcinogenic[5] or mutagenic[6]. In order to minimize the hazards of aflatoxins, a search was made for various drugs that could nullify toxin-caused damage. The well-known antitoxicant, L-ascorbic acid (vitamin C)[7,8], was tested and the results are presented here.

The rate of increase in body weight of weaning guinea pigs (*Cavea cavea*), was used as a parameter for adjudging the general physical profile of the animal. Six- to seven-week-old healthy animals (supplied by Central Drug Research Institute, Lucknow) were fed 50 ± 10 ppb of crude aflatoxin per day per animal along with their normal food for 20 weeks. The method of laboratory elaboration of toxin, maintenance of the experimental animals, and the mode of feeding have been described elsewhere[3,4]. The animals were divided into six groups: (i) no administration of vitamin C or toxin (control), (ii) administration of vitamin C only (AA), (iii) administration of toxin only (AFT), (iv) concurrent administration of toxin and vitamin C (AFT + AA), (v) toxin feeding for 10 weeks followed by exclusive feeding with vitamin C for 10 weeks (AFT → AA), and (vi) vitamin C feeding for 10 weeks followed by exclusive feeding with the toxin for 10 weeks (AA → AFT). The dose of vitamin C was 2 mg/kg body weight which is proportionate with the dose prescribed for humans.

To study the effect on body weight, a weekly mean weight was calculated for each group of animals ($n = 12$ in each group) for up to 20 weeks. From these weekly means, the relative increase in