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EVALUATION OF SOME PHARMACOLOGICAL ACTIONS OF *SYZYGIUM CUMINI* SEEDS EXTRACT

SHAHIDA PERVEEN AHMED, MANSOOR AHMED*, S. IQBAL AHMED, RAHEELA NAJAM AND S. JAVAID KHURSHID**

Department of Pharmacology, Faculty of Pharmacy, University of Karachi, Karachi-75270, Pakistan

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Seeds extract of *Syzygium cumini* or Eugenia jambolana, commonly known as Jaman was tested for its stress reducing properties. A considerable positive response in general behaviour of test animals was observed. Reduction in locomotion, decrease in aggressiveness of behaviour, dose dependent potentiation of phenobarbitone induced sleeping time, significant analgesic action against acetic acid induced writhing movement and reduction in body temperatures were noted. A significant reduction in the stress induced elevated corticosterone level was observed which is a reliable indicator of stress.

Key words: Syzygium cumini, Corticosterone, Stress-induced.

Introduction

Syzygium cumini (Jaman) belongs to the botanical family Mytraceae. It is widely planted in Indo-Pak and is well known due to its delicious fruit and importance in folk medicines [1]. Different parts of *S. cumini* tree are useful/effective in various disease conditions. *Syzygium cumini* seeds as such are commonly used in diarrhea and dysentery, dried seed powder in diabetes and seed extract as CNS depressant, while decoatation of bark is also known to be effective in dysentery [2]. We have evaluated different effects of *S. cumini* seed extract on some stress induced biochemical parameters such as motility, sleeping time, anticonvulsant and analgesic activity and plasma corticosterone level. It is a well know fact that corticosterone level increases in acute stress rendering it a reliable indicator of stress [3,4].

Materials and Methods

Dried seeds of *Syzygium cumini* were purchased from the local market. Methanol, petroleum ether, chloroform and acetic acid used were of Anal R grade from E. Merck. Mice weighing 18-22 gm were used as models for evaluation of different parameters.

Solvent extraction. Dried seeds of *Syzygium cumini* as a whole were treated with methanol and filtered. The filtrate was dried under reduced pressure and distilled water was added to the residue and the solution thus obtained was partitioned with petroleum ether. The aqueous phase was separated and extracted with chloroform and the aqueous layer remaining after the extraction. The chloroform extract was completely evaporated with a rotary evaporator and a blackish brown sticky material was left behind. It was dissolved (250 mg/ml) in a mixture of propylene glycol and water (1:3) and preserved for animal tests.

EVALUATION OF CNS ACTIVITY.

Effect on corticosterone level. Stress was induced in a group of 10 mice applying "forced swimming" method. Thirty minutes after the induction of stress, the extract (100 mg/ml per animal) was administered intraperitoneally to 5 animals and they were decapitated at 30 mins following the administration and then blood was collected and plasma separated.

Corticosterone level in plasma was measured by spectrofluorometric method [5] and glucose level was estimated by o-toluidine method [6], in both treatd and control animals (Table 1 & 2).

Effect on locomotor activity. Five mice each, in three groups, were placed in activity meter before and after the injection of extract (25, 50 and 100 mg/kg per animal) intraperitoneally and locomotor activity was recorded alongwith the controls after 20 min [7,8] (Table 3).

Effect on phenobarbitone induced sleeping time. Effect of phenobarbitone on sleeping time was evaluated by a known method [9]. Ten mice were intraperitoneally injected with phenobarbitone sodium (40 mg/ kg per animal). Fifteen minutes later with *S. cumini* seed extract (100 mg/kg per animal) and the loss and regaining of wrighting reflux was monitored 20 mins after the injection of seed extract alongwith controls (Table 4).

Analgesic activity. Analgesic activity of *S. cumini* extract was tested as anticoceptive effects against chemical and thermal noxious stimuli [10,11].

Chemical stimuli were evaluted by injecting interperitoneally 10 mice with the extract (100 mg/kg per animal) followed by 3% acetic acid (3.3 ml/kg per animal) interpertioneally after 15 mins in five of the ten animals. The-

*Department of Pharmacognosy, Faculty of Pharmacy, University of Karachi, Karachi-75270, Pakistan.

**Nuclear Chemistry Division, Pakistan Institute of Nuclear Science & Technology, P.O. Nilore, Islamabad, Pakistan.

TABLE 1. EFFECT OF SEED EXTRACT OF *S. CUMINI* ON PLASMA CORTICOSTERONE LEVEL.

Animal treatment	Plasma corticosterone(μg/ml)
Control	14.3 + 2.7
Stress without extract	81.0 + 1.6
Stress with extract (100mg/kg)	21.7 + 2.7

TABLE 2. EFFECT OF SEED EXTRACT OF *S. CUMINI* ON GLUCOSE LEVEL.

Animal treatment	Glucose level (mgml)
Control	161 + 2.8
Stress without extract	128 + 3.4
Stress with Extract	134 + 3.0

TABLE 3. EFFECT OF SEED EXTRACT OF *S. CUMINI* ON LOCOMOTOR ACTIVITY.

Dose mg/kg	Locomotor activity before extract administration	Locomotor activity after extract administation
25	658 + 11.91	343 + 16.31
50	647 + 17.90	302 + 19.02
100	644 + 18.10	227 + 16.19

TABLE 4. EFFECT OF SEED EXTACT OF *S. CUMINI* ON PHENOBARBITONE SLEEPING TIME.

Treatment	Wrighting reflux time after 20 mins
Control	
Phenobarbtone 1ml (40mg/ml)	30 mins
Phenobarbitone 1ml (40mg/ml) + extract 1 ml (100mg/kg)	45 mins

writhing response was checked in both of the groups i.e. five animals injected with the acetic acid and five without it. (Table 5).

Thermal stimuli were evaluated by Caudal immersion method [11]. According to this method, a violent jerk of tail within 15 sec on immersion in water at 50°C is monitored as the end point indicator of the painful stimulus. The extract (100 mg/kg per animal) was injected interperitoneally and the time of the jerk to occur was noted (Table 5).

Anticonvulsant activity. This test was performed according to a method reported earlier [12]. A group of 5 mice was tested by interperitoneally injecting the extract (150 mg/kg per animal), followed by pentylenetetrazol 1 ml (100mg/ml) per animal in 5 animals, and 5 animals by strychnine 1 ml (3mg/kg) per animal interperitoneally after 30 mins of administration of seed extract. The change in body temperature was noted at different time intervals (10, 20, 30 mins) while death of the animals was recorded in both groups after 4 hrs of injection (Table 6).

Amphetamine toxicity test. This test was perfromed as suggested [13] by treating 5 mice each with the extract (50, 100, 150 mg/kg per animal) followed by injecting amphetamine 1 ml (2.5 mg/ml) interperitoneally after 30 mins. Mice were kept in cubic wire mesh cages at 30°C for 5 hrs and then motility rates were recorded (Table 7).

TABLE 5. ANALGESIC ACTIVITY OF SEED EXTRACT OF *S. CUMINI.*

Treatment	Stimuli	
	Chemical	Thermal
Control 1ml (extract 100mg/kg)	15 min	15 min
Extract 1ml (100mg/kg)+ 1ml 3% acetic acid (3.3ml/g)	32 min	16 min

TABLE 6. ANTICONVULSANT ACTIVITY OF *S. CUMINI* SEED EXTRACT.

Animal treatment	Effect with time			
	10 mins	20mins	30 mins	Death
Extract 1ml (100mg/kg)	Nil	Nil	Nil	Nil
Pentylenetetrazole 1ml (100mg/ml) + extract 1ml1 (150mg/ml)	0.5°C	1°C	1°C	40%
Strychinine 1ml (3mg/ml) + extract 1ml (150 mg/ml)	0.5°C	1°C	1°C	40%

TABLE 7. EFFECT OF *S. CUMINI* SEED EXTRACT ON AMPHETAMINE TOXICITY TEST.

Animal treatment	Motility rate
Amphetamine 1ml (2.5mg/ml)	30%
Amphetamine 1ml (2.5mg/ml) + seed extract 1ml (50 mg/ml)	20%
Amphetamine 1ml (2.5mg/ml) + seed extract 1ml (100 mg/ml)	10%
Amphetamine 1ml (2.5mg/ml) + seed extract 1ml (150 mg/ml)	0%

Results and Discussion

The results of *S. cumini* seed extract on the stress induced changes show reduction in plasma corticosterone (21.7 ± 2.7 μg/ml) as compared to the level of corticosterone (81 ± 2.5 μg/ml) without extract (Table 1) while no difference was observed in glucose level (Table 2). The reduction in locomotor activity was obsrved with the increase in dose (Table 3). Phenobarbitone induced sleeping time was potentiated by injecting the extract which resulted in a decrease in touch and ptosis (Table 4). The extract showed significant analgesic activity against acetic acid induced writhing effect but no analgesic effect could be detected by thermal method

(Table 5). Pentylenetetrazol and strychnine induced convulsion did not respond to the extract introduction (Table 6). The different doses (50, 100, 150 mg/ml) of the extract demonstrated dose dependent antagonism to amphetamine toxicity in aggregated mice. The motility was 20,10 and 0% respectively when compared to 30% of controls (Table 7).

The results show that the seed extract of *Syzygium cumini* produce alteration in the general behaviour of test animals such as reduction in locomotion, decrease in aggressiveness of behaviour, some potentiation of phenobarbitone induced sleeping time in dose dependent fashion, significant analgesic action against acetic acid induced writhing movement and reduction in body temperature (0.5-1.0°C).

The extract when injected in animals, produced a significant reduction in plasma corticosterone level elevated due to stress, thus showing its CNS depressant action, where a significant decrease in stress induced increase plasma corticosterone level is the only valid paramter used as a reliable marker of stress [3,4]. This decrease in level is due to local action on zona fasciculata in the adrenal cortex on enzyme involved in the synthesis of corticosterone as it does not persist for a longer period of time. Based upon the investigation we can say that seed extract of *S. cumini* (jaman) may be considered of possessing the ability to reduce at least one parameter observed to be elevated in stress. However, further studies may prove its significance and potential as an anti-stress agent.

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