Phytochemical and biological assessments on *Lipidium meyenii* (maca) and *Epimidium sagittatum* (horny goat weed)

Mahmood Qureshi[1], Mehjabeen[2]*, Noorjahan[3], Shafi Muhammad[4], Faheem Ahmed Siddiqui[1,5], Iftikhar Baig[1] and Mansoor Ahmad[1]*

[1]Research Institute of Pharmaceutical Sciences, Faculty of Pharmacy, University of Karachi, Karachi, Pakistan
[2]Department of Pharmacology, Federal Urdu University of Arts, Science & Technology, Karachi, Pakistan
[3]Department of Pharmacology, Dow College of Pharmacy, Dow University of Health Sciences, Karachi, Pakistan
[4]Department of Pharmacognosy, Faculty of Pharmacy, University of Balochistan, Quetta, Pakistan
[5]Department of Pharmacognosy, Faculty of Pharmacy, University of Central Punjab, Lahore, Pakistan

Abstract: The effects of *Lipidium meyenii* (maca, LM) and *Epimidium sagittatum* (horny goat weed, ES) have been investigated due to their involvement in fertilization. Both of the drugs showed good results before, during and after fertilization in male and female mice. The results revealed that the crude extract of *Lipidium meyenii* caused a significant decrease in the no. of writhes at 300 and 500mg/kg ($p<0.05$) as compare to control, *Epimidium sagittatum* and standard drug. The gross behavioral, open field, exploratory behaviour, forced swimming test for stress, diuretic activity, chronic toxicity with the effect on reproduction of both male and female and change in body weight were also studied. The phytochemical study showed the presence of tannin, alkaloid, carbohydrate, rich protein and absence of sterol in LM, whereas ES shows presence of sterol and less protein. LS improve in muscle activity and exploratory behaviours without any toxic effects on mice and their pups. It does not have diuretic effect for first two hour but act normally after initial phase of drug therapy. *Epimidium sagittatum* has dual action that is at low dose it has slight stimulation action and at high dose little depressive effect. ES also has some diuretic effect. Overall these results suggest that LM is highly effective remedy for treatment of impotency and reduces stress and depression, because of dual effect ES not only suggested as an anxiolytic medicine but also effective in female hormonal disorder.

Keywords: *Lipidium meyenii*, *Lipidium meyenii*, diuretic, infertility.

INTRODUCTION

Recent advancement in the field of drug evaluation have made it necessary to modify the traditional views or rather explore them based on the current results carried out using the modern scientific methods used for pharmacognostical and pharmacological investigations. The two selected herbal ingredients namely *Epimedium sagittatum* (Horny Goat Weed) and *Lepidium meyenii* (Maca) have been in use by the mankind since decades but the recent developments has uncovered many of their hidden benefits along with their safety profiles. However, because of their great potential in the field of herbal drugs there still exists a room to conduct more research on them to verify the claimed benefits & investigate their margin of safety in particular and moreover, to expand the research beyond their traditional major uses so that the mankind gets maximum of their benefits. Both the ingredients have got aphrodisiac properties & widely used as food supplements alone or in combination with other food supplements.

The research shows that 70% of mental illnesses occur with stress. This gives us a pessimistic view of involvement of stress in reproductive disorder. This thought help to up bring the knowledge of those medicines having potential to use in erectile dysfunction, impotency, infertility associated with psychological disturbances.

There are a huge range of such kind of remedies to the public, practitioners and established health clinics. These remedies can provide many benefits for a variety of situations, but patient compliance decreases due to their side effects, for example the intraurethral therapy causes complications such as pain or uneasiness in the penis, surrounding areas (testicles, legs and perineal), some time hot or burning feeling appears in urethra and swelling of legs (Raina *et al*., 2001). Therefore this study might be helpful for to solve this problem in a better ways.

Lipidium meyenii (Maca) herbal remedy and uses as a energy food. Most commonly it is used for fertility enhancement and aphrodisiac qualities due to its energizing effects. Traditionally it is used to promote mental clarity, in impotency, menstrual irregularities in female, menopause and chronic fatigue syndrome (Brooks *et al.*, 2008). The roots of *L. meyenii* are relaxant, nutritive, aphrodisiac and immunity enhancer (Brooks *et al.*, 2008).

The whole plant of *Epimidium sagittatum* is

**Corresponding author:* e-mail: herbalist53@yahoo.com, mehjbn1@gmail.com

antirheumatic, aphrodisiac, carminative, expectorant, ophthalmic and vasodilator. Used as a kidney tonic, it also treats sterility and barrenness (Bown 1995). It is taken internally in the treatment of asthma, bronchitis, cold or numb extremities, arthritis, lumbago, impotence, involuntary and premature ejaculation, high blood pressure and absentmindedness (Bown. 1995). It should be used with some caution since in excess it can cause vomiting, dizziness, thirst and nosebleeds (Bown 1995). The plant is harvested in the growing season and dried for later use (Bown1995).

MATERIALS AND METHODS

Preparation of extracts

The plant materials were collected at Karachi, Pakistan. The plants were identified and voucher specimen No. LM/ES/0306 were deposited in the herbarium of Research Institute of Pharmaceutical Sciences, Department of Pharmacognosy, University of Karachi, Karachi, Pakistan. The fresh plant materials were chopped into small pieces. The chopped material was macerated with ethanol for 15 days (2 times) at room temperature. The ethanol extract was then filtered and evaporated under reduced pressure in rotary evaporator to yield a residue.

Animals and drugs

The following drugs were used: Diazepam and acetylsalicylic acid (Merck) and Furosimide, Imipramine. Swiss albino mice male and female (25-30) were used. They were housed under a 12h light and dark cycle at 22 $\pm$ 2ºC with *ad libitum* access to food and water. Animals were acclimatized at the laboratory for at least 1 h before testing. All animals were fasted over night before test, water was supplied. Plant drugs and standard drug were dissolve in distilled water immediately prior to use and plant drugs given orally according to body weight. Control animals received the same dose of vehicle under the same conditions.

Phytochemical analysis

The preliminary phytochemical tests on plant drugs were done by qualitative analysis standard methods (Trease and Evans, 1983; Plummer, 1985; Wallis, 1985).

Assessment of analgesic activity

By writhing method

These tests were performed according to the modified method of Koster *et al.,* 1959 and Turner 1965. Mice were used as the test animals in this method. According to this method writhes were induced by intraperitonial administration of the acetic acid solution 10ml/kg. Thirty minutes prior to the administration of the acetic acid, the animals were treated orally with the test substance. Numbers of writhes was counted for 30 minutes immediately after acetic acid administration. A reduction in the number of writhing as compared to the control animals was considered as evidence for the presence of analgesia and expressed as percent inhibition of writhing.

Mice were divided into 4 groups (i.e. Group-A for control, Group-B and Group-C for 300mg/kg and 500mg/kg oral doses of crude extract respectively and Group-D for standard). Each group comprised of 5 animals, weighing 25-30gm. Acetyl salicylic acid (Aspirin) as 300mg/kg orally was used as the reference compound. The crude drug and the acetyl salicylic acid were diluted in distilled water and administered orally. The control animals were treated orally with the same volume of saline as the crude extract.

Gross behavioural study

For monitoring the effects of crude extract of *Lipidium meyenii* and *Epimidium sagittatum* on central nervous system, the following procedure was adopted as described by Irwin *et al.,* 1968 and Debprasad *et al.,* 2003. Mice were divided in to seven groups each congaing five animals. The First three groups received vehicle, standard drugs diazepam and imipramine respectively and the remaining four groups received crude drugs at the dose of 300 and 500mg/kg. The animals were under observation visually by different responses immediately after the drug administration. The score of response were recoreded as no response (0), mild increase effects (+) moderate increase effects, strong increase effects (+++), very strong increase effects (++++). Mild decrease effects (-) moderate decrease effects (--),strong decrease effects (---), very strong decrease effects (-----).

Assessment of neuropharmacological activity

CNS activity was studied by open field test, cage crossing, head dip test, and swimming induced depression test. All the CNS related tests were performed in a calm and peaceful environment.

In each test, animals were divided into 4 groups (i.e. Group-A for control, Group-B and Group-C for 300mg/kg and 500mg/kg oral doses of crude extract respectively, and Group-D for standard). Each group comprised of 5 animals. Diazepam as 2mg/kg orally was used as standard. The crude drug and the diazepam were diluted in distilled water and administered orally. The control animals were treated orally with the same volume of saline as the crude extract. In all the tests observations were made after 30 to 40 minutes of oral dose of the test substance.

Open field activity

The open field apparatus designed in the laboratory consists of 76 X 76cm square area with opaque walls 42 cm high. The floor is divided by lines into 25 equal squares. Rats weighing 200 to 230gm were used as the test animals in this method. Testing was performed in a quite room under white light as described by Kennett *et*

al., 1985 and Turner 1965. Animals taken out from their home cages and were placed in the center square of the open field (one at a time). Number of Squares crossed with all four paws was counted for 30 minutes. Activities of control rats and drug treated rats were monitored in a balanced design to avoid order effect.

Head dip test

It is an exploratory test. A specially designed square shaped Head dip box having three holes in each side was used in this study. The observation was to count the number of head dips by the animal through these holes in specified time (Sanchez-Mateo *et al.,* 2002; Kasture, V.S., *et al.,* 2002 and Debprasad *et al.,* 2003). The head dip box in our laboratory is designed for mice. Mice weighing 25 to 30 gm were used in this test. The control and drug treated animals were placed individually in the head dip box and the observations were made for 30 minutes.

Cage crossing movement

The test performed on mice in a specifically designed having rectangular shape. Both control and treated mice were placed in to the cage and their cage crossing movements were noted in 30 minutes. The test is important for the motor activity of animal. This test was performed according to the method described by Florence *et al.,* 2000.

Forced induced swimming test

Forced induced swimming test was performed according to Sanchez Mateo *et al.,* 2002 and Turner 1965. This test determines the muscle and CNS activity of the crude extract. Mice weighing 25 to 30gm were placed individually for six minutes in the glass tub filled with water at room temperature up to the marked level. Mouse when placed in water suddenly starts to move its front and hind paws. The activity time of animal is determined with the help of stopwatch out of total observation time of six minutes.

Assessment of diuretic activity

Diuretic test

The modified method of Armando *et al.,* 1992 was used for the assessment of diuretic activity. Each mice was placed in an individual metabolic cage after the oral administration of test drug (Nalgene 170015, Techniplast, Italy) with the provision of water *ad libitum*. The cumulative urine output was measured (in ml) at 2, 4 and 6 hours. Furosimide 50mg/kg orally was taken as reference drug.

Social interaction

In this test mices were housed singly for five days prior to testing and social interaction was carried out in the suitable box. Control and experimental mice were intermixed and then observations were made (File, 1980).

Effect on body weight, reproduction and chronic toxicity studies

Modified methods were used for the assessment of body weight, reproduction and chronic toxicity studies as described by Adeneye *et al*., 2006 and Mukinda and Syce 2007. Mice of both sexes (25-30gm) were divided in to five groups each group consists of six animals. Three pairs of mice/cage were housed in well-ventilated room at 25°C. The animals had free access to water and same food. The crude extracts of both plants were administered orally (100, 200, 300 and 500 mg/kg body weight) for a period of 40 days. Control group received normal saline at the same time. The animals were observed for any change during the experiment. The signs of toxicity or death were also recorded.

Table 1: Chemical constituents identified by colour reactions with various chemical reagents

Types of chemical	*Lipidium meyenii*	*Epimidium sagittatum*
Triterpenes	-	-
Tannin	+	+
Saponin	-	-
Alkaloids	+	+
Carbohydrates	+	+
Proteins	++++	++
Sterols	-	+

Table 2: Assessment of analgesic activity by writhing test

Treatment	Dose mg/kg orally	Mean No. of writhes ±S.E.M	Inhibition (%)
Control	0.5 ml Saline	132.6±5.12	00
Crude extract of *maca*	300mg/kg	60.6±0.96	54.2*
	500mg/kg	44.6±1.08	66**
Crude extract of *Epimidium sagittatum*	300mg/kg	68.8±4.12	48.11
	500mg/kg	52.2±1.59	60.6*
Aspirin	300mg/kg	52.2±1.59	60.6**

STATISTICAL ANALYSIS

The significance of difference between means with ± SEM was determine by Dunnett's t-test at $P<0.05$ and $P< 0.01$. All statistical procedure was performed according to the method of Alcaraz and Jimenez, 1989.

RESULTS

Chemical test

The presence of different chemical constituents in of *Lipidium meyenii* and *Epimidium sagitatum* were, identified by reactions with various chemical reagents mentioned in the experimental part. The reactions showed positive results for the presence of tannin, alkaloids, carbohydrate and sterols and protein while the triterepene

Table 3: Results of Gross behavioural activity

Type of response	Control	*Lipidium meyenii*		*Epimidium sagittatum*		Diazepam	Imipramine
		300mg/kg	500mg/kg	300mg/kg	500mg/kg	2mg/kg	10mg/kg
Nystagmus	0	0	0	0	0	++	0
Micturation	0	-,+	-,+	-,++	++	0	+
Irritability	0	--	--	-	--	--	0
Disorientation	0	0	0	0	+	+	0
Passivity	0	--	---	-	+	+++	--
Spontaneous activity	0	+++	++++	+	--	---	++
Pain response	0	-,+	--,+	+, -	-	--	+
Respiration	0	-,+	-,+	+, -	-	+	+
Limb tone	0	++	++	+	-	-	+
Enophthalmoses	0	+	++	0	-	+	0
Touch response	0	+	++	+	+	--	+
Righting reflex	0	+	++	+	+	-	+
Tail erection	0	++	+++	0	0	0	+

0: no effect or Normal, -, +: initially decrease than increase, +,-: initially increase than decrease

test is negative indicated the absence of these components (table 1).

Analgesic activity

The analgesic activity of *Lipidium meyenii* is given in table 2. The antinociceptive effect was evaluated in mice by the writhing test induced by acetic acid 0.6% (0.2 ml/20 g, i.p.). The extract at 300 and 500mg/kg orally caused an inhibition on the writhing response. Such effect were observed in mice pretreated with aspirin (*60.6%, $p<0.05$). The maximum inhibition of the nociceptive response (66%, $p<0.05$) was achieved at a dose of 500mg/kg.

Table 4: Assessment of Open field activity

Treatment	Dose mg/kg orally	Mean No. of Observations+ ±S.E.M
Control	0.5 ml Saline	58.6±1.61
Crude extract of *Lipidium meyenii*	300 mg/kg	66.2±1.86*
	500 mg/kg	81.6±2.55**
Crude extract of *epimedium sagittatum*	300 mg/kg	64.4±1.21*
	500 mg/kg	58.8±1.59
Diazepam	2 mg/kg	39±1.12
Imipramine	15 mg/kg	65.8±1.04

As shown in the table 3 and graph 2, the crude extract of *Epimidium sagittatum* shows 48.1% and 60.6% ($p<0.05$) inhibition of pain response at the dose of 300 and 500mg/kg respectively as compare to standard aspirin who's inhibitory response is 59.1%, $p<0.05$.

Gross behavioural activity

The results obtained from different experiments were presented in table 3. *Lipidium meyenii* produced spontaneous activity after 5 to 10 minutes of drug administration at 300mg/kg and at 500mg/kg dose produces more active response and alertness. However, the standard drug diazepam shows significant decrease in the motor activity and imipramine improve the motor activity (table 3). All these response of *Lipidium meyenii* when compared with standard drug imipramine a significant difference were observed.

The results of *Epimidium sagitattum* have interesting findings at 300 and 500mg/kg dose. At low dose the drug shows alertness and increase motor activity where as at high dose it has slight depressive response (table 3) but not as significant as diazepam.

Table 5: Assessment of head dip test

Treatment	Dose mg/kg orally	Mean No. of Observations ±S.E.M
Control	0.5ml Saline	25±4.75
Crude extract of *maca*	300mg/kg	38.6±2.16*
	500mg/kg	44.8±1.14**
Crude extract of *Epimidium*	300mg/kg	38±2.16*
	500mg/kg	30.2±1.14
Diazepam	2mg/kg	16.6±2.17**
Imipramine	15mg/kg	30.8±2.03

Neuropharmacological assessment

Open field, cage cross, head dip activity

In this test Diazepam significantly reduces the no. of square covered (table 4), cage cross (table 6) and head dip (table 5) ($p<0.05$). On the other hand Imipramine induced a slight increase in these parameters ($p<0.05$). Mice received 300 and 500mg/kg.

Administration of crude extract of *Lipidium meyenii* at 300 and 500mg/kg showed significant increment of number of square traveled ($p<0.05$), cage cross ($p<0.05$) and head dip ($p<0.05$). However the crude extract of *Epimidium sagittatum* showed interesting results. At 300

mg/kg there is stimulating response and at 500mg/kg slight depressive response was observed.

Forced induce swimming test and social interaction

All animals were treated with the crude extract of *Lipidium meyenii* and *Epimidium sagittatum* at the dose of 300 and 500mg/kg respectively. The results showed significant increase in mobility time with *Lipidium meyenii* at $p<0.05$ thus it possess dose dependant highly potent antidepressant effect (table 7) in comparison with imipramine standard drug.

Table 6: Assessment of Cage crossing activity

Treatment	Dose mg/kg orally	Mean No. of Observations ±S.E.M
Control	0.5ml Saline	25.67±1.604
Crude extract of *Lipidium meyenii*	300mg/kg	30±0.71*
	500mg/kg	45.2±0.86**
Crude extract of E*pimidium sagittatum*	300mg/kg	38±2.35?**
	500mg/kg	29.6±1.76
Diazepam	2mg/kg	09±0.317
Imipramine	15mg/kg	28±0.18

In case of *Epimidim sagitattum* (table 7) results are good in term of anxiolytic effect but not significant as standard drugs Diazepam and Imipramine at $p<0.05$. However its dual response of increase in mobility time at low dose and decrease in mobility time at high dose made useful for the management of complicated psychiatric disorders.

There were positive attitude in between mice when inter mix with each other upon administration of both crude extract but the intensity was varied (table 12).

Diuretics test

In this assay the crude extract of *Lipidium meyenii* did not show any significant diuretic activity ($p<0.05$) as compare to control and standard drug Furosemide, at 300 and 500mg/kg dose (table 8). Whereas *Epimidium sagtitatum* showed little diuretic effect at 300mg/kg and 500mg/kg respectively but also non significant at $p<0.05$ in comparison with standard drug (table 8).

Effect on body weight, reproduction and chronic toxicity studies

The crude extract of *Lipidium meyenii* and *Epimidium sagittatum* were found to be non toxic at the dose up to 500 (therapeutic doses) and did not cause any death in the treated animals. The Chronic oral administration of *Lipidium meyenii* caused no aggressive behaviour with all dosese, it greatly improves the fertility profile with increased number of pups (table 9). No significant change in body weight was observed (table 11).

The crude extract of *Epimidium sagittatum* was also found to be non toxic at all doses and also shows positive sign for fertilization (table 10) and did not cause any death and change in body weight (table 11).

DISCUSSION

The crude extract of *Lipidium meyenii* (maca) at the dose of 300 and 500mg/kg showed 54.2 and 66% inhibition of

Table 7: Assessment of force induced swimming test

Treatment	Dose mg/kg orally	Mobility time Mean No. of Observations ± S.E.M	Immobility time Mean No. of Observations ± S.E.M
Control	0.5ml Saline	3.55±0.01	2.45±0.01
Crude extract of *Lipidium meyenii*	300mg/kg	4.30±0.07	1.7±0.07
	500mg/kg	5.22±0.07**	0.78±0.07
Crude extract of *epimidium*	300mg/kg	3.98±0.06	2.02±0.06
	500mg/kg	3.74±0.07*	2.26±0.07
Diazepam	2mg/kg	2.82 ±0.13	3.18 ± 0.074
Imipramine	1mg/kg	4.20 ± 0.23	1.40 ± 0.23

Table 8: Cumulative Urine out put in ml (Diuretic effect)

Treatment	Dose mg/kg orally	0.5 hr	2 hrs	4 hrs	6 hrs
Control	0.5 ml Saline	0.32±0.04	0.8±0.03	1ml±0.05	1.9±0.07
Crude extract of *Lipidium meyenii*	300 mg/kg	0.2±0.01	0.5±0.01	1.1 ±0.04	2.17±1.33
	500 mg/kg	0.25±0.004	0.45±0.01	1.24±0.05	2.53±1.36
Crude extract of *Epimidium* sagittatum	300 mg/kg	0.38 ±0.04	0.92±0.04	1.92±0.12	2.37±1.33
	500 mg/kg	0.46±0.024	0.98±0.074	1.22±0.16	2.63±0.36
Furosemide	10 mg/kg	1.02 ±0.06	3.04±0.093	4.98±0.07	5.27±1.86

Mean ±S.E.M, N = 5, Significance with respect to control (* = Significant results, ** = Highly significant results) $p<0.05$.

Table 9: Effects of oral administration of crude extracts *Lipidium meyenii* (therapeutic dose) for 40 days

Dose mg/kg	Mice Sex Male (3) /Female (3)	Total no. of dead	Survival < 2 month	Reproduction Symptom within 21 days	No. of pups
Control	0/6	2/6	"	---	----
100	0/6	0	"	+ 1/3	(4)
200	0/6	0	"	+ (1/3	(7)
300	0/6	0	"	++ (2/3)	7+9
500	0/6	0	"	++(2/3)	9+9

Table 10: Effects of oral administration of crude extracts *Epimidium sagittatum* (therapeutic dose) for 40 days

Dose mg/kg	Mice Sex Male (3)/Female (3)	Total no. of dead	Survival < 2 month	Reproduction Symptom Within 21 days	No. of pups
Control	0/6	1/6	"	---	----
100	0/6	0	"	+(1/3)	(4)
200	0/6	0	"	+ (1/3	(7)
300	0/6	0	"	+ (1/3)	(7)
500	0/6	0	"	+ (1/3)	(6)

Table 11: Effect on body weight after 21 days. (Average weight 25-30gm)

Dose	*Lipidium meyenii*		*Epimidium sagittatum*	
	Weight before drug	Weight After drug	Weight before drug	Weight After dry
Control	27.9	28.4	25	24
100 mg	25.4	26	28.4	27.9
300mg	29.3	29.90	26.3	27.4
500 mg	27.8	28	25.9	31

pain response induced by acetic acid in comparison, - standard drug aspirin produces 60 percent inhibition.

Whereas the crude extract of *Epimidium sagittatum* (horny goat weed) showed 48.1 and 60.6% response at the dose of 300 and 500mg/kg respectively.

Evaluation of abdominal constriction induced by acetic acid releases some endogenous mediators (Collier *et al.*, 1968) it is also believed that some proistanoids are also involved (Hunskaar and Hole, 1987). This drug reduces the nociceptive response at peripheral level and prominent effect is seen in late phase (Rosland *et al.*, 1990). Beside this there is increase in the sperm count and it improve fertility, smooth muscle relaxant prostaglandin such as PGE_1 enhance penile errection by relaxing the smooth muscle of Corpora Cavernosa. PGE_1 has been important for the treatment of impotency (Katzung Bertram G. 1998). Presence of different amino acid protein and fats (table A), would plays an important role for the synthesis of catecholamines. Epinephrine and nor epinephrine have been involve in errection and ejaculation as well as inhibit diuresis due to its sympathomimetic action (Katzung Bertram G. 1998). The possibility of mechanism is more through catecholamines but one cannot ignore the influence of prostaglandins. The effect of the crude extract of *Lipidium meyenii* at CNS is not excitatory but it improves the muscle activity (table 7) as well as enhances exploratory behaviour in the mice (open field, head dip and cage crossing). The diuresis is inhibited by the administration of crude extract of *L. meyenii*.

Mice were forced to swim; this test evaluates the depressive or antidepressant activity of drugs by mobility and immobility time. This drug (maca) significantly reduces the immobility time thus suggested that maca induces anti depressive activity which is more at 500 mg/kg dose. Significant differences were appeared by open field test among all test groups.

L. meyeni contains the high concentration of proteins and important nutrients, which provides the improved sexual function. It has arginine and histidine amino acid, which increases the sperm production, motility and improves ejaculation and orgasm therefore, enhances male fertility. *L. meyeni* also contain histidine amino acid (Valerio 2005). This histidine plays an important role in sexual function and helps for ejaculation and orgasm (Nemetallah, 1985).

In case of *Epimidium sagitattum* the crude extract also shows some analgesic effect which is less than *Lipidium meyenii*, it showed little stimulating effect at low dose (300mg/kg) but at increased dose (500mg/kg) it has little

depressive effect. The crude extract of Epimidium also promotes diuresis at 500mg/kg but not potent action was observed.

Social interaction shows positive behaviour with both extract, rather *Lipidium meyenii* increase the sniffing and following, it also increase sexual desires with out any aggressive behaviour in term of fighting and boxing. *Epimidium sagitattum* act as an anxiolytic and produces relaxation especially in female mice.

Reproduction cycle shows very interesting results in *Lipidium Meyenii* (table 9) with healthy pups who survive very well and more active as compare to control pups. These findings help the safety use for fertility and to improve body functions. Body weight neither increase nor decrease with *Lipidium meyenii* but there is slight increase in the weight at 500 mg/kg of crude extract of *Epimidium sagitattum* that may be because of its depression action on the CNS.

Epimidium sagitattum traditionally used in sexual disorders such as pre-menopausal problems, erectile dysfunctioning. The exact way that *E. sagitattum* works remain unknown. However, it may has adaptogenic effect which promote energy and decreases cortisol levels. In stress situation, increase cortisol levels causing fatigue and depressing sex drive. This drug helps to restore the levels of testosterone and thyroid hormone and improve sex drive. Some other studies showed that the horny goat weed also helps in reduction in bone loss, increased immune system function and muscle mass, and reduction in fat (Kuang *et al*., 1989). *E. sagitattum* stimulates sensory nerves especially in the genital region and also increases sperm production. Because of this effect the drug showed positive androgen effect on the genital organs (testes, prostate gland and muscles) in men and promotes sexual activity (Kuang *et al*., 1989, Liao *et al*., 1995).

CONCLUSION

In conclusion the results of *Lipidium meyenii* and *Epimidium sagittatum* are very good medicine for the treatment of reproductive disorders, *Lipidium meyenii* posses little central action and more peripheral effect in antinociceptive activity. It improve sexual activity possibly through sympathomimetic action and partly through prostaglandin, where as *Epimidium sagittatum* posses dose dependant central and peripheral effect which may be through other transmitter such as serotonin. These finding support the use of these potent medicines in reproductive disorders with out disturbing the behavioural profile (depressive or aggressive) as well as have good analgesic property. *Lipidium meyenii* has more advantage over alprostadil (because it causes pain: Katzung Bertram G. 1998). These results help for other investigations and for more precise mechanism.

Table 12: Assessment of Social interaction

Type of Social interactions	Control	*Lipidium meyenii*	*Epimidium sagittatum*
Sniffing	-	+++	+
Kicking	+	–	–
Following	-	+++	+
Bitting	-	_	-
Grooming	+	++	+

REFERENCES

Adeneye AA, Ajagbonna OP, Adeleke TI and Bello SO (2006). Preliminary toxicity and phytochemical studies of the stem bark aqueous extract of Musanga cecropioides in rats. *J.of Ethnopharmacol,* **105**: 374-379.

Alcaraz MJ and Jimenez MJ (1989). Anti-inflammatory compound from siderites javalambrensis n-hexane extract. *J. Nat. Prod.*, **52**: 1088-1091.

Armando Caceres, Amarillis Saravia, Sofia Rizzo, Lorena Zabala, Edy De Leon and fe derica (1992). Nave, Pharmacological properties of Moringa Oleifera 2: screening for antispasmodic, anti-inflammatory and diuretic activities. *Journal of Ethnopharmacol,* **36**: 233-237.

Bertram JK (1998). Basic and Clinical Pharmacology, publised by appleton and lange a simen and schuster company. Pp.310-314.

Bown D (1995). *Encyclopaedia of Herbs and their Uses.* DK Publishing.

Brooks NA, Wilcox G, Walker KZ, Ashton JF, Cox MB, Stojanovska L (2008). Beneficial effects of Lepidium meyenii (Maca) on psychological symptoms and measures of sexual dysfunction in postmenopausal women are not related to estrogen or androgen content. *Menopause,* **15** (6): 1157-62.

Collier HOJ, Dinneen Dinneen LC, Johnson CA and Schneider C (1968). The abdominal constriction response and its suppression by analgesic drugs in the Mouse. *Br. J. Pharmacol,* **32**: 295-310.

Debprasad Chattopadhyay G, Arunachalam, Subhash C, Mandal R, Bhadra, Asit B and Mandal (2003). CNS activity of the methanol extract of Mallotus Peltatus (Geist) Muell Arg. Leaf: An ethno medicine of Onge. *J. Ethnopharmacol,* **85**: 99-105.

File SE, Zangrossi JR H and Andrews N (1993). Social interaction and elevated plus maze tests: Changes in release and uptake of 5-HT and GABA. *Neuropharmacology,* **32**: 217-221.

File SE, Zangrossi JRH and Andrews N (1993). Social interaction and elevated plus maze tests: Changes in release and uptake of 5-HT and GABA. *Neuropharmacology,* **32**: 217-221.

Florence Crestani, James R. Martin, Hanns Mohler and Uwe Rudorlph (2000). Mechanism of the hypnotic Zolpidem *in vivo*. *Br. J. Pharmacol,* **131**: 1251-1254.

Hunskar S and Hole K (1997). The formalin test in mice: Dissociation between inflammatory and non-inflammatory pain. *Pain*. **30**: 103-114.

Irwan S, Taber RI, Fox JA and Roth FE (1968). Comparison of perphenazine and Fluphenazine enanthates in rats. *Psychopharmacology,* **12**: 441-447.

Kasture VS, Deshmuk VK, Chopde CT (2002). Anxiolytic and anticonvulsive activity of Sesbania grandiflora leaves in experimental animals. *Phytother. Res.,* **16**: 455-460.

Kennett GA, Dicknison SL and Curzon G (1985). Central serotonergic responses and behavioral adaptation to repeated immobilization: The effect of corticosterone synthesis inhibitor metyrapone. *Eur. J. Pharmacol.*, **119**: 143-152.

Koster R, Anderson M and De Bear EJ (1959). Acetic acid for analgesic screening. *Fed. Proceed.,* **18**: 412-416.

Kuang AK, Chen JL and Chen MD (1989). Effects of yang-restoring herb medicines on the levels of plasma corticosterone, testosterone and triiodothyronine. *Zhong. Xi. Yi. Jie. He. Za. Zhi.*, **9**: 737-738, 710.

Liao HJ, Chen XM, Li WG (1995). Effect of *Epimedium sagittatum* on quality of life and cellular immunity in patients of hemodialysis maintenance. *Zhongguo. Zhong. Xi. Yi. Jie. He. Za. Zhi*., **15**: 202-204.

Mukinda JT and Syce JA (2007). Acute and Chronic Toxicity of the aqueous extract of Artemisia aftra in rodents. *J. Ethnopharmacol,* **112**: 138-144.

Nemetallah BR, Howell RE and Ellis LCa (1985). Histamine and secondary autoimmune infertility in dark mink (Mustela vison). *Arch Androl*., **15**(1): 79-82.

Plummer, D.I. (Ed.), 1985. An introduction to practical Biochemistry, 2nd ed. Tata Macgrow-Hill Publishing Co. Ltd., New Delhi, pp.136-143.

Raina R, Khattri S, Thukral M, Lakin MM, Agarwal A and Zippe CD (2001). Treatment option for erectile dysfunction. *J. Int.l Med. Ind.,* **4**(4): 198-209.

Rosland JH, Tjolsen A, Machle B and Hole K (1990). The formalin test in mice, effect of formalin concentration. *Pain*. **42**: 235-342.

Sanchez-Mateo CC, Prado B and Rabanal RM (2002). Antidepressant effects of the methanol extract of several Hypericum species from the Canary Islands. *J. Ethnopharmacol.*, **79**: 119-127.

Trease, G.E., Evans, W.C. (Eds.), 1983. Pharmacognosy, 12th ed. ELBS Publication, Baillier Tindall, East Bourne, pp.344-539.

Turner RA (1965). Screening methods in pharmacology, Academy Press, New York. P.113.

Valerio LG and Gonzales GF (2005). Toxicological aspects of the South American herbs cat's claw (Uncaria tomentosa) and maca (*Lepidium meyenii*): a critical synopsis. *Toxicol. Rev.*, **24**(1): 11-35.

Wallis TE (Ed.), 1985. Textbook of Pharmacognosy, 5th ed. CBS Publishers & Distributors, Delhi, pp.15-20, 561-565.