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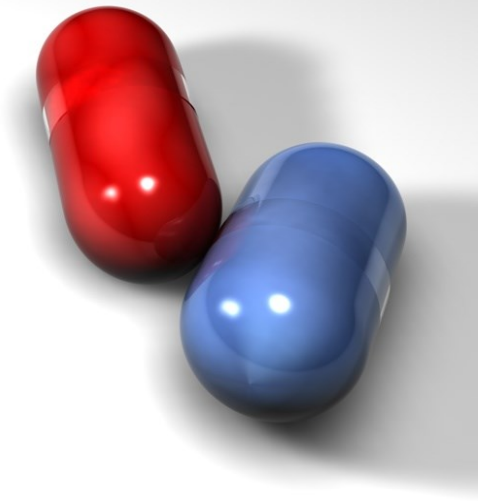

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Letter to the Editor

Anxiolytic activity of fortified *Centella asciatica*

Sir,

Mandookaparni (*Centella asiatica*) is a medicinal plant used in Ayurveda since thousands of year and listed in the historic Shusruta Samhita, an ancient Ayurvedic medicinal text. The fortified form of *C. asiatica* is prepared by giving Bhavana (triturating with decoction prepared from *C. asiatica* leaves) to the *C. asiatica* powder. The herb *C. asiatica* is extensively used in various parts of India for various ailments like headache, body ache, asthma (Chopra et. al., 1956). It is also reported that *C. asiatica* used in various mental disorders and is regarded as one of the best psycho-tropic drugs. *C. asiatica* and its chemical constituent asiaticoside were evaluated for its anxiolytic activity in rats (Wijeweera et al., 2006). The anxiety disorders are increasing in general population and there is a great need of cost effective, less addictive, toxic free drugs for the management of anxiety disorders. In this regard we planned to study the fortified form of *C. asiatica* screened for its anxiolytic activity in Wistar albino rats.

Wistar albino rats of 200 ± 50 g and Swiss albino mice of either sex, weighing between 30-40 g were used in the present study. The dose of fortified form of *C. asiatica* for anti anxiety activity in human is 6 g. The dose for the rat and mice were calculated on the basis of body surface area ratio by referring to the standard table of Paget and Barnes (Pagets et and Barnes, 1964). The test drug was suspended in 0.5% gum acacia and administered orally with the help of oral catheter at a dose of 540 mg/kg body weight for rats in open field test and 780 mg/kg for mice in mirror chamber and zero maze test. In the open field behaviour test the number of rearings, number of fecal pellets expelled, number of squares crossed, duration of immobility (freezing time), and time of initiation were recorded (Bhattacharya and Satyan, 1993). Spontaneous motor activity was studied by using an actophotometer. The number of horizontal movements, number of vertical movements and total number of activity parameters were recorded (Kulkarni and Reddy, 1996). Mirror chamber test the latency of entry, number of partial entries, number of full entries, time spent inside the mirrored chamber during 5 min of observation (Reddy and Kulkarni, 1997). In the zero maze test the time spends in the open and closed section were measured. The number of entry in to open tunnel, frequency of entry in to open tunnel, number of head dips in the closed tunnel, number of head dips in the open tunnel and number of times the mouse crossed from one section to the other section of the zero maze were noted down (Kulkarni et al., 2007).

Open field behaviour there is a significant increase in the rearing activity and the number of squares crossed in the outer circle was considerably increased and number of middle squares was decreased in the test drug administered group in comparison to normal control group (Table I). FCA has been increased the activity on both horizontal and vertical plane during five minutes of observation in actophotometer in comparison to normal control group.

In the mirror chamber test there is a remarkable decrease in the time taken to entry into the mirror chamber (latency period) and significantly increased number of partial and full entry into the mirror

Table I: Effect of test drug on the activity profile of rat in open field behaviour and actophotometer test

Groups	Open field behaviour					Locomotor activity in actophotometer		
	No. of outer squares crossed	No. of middle squares crossed	Number of rearing	Number of grooming	Number of fecal pellets	Horizontal movement (X axis)	Vertical movement (Y axis)	Total activity (X+Y)
Control	52.5 (16.3)	5.0 (3.8)	9.3 (2.2)	2.8 (0.9)	1.0 (0.4)	191.8 (22.9)	199.6 (27.1)	392.0 (49.8)
Diazepam 2 mg/kg	84.8 (14.4)	2.2 (2.0)	8.7 (1.6)	2.3 (0.6)	0.5 (0.2)	168.2 (29.9)	144.3 (34.0)	312.5 (62.8)
FCA 540 mg/kg	75.7 (8.2)	0.3 (0.2)	15.7 (0.8)*	3.2 (0.7)	1.7 (0.3)	244.2 (33.8)	293.5 (38.5)	537.7 (57.8)

Data in mean (SEM); *p<0.05 in comparison to normal control group rats; FCA – Fortified *Centella asiatica*

Table II: Effect of test drug on the activity profile of mice in mirror chamber and zero maze test

Groups	Latency (sec)	Activity profile in the mirror chamber					Zero maze test			
		No. of entry	Full entry	Partial entry (fore limbs only)	Total No. of partial entries	Total No. of entries	Latency of onset of explo-ration (sec)	Duration of stay in open tunnel (sec)	Duration of stay in closed tunnel (sec)	No. of open head dips
Control	151.7 (28.3)	0.6 (0.4)	7.3 (1.5)	8.3 (2.0)	8.1 (1.3)	3.2 (0.7)	08.5 (2.2)	43.5 (6.1)	153.0 (30.8)	11.2 (1.3)
Diazepam 2 mg/kg	115.0 (15.8)	4.8 (3.3)	2.0 (1.0)	2.0 (1.0)	2.0 (0.7)	7.5 (1.4)	05.3 (3.0)	109.7 (41.1)	42.3 (15.2)*	08.7 (5.8)
FCA 780 mg/kg	58.4 (12.5)	16.7 (5.3)	12.8 (3.7)	16.8 (2.6)*	14.8 (2.2)*	15.4 (2.1)	12.8 (3.4)	66.3 (16.1)	142.2 (33.0)	20.5 (4.3)

Data in mean (SEM); *p<0.05 in comparison to normal control group rats; FCA – Fortified *Centella asiatica*

chamber in comparison to normal control group. In zero maze performance there is a decrease in the latency period of exploration; considerable increase in the time spent in open tunnel and open head dips in comparison to normal control group rats. Reference standard (diazepam) has shown considerable increase in the duration stay at open tunnel and significant reduction in the time spent in side the closed tunnel (Table II).

The primary important focus of the present study was the assessment of anti-anxiety activity. The result obtained from zero maze test, mirror chamber test, actophotometer test and open field behaviour clearly shows that the test drug has significant anti anxiety activity.

The test drug did not affect gross behaviour to significant extent. This clearly indicates that the administration of fortified *Centella asiatica* suspension did not produce any signs of either CNS depression or CNS stimulation. To supplement the observations made in the gross behaviour tests the data obtained from actophotometer were analysed. The results obtained in the present study showed a moderate non-significant increase in spontaneous motor activity in FCA given group. Dopamine's role in control of movement is well known. Mesolimbic and nigrostriatal dopamine systems has predominant role in this. Increased locomotor activity is indicative of enhanced dopaminergic activity especially, in rodents irrespective of it being horizontal or vertical. Even the stereotypy involving movement is also considered to involve dopaminergic system. However, locomotor activity is multifactorial and is influenced by other factors and neurotransmitters. In this regard it is pertinent to mention the involvement of glutamate receptor especially its variant N-methyl-D-aspartate (NMDA) receptor subtypes. Antagonists of this receptor type are reported to produce hyperactivity implicating its role in modulating the motor activity (van den Buuse, 2010).

The test drug has significantly prolonged the stay of the animal in open tunnel, the primary index predictive of anti-anxiety activity. Further the open head dips also higher in these groups compared to the control group. In the open field behaviour the number of squares crossed by the test group where more compared to the control group .The activities like grooming and rearing also increased in the test group compared to both standard and control group ,which is the indicative of the anti-anxiety activity. The latency for entering inside the mirror chamber was decreased and the number of entries and partial entries inside the mirror chamber was increased in the test group in comparison to control. Thus the results obtained in our study provide evidence for the presence of anti-anxiety activity.

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