Influence of chloroform extract of *Sida acuta* Burm.f. leaves on the Sexual Behavior of normal rats

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**ABSTRACT**

**Background:** According to traditional ayurvedic book *Sida acuta* Burm.f. (Malvaceae) claimed to have good aphrodisiac potential but the actual action is not yet proved by scientific methods. Therefore the present study was conducted to investigate the aphrodisiac potential of *Sida acuta* Burm.f. **Methods:** Acute toxicity test was carried out to determine the nature and extent of untoward reaction which might follow the administration of a single dose (or an overdose) of a drug. The acute toxicity study was carried out on male mice by the administration of PE, CH and ME extracts of *Sida acuta* Burm.f. (Leaves) orally at one dose level (150, 500, 1000, 1500 and 2000 mg/kg) once only. Finally a dose of 2000 mg/kg was selected which is 1/10th of the toxic dose. Furthermore male albino rats were distributed into 5 groups consisting of six rats per group. Rats in group I (control) were administered with 1 ml/kg, p.o. of saline. Group II rats were treated with Sildenafil citrate at a dose 5 mg/kg, s.c while those in group III, IV and V were given 200 mg/kg of PEE, CE and ME of *Sida acuta* Burm.f. Sexual behaviour study was carried out on days 0, 7, 14, 21 and 28th. **Results:** The sexual behaviours were preceded with perceptive and pre-copulatory behaviours in the animals. The increase in Mount Frequency, and Intromission Frequency, and decrease in the Mount and Intromission Latencies, Ejaculation Latency and Post Ejaculatory Phase was observed on 0, 7, 14 and 28th consecutive days of treatment period. **Conclusion:** The present investigation reveals that oral administration of all the extracts of *Sida acuta* Burm.f. leaves showed significant increase in aphrodisiac activity, but CE remarkably enhanced male sexual behavior in male rats.

**Keywords:** Sexual behavior, Aphrodisiac, Pre-copulatory, Toxic, *Sida acuta* Burm.f., CE (Chloroform extract)

**Introduction**

The main essence of marriage in humans is procreation and/or sexual fulfillment of both partners that is initiated by the mating of male with a female in sexual intercourse. For there to be a normal sexual intercourse in males, the sexual organs and factors relating to the erection of the copulatory organ must function normally. The repeated inability of the male to perform this function, at least effectively or a disorder that interfere with his full sexual response cycle is termed male sexual dysfunction (MSD)[1].

Male sexual dysfunction is common worldwide among man of all ages, ethnicities and cultural backgrounds. Although, Male sexual dysfunction rarely threatens health, it can take a heavy psychological toll, brining on depression, anxiety and debilitating feelings of inadequacy[2].

Certain cells like fat and muscle cells absorbs glucose in presence of insulin. When these cells fail to respond adequately to circulating insulin, blood glucose levels rise. The liver helps regulate glucose levels by reducing its secretion of glucose in the presence of insulin [3].

Male sexual problems include libido, erection, ejaculation and orgasm. These sexual problems generally arises Male sexual response cycle is called normal if all the steps are timely and sequentially if any one of the following is not in sequence or delayed than it leads sexual dysfunction in humans. Main causes which are responsible for sexual problems include smoking, obesity, testosterone deficiency, depression, anxiety, alcoholism, and antidepressants and blood pressure medications. Libido refers to sexual need of individuals and it very person to person.

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Semwal and Kumar  ASIAN PACIFIC JOURNAL OF HEALTH SCIENCES, 2014; 1(4S): 84-93
Erection is enlarged condition of male reproductive organ. Ejaculation is ejection of semen during sexual intercourse, and orgasm represents intense pleasure condition during the climax of sexual response. One of the measure sexual problems arising in the modern time is due to erectile dysfunction which is also associated with depression, endocrine, neurologic, vascular, and systemic disorder[3].

ED is a broad category that includes inability to achieve erection, or the ability to achieve only brief erections[4]. Besides of ED there are various sexual dysfunctions like Disorders of ejaculations, disorders of orgasm, and failure of detumescence. By the several years clinical and epidemiological studies it has been proved that several risk factors are associated with ED. These risk factors include smoking, age, obesity, and diabetes and also various stress conditions. An important point to notice here is that these risk factors are the same as the risk factors of cardiovascular disease.

Synthetic drugs like Sildenafil citrate, Tadalafil citrate, Vardenafil, Tadalafil, Alprostadil, Papaverin are used for ED but these drugs also have fatal side effects like sudden hypotension, hypersensitivity reaction, abnormal vision, infertiltiy, suicidal tendencies, mental disorders and tremors[6]. The use of synthetic aphrodisiacs results in the dilatation of blood vessels in other parts of the body causing headache and fainting. Other side effects include facial flushing, stomach upset, blurred vision and sensitivity to light which usually occur at higher doses[7].

Thus, there is growing need to look for aphrodisiacs more of natural plant or herbal origin as opposed to synthetic compounds which are known to cause severe unwanted side effects. Some of the most ancient plant-based aphrodisiacs, such as ginseng and yohimbine, are still as popular today as in ancient times. Unlike the old-time aphrodisiacs, which were meant only to increase sex drive and/or sexual pleasure, modern stimulants including Viagra, may rightly be called medications, since their purpose is to correct problems that make sex difficult or impossible. Besides of the fact that several plant sources contain aphrodisiac ingredients (phytochemicals) which can be beneficial as an immune modulator, sex stimulant and also as medication in erectile dysfunctions, there is very low range of research work carried out in this field.

According to traditional ayurvedic book medicinal plant Sida acuta Burm.f. claimed to have good aphrodisiac potential but the actual action is not yet proved by scientific methods. So our current research work includes collection, identification, extraction, characterization and pharmacological evaluation of aphrodisiac potential of Sida acuta Burm.f. is intended to look for safe and powerful aphrodisiac.

Collection, identification and authentication of plant materials

The leaves of Sida acuta Burm.f. (Figure 1) was collected from the Paonta Sahib (H.P), Srinagar Garhwal (U.K) and F.R.I, Dehradun (U.K)., India in the months of February-March 2012. The plant materials were identified and authenticated by botanist Dr. R. M. Painuli, Department of Botany H. N. B. Garhwal (A Central University) Srinagar Garhwal, Uttarakhand India. The air dried Plant parts were reduce to coarse powder and stored in air tight containers until the time of use.

Figure 1: Plant of Sida acuta Burm. f
Preparation of plant extracts

The air dried leaves of *Sida acuta* Burm.f. was reduced to coarse powder. The dry powder of plant material (500 g) was subjected to successive solvent extraction procedure using various solvents such as; petroleum ether, chloroform, acetone and methanol in the increasing order of polarity. The solvents were evaporated under reduced pressure to obtain a semisolid mass and then vacuum dried to yield solid residues (Figure 2)[8]. The dried extracts were stored in air tight container until the time of use.

Figure 2: The scheme for extraction of leaves of *Sida acuta* Burm.f.

Preliminary phytochemical screening of different extracts

The different plant extracts of *Sida acuta* Burm.f. were subjected to qualitative chemical tests for the identification of various constituents such as alkaloids, carbohydrates, glycosides, proteins, tannins, sterols, saponins, amino acids etc[9].

Animals

Procurements of Animals

The experimental protocol was approved by Institution Animal’s Ethics Committee (IAEC) of Himachal Institute of Pharmacy, Paonta Sahib, Himachal Pradesh and from Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA) vide approval no. HIP/IAEC/03/14/11. Sprague-dawley albino rats (male & female) were used for evaluating aphrodisiac activity.

Housing

Animals were housed in polypropylene cages (6 per cage) with dust free rice husk as a bedding material under laboratory condition with control environment of temperature (26-28°C), humidity (40-60%) and under reversed light and dark cycle with light from 10:00 P.M to 10:00 A.M. They were provided standard rodent chow/feed and water ad-libitum. After sufficient period of acclimatization, they were used to evaluate aphrodisiac activity.

Acute toxicity study

OECD Guideline No.423 (14 Days Study)

The purpose of an acute toxicity test is to determine the nature and extent of untoward reaction which might follow the administration of a single dose (or an overdose) of a drug. Male albino mice were used.
The acute toxicity study was carried out on male mice by the administration of extracts of *Sida acuta* Burm.f. (Leaves), orally at one dose level (150, 500, 1000, 1500 and 2000 mg/kg) once only. The dose that shows toxicity signs/morality is the toxic dose and 1/10th of this toxic dose is considered for therapeutic explorations. Toxicity study of different extracts of *Sida acuta* Burm.f. (Leaves) was performed as per OECD guideline No. 423. The animals were observed for changes in the skin and fur, eyes and mucous membranes, and also respiratory, circulatory, autonomic and central nervous system, and somato motor activity and behaviour pattern. An attention was given to observation of tremors, convulsions, salivation, diarrhoea, lethargy, sleep and coma[10].

**Route of administration**

Control animal received vehicle (normal saline) while treated animals received extracts of *Sida acuta* Burm.f. leaves. All the extracts were administrated orally by gavage and Standard group received (Sildenafil Citrate) by (s.c) route.

**Experimental design[11,12](Table 1)**

**Selection of male rats**

Sprague-dawley adult male albino rats weighing 200-250 gm were given training for sexual experience. The animals were observed for 2 hours for sexual behavior in their transparent arena under dim (25w) red light. To provide sexual experience, each male rats were allowed 30 minutes exposure to a stimulus female in behavioral oestrous, several days before testing for copulatory performance. The animals were tested three times over 10 days period for copulatory behavior and divided into groups demonstrating comparable copulatory performance. Males were trained individually with normal adult female in oestrous in transparent arena.

| 48 Hours before Behavioral Study | 6 hours before behavioral study | 1 hours before behavioral study | Male behavioral study |
|--------------------------------|--------------------------------|--------------------------------|-----------------------|
| Female rats injected with estradiol benzoate (10 µg/100 g) to bring the animal to estrous phase | Treated with progesterone (0.5 mg/100 g) to bring rats to estrous phase | Checked for female responsiveness (vaginal smear test) | Male rats were exposed to estrous female for a period of 2 hour and observed for their sexual behavior patterns on days 0, 7, 14, 21 and 28th of drug treatment |

**2.5.2 Selection of female rats**

Adult female rats were brought to oestrus by the sequential administration of estradiol benzoate (10 µg/100 gm) and progesterone (0.5 mg/100 gm) through subcutaneous injections, 48 hours and 4 hours respectively prior to pairing. These female rats were divided into five groups, each group consisting of five animals. They were housed in a temperature-control room (26-28°C) in a reversed dark/light cycle. Food and water were provided *ad libitum*. The female rats, which were in oestrous stage, were used for the study. The highly receptive female was introduced into the male’s cage and each male rat is observed for 2 hours for copulatory behavior under dim red light. All the rats were tested for copulatory behavior on 0, 7, 14, 21 and 28th days respectively.

**Group V: Animals treated with methanol extract (ME) at a dose of 200 mg/kg (Sida acuta Burm f.) p.o.**

**Experimental procedure**

From 2 weeks prior to the screening tests, until the end of the study, the rats were housed individually at 26 °C-28 °C under reversed light and dark cycle with light from 10:00 PM to 10:00 A.M. Food and water were given ad libitum.
The leaves extract were made into suspension with DMSO and administered to ‘male rats’ p.o in the dose of 200 mg/kg (*Sida acuta* Burm.f.). Control group received only saline (1ml) while standard group received Sildenafil citrate 5 mg/kg s.c.

**Sexual behaviour study**

Sexual behavior studies were monitored in a separate room for 2 hours following the administration of standard drug & extracts and were given 20 minutes adaptation period, after which a primed female was introduced into the study cage. On days 0, 7, 14, 21 and 28th sexual behaviors study were monitored. Experiment performed in the same environment during the dark phase of the cycle in large cage (e.g. 40x40x40cm) with a floor that is similar to the home cages. The following male sexual behavior patterns were recorded, including:

(a). Mount frequency (MF): number of mounts in series, or number of mounts in a given period of time. (30 min.)

(b). Intromission frequency (IF): number of intromissions observed in 30 minutes.

(c). Mount latency: the time interval between the introductions of the female to the first mount by the male.

(d). Intromission latency: the interval from the time of introduction of the female to the first intromission by the male.

(e). Ejaculatory latency: the time interval between the first intromission and ejaculation.

(f). Ejaculation frequency: the number of ejaculation in a series.

(g). Post ejaculatory mount latency: time from ejaculation to next mount.

(h). Post ejaculatory interval: times from ejaculation until next intromission.

(i). Copulatory rate: the number of mounts plus number of intromissions divided by the time from the first mount until ejaculation[12,13].

**Guidelines were followed during the experiment**

(a). Males were kept individually but females were kept in group.

(b). Training of each male rat for 15 min. at a time was done till they elicit sexual behavior. Once the behavior was noticed, males were exposed to receptive females.

(c). Repeated training to overcome the lack of sexual response in the presence of observers.

(d). The experiment was conducted in a dark and silent room.

(e). Any jerking movements of the mating arena were avoided.

(f). Sufficient space for animals in the mating arena were provided to enable them to chase each other.

(g). Cleaning of the mating arena was done after each trail, since the urine trails left by one rat may have marked effects on the behavior of his successor.

**Statistical analysis**

All the results were expressed as Mean ± Standard Error (SEM). Interpretation of the result was supported by statistical analysis. Results of the same group of different days of treatment were analyzed by one way analysis of variance (ANOVA) followed by Dunnett’s test to calculate the level of significance. Statistical analysis of data was performed using Graph Pad Prism demo version 5.

**Results and discussion**

**Preliminary Phytochemical Screening of the leaves of Sida acuta Burm.f.**

Preliminary phytochemical investigations were done for steroids, carbohydrates, fatty acids, flavanoides, glycosides, proteins, saponins, and tannins for different extracts of *Sida acuta* Burm.f. leaves and results are shown in Table 2.

| S.No. | Plant Constituent | Tests | PEE | CE | AE | ME | AE |
|-------|------------------|-------|-----|----|----|----|----|
| 1. Alkaloids | | | | | | | |
| a) Hager’s reagent | | -ve | + ve | - ve | - ve | - ve | - ve |
| b) Wagner’s reagent | | - ve | + ve | - ve | - ve | - ve | - ve |
| c) Mayer’s reagent | | - ve | - ve | - ve | - ve | - ve | - ve |
| d) Dragendorff’s reagent | | - ve | + ve | - ve | + ve | - ve | - ve |
| 2. Phenolic compounds and tannins | Ferric Chloride solution | - ve | + ve | - ve | + ve | - ve | + ve |

Table 2: Preliminary phytochemical identification test for the different extracts of the leaves of Sida acuta Burm.f.
b) Lead acetate test - ve - ve - ve + ve - ve
c) Acetic Acid Solution - ve - ve - ve - ve - ve
d) Dil. Nitric acid - ve - ve - ve + ve - ve
e) Bromine Water - ve + ve - ve + ve - ve
f) Dil. Iodine - ve - ve - ve - ve - ve
g) Pot. Permanganate - ve - ve - ve + ve - ve
h) Gelatin Solution - ve - ve - ve - ve - ve
i) Pot. Dichromate - ve + ve - ve - ve - ve

3. Flavonoids
   a) Shinoda test - ve - ve - ve + ve + ve
   b) Lead acetate test - ve - ve - ve + ve - ve
   c) Alkaline test - ve - ve - ve + ve - ve

4. Saponins
d) Biuret test - ve - ve - ve - ve - ve
e) Million’s test + ve - ve - ve - ve - ve
   Test proteins containing sulphur - ve - ve - ve - ve - ve
f) Precipitation test - ve - ve - ve - ve - ve

5. Amino acids
a) Ninhydrin test - ve - ve - ve - ve - ve

6. Fats and oils
a) Solubility test + ve + ve - ve + ve + ve
   Filter paper test + ve + ve + ve + ve - ve

7. Steroids
   a) Salkowski reaction + ve + ve + ve + ve + ve
   b) Tannins + ve - ve - ve + ve + ve
   c) Saponins + ve + ve - ve + ve + ve

10. Carbohydrates - ve + ve - ve + ve - ve

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**Acute Toxicity study**

OECD Guideline no. 423 (14 Days Study): Test drug is administered at one of the dose level (150, 500, 1000, 1500 and 2000 mg/kg) once only. Toxicity studies of PFF, CE and ME of *Sida acuta* Burm.f. at 150, 500, 1000, 1500 and 2000 mg/kg dose on mice was performed. All parameters were found to be normal. Thus all extracts were preventing all behavioral attention and toxicity indication in mice, so it was concluded that LD<sub>50</sub> (50% Lethal dose) is more than 2000 mg/kg body weight.

**Sexual Behavior study**

Several female proceptive and male pre-copulatory behavior parameters were observed from the cage side when the extract treated male rats were introduced to the receptive female rats. The proceptive behavior displayed by the female rats included ear-wiggling characterized by a rapid anteroposterior to the male rats (darting) and a short jump with stiff legs followed by immobility and presentation (hopping). The male rats, upon introduction, responded with immediate advances towards the females and displayed precopulatory behavior such as chasing, anogenital sniffing which eventually culminated into mounting. Lordosis was also displayed by the receptive female rats before, at the beginning and during the mounts. There was genital toileting after every mount that resulted in intromission. The extract produced no sedative effect on the male rats since none of the animals showed evidence of tiredness throughout the observatory period. Aphrodisiac studies in male rats were carried out for 28 days. The following observations were recorded in *Sida acuta* Burm.f. extract treated rats.

**Mount Frequency** (Table 3)

CE produced a significant increase (p<0.01) as compared to control group) in number of mounts were observed from day 0 till day 28<sup>th</sup> in male rats.

**Intromission Frequency** (Table 4)

CE produced a significant increase (p<0.05 as compared to control group) in number of intromission on 0, 7, 14, 21 and 28<sup>th</sup> day a significant increase (p<0.01 as
Compared to standard group in male rats.

**Ejaculation Frequency (Table 5)**

CE produced a significant increase (p<0.01) as compared to control group in number of mounts were observed from day 0 till day 28th in male rats.

**Mount Latency (Table 6)**

CE treated rats showed significant decrease (p<0.001 as compared to control group) in mount latency from 0 day till 28th day in male rats.

**Intromission Latency (Table 7)**

CE produced significant decrease (p<0.001 as compared to control group) in intromission latency from 0 day till 28th day in male rats.

**Ejaculation Latency (Table 8)**

CE treated rats showed significant decrease (p<0.001 as compared to control group) in post ejaculatory mount latency from 0 day till 28th day of treatment.

**Post Ejaculatory Mount Latency (Table 9)**

CE treated rats showed significant decrease (p<0.001 as compared to control group) in ejaculation latency from 0 day till 28th day of treatment.

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**Table 3: Effect of *Sida acuta* Burm.f. leaves extracts on Mount Frequency in male albino rats**

| S.No. | Treatment Dose (mg/kg) | Number of Mount Frequency in 30 minutes (Mean ± SEM) |
|-------|-------------------------|--------------------------------------------------|
| 1.    | Control 1 ml            | 20.72±1.5 20.72±1.5 21.92±1.7 23.52±0.9 26.72±2.2 |
| 2.    | Standard 5 mg/kg        | 20.15±1.1 20.15±1.5 21.43±1.8** 24.35±1.2**** 32.37±1.7*** |
| 3.    | PEE 200                 | 6.36±1.2  7.96±2.6 14.30±1.4 18.30±1.9 21.50±2.4  |
| 4.    | CE 200                  | 12.57±2.1* 14.96±2.1* 18.57±1.6** 26.40±2.3*** 30.76±1.6** |
| 5.    | ME 200                  | 10.24±0.8 12.50±1.6 15.80±2.3 16.50±2.6 20.40±1.6  |

Values are expressed in mean ± S.E.M. Where n=5)

*=p<0.05, **=p<0.01, ***p<0.001; compared with vehicle treated group.

Statistical analysis done by one-way ANOVA followed by Dunnett’s test.

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**Table 4: Effect of *Sida acuta* Burm.f. leaves extracts on Intromission Frequency in male albino rats**

| S.No. | Treatment Dose (mg/kg) | Number of Intromission Frequency in 30 minutes (Mean ± SEM) |
|-------|-------------------------|--------------------------------------------------|
| 1.    | Control 1 ml            | 7.96±0.21 7.96±0.13 8.56±0.27 9.36±0.27 10.30±0.34 |
| 2.    | Standard 5 mg/kg        | 9.01±0.13** 9.54±0.24 10.34±0.25* 11.34±0.23 12.14±0.36*** |
| 3.    | PEE 200                 | 6.59±0.31  6.87±0.48 6.4±0.35** 6.3±0.26* 8.25±0.68  |
| 4.    | CE 200                  | 2.58±0.36*** 2.78±0.52*** 3.30±0.22*** 4.16±0.44*** 5.09±0.22*** |
| 5.    | ME 200                  | 7.21±0.19  7.23±0.24 6.6±0.20* 7.4±0.41 7.98±0.53 |

Values are expressed in mean ± S.E.M. Where n=5)

*=p<0.05, **=p<0.01, ***p<0.001; compared with vehicle treated group.

Statistical analysis done by one-way ANOVA followed by Dunnett’s test.

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**Table 5: Effect *Sida acuta* Burm.f. leaves extracts on Ejaculation Frequency in male albino rats**

| S.No. | Treatment Dose (mg/kg) | Number of Ejaculation Frequency in 30 minutes (Mean ± SEM) |
|-------|-------------------------|--------------------------------------------------|
| 1.    | Control 1 ml            | 2.26±0.13 2.66±0.29 2.80±0.26 3.31±0.18 3.34±0.17 |
| 2.    | Standard 5 mg/kg        | 2.20±0.08 3.05±0.32 3.22±0.32 3.45±0.19 3.27±0.28 |
| 3.    | PEE 200                 | 1.82±0.16 2.01±0.06 2.40±0.35 2.5±0.10 2.92±0.34  |
| 4.    | CE 200                  | 1.82±0.14 2.01±0.21 2.29±0.09 2.9±0.12* 2.68±0.12*** |
| 5.    | ME 200                  | 1.62±0.35 2.23±0.18 2.6±0.05 2.36±0.32 2.39±0.08  |

Values are expressed in mean ± S.E.M. Where n=5)

*=p<0.05, **=p<0.01, ***p<0.001; compared with vehicle treated group.

Statistical analysis done by one-way ANOVA followed by Dunnett’s test.
Table 6: Effect of *Sida acuta* Burm.f. leaves extracts on Mount Latency in male albino rats

| S.No. | Treatment | Dose (mg/kg) | Number of Mount Latency seconds (Mean ± SEM) |
|-------|-----------|--------------|---------------------------------------------|
|       |           |              | 0  | 7  | 14 | 21 | 28 |
| 1.    | Control   | 1 ml         | 64.7±6.4 | 69.8±1.3 | 71.3±0.7 | 68.2±0.5 | 53.1±2.1 |
| 2.    | Standard  | 5 mg/kg      | 69.8±4.3 | 64.3±2.4 | 48.3±1.2*** | 38.7±5.0 | 35.7±1.6 |
| 3.    | PEE       | 200          | 62.1±6.8 | 49.5±1.8 | 43.6±1.8** | 36.6±0.5** | 30.8±1.8** |
| 4.    | CE        | 200          | 68.1±2.6 | 53.6±0.7 | 50.5±1.9 | 39.6±0.4 | 35.1±1.9 |
| 5.    | ME        | 200          | 62.0±2.7 | 60.8±1.9 | 55.5±0.9** | 30.1±0.8** | 15.4±0.6*** |

Values are expressed in mean ± S.E.M. Where n=5

4. Discussion

In this study, an attempt has been made to evaluate aphrodisiac activity of *Sida acuta* Burm.f. in the experimental animals. The acute toxicity was determined by the method of OECD guidelines, which is adequate for most practical purposes. Based on these results, dose of 200 mg/kg of the plant extract was selected for various animal models. To understand the scientific reasons behind these folk claims, we investigated the effects of PEE, CE and ME of *Sida acuta* Burm.f.
In this investigation, treatment of male rats with the PEE, CE and ME of *Sida acuta* Burm.f. enhanced the sexual behavior of the male rats. These sexual behaviours were preceded with perceptive and pre-copulatory behaviours in the animals. For example, the ear-wiggling, darting, hopping and lordosis by the receptive female rats in this study implied intense perceptivity and receptivity whereas the pre-copulatory behavior by the extract treated male rats also suggested that the animals were generally aroused. The pursuit of the female animals (the males running behind the female animals in close contact) suggested imminent copulation.

Mount Frequency and Intromission Frequency are useful indices of vigour, libido and potency. While the number of Mount Frequency (MF) reduces sexual motivation, increase in the number of Intromission Frequency (IF) shows the efficacy of erection, penile orientation and the ease by which ejaculatory reflexes are activated[14]. Therefore, the increase in Mount Frequency, and Intromission Frequency following the administration of CE of *Sida acuta* Burm.f. leaves at 200 mg/kg body weight on day 0 and subsequently at all the other days of observation suggests enhanced libido.

Mount Latency and Intromission Latency are indicators of sexual motivation. Mount Latency and Intromission Latency are inversely proportional to sexual motivation. Therefore, the decrease in the Mount and Intromission Latencies observed in CE at 200 mg/kg body weight on 0, 7th and 14th consecutive days in this study might imply stimulation of sexual motivation and arousability. It may also be an indication of enhanced sexual appetite behavior in the male rats. All these further support the sexual function improving effect of the extract at these days. In addition, the higher values of the computed rat sexual behavior parameters following treatment with the CE when compared with the normal saline (control group) are indications of significant and sustained increase in sexual activity[11].

Ejaculation Latency and Post Ejaculatory phase are indicators of sexual motivation. Therefore, the decrease in the Ejaculation Latency and Post Ejaculatory phase was shortened observed in CE at 200 mg/kg body weight on 0, 7th and 14th consecutive days. Many plants with medicinal properties are effective as aphrodisiacs through mechanisms such as vasodilation, generation of nitric oxide, elevation of androgens and gonadotropins. It has also been documented that sexual behavior and erection are dependent on androgen which may act through central and peripheral mechanisms[15,16].

**Conclusion**

In preliminary phytochemical screening, the chloroform extract (CE) showed positive results for alkaloids, steroids, etc. Therefore, it is possible that the active principle(s) contained in the extract might have crossed the blood brain barrier of the animals to exert its aphrodisiac effect on the hypothalamic-pituitary-testicular axis.

From the results of the studies, it is obvious that PE extract of *Sida acuta* Burm.f. has aphrodisiac action. Furthermore a result obtained indicates the possibility of developing the cheaper, safer and potent agent for the treatment of sexual dysfunction. These findings scientifically validated the traditional use of these plants for treating sexual dysfunction in the folk medicine.

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