

APHRODISIAC ACTIVITY OF *CYCAS CIRCINALIS.L* AND *IONIDIUM SUFFRUTICOSUM.GING* ON MALE WISTER ALBINO RATS

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ABSTRACT

Introduction: *Cycas circinalis .L* and *Ionidium suffruticosum. Ging* are the two herbs used in Siddha system of medicine (Indian Medicine) for years together to improve the fertility of male.

Objective: The aphrodisiac activities of the two herbs *Cycas circinalis .L* and *Ionidium suffruticosum. Ging* were tested on male albino rats and compared the effect with normal and positive control male albino rats.

Materials and Methods: The present study involves 4 groups, each group has 6 healthy sexually active male albino rats. The *Cycas circinalis* and *Ionidium suffruticosum* extract (200mg/kg body weight) were administered orally to 2 experimental group of albino rats and its sexual performance was compared to the normal albino rats (given normal saline) and positive control albino rats (given Sildenafil citrate 4.5mg/kg body weight). The aphrodisiac activities of rats due to the effect of the herb were observed by various parameters such as mount frequency, mount latency, intromission frequency, intromission latency, ejaculation latency, post ejaculatory Interval and total sexual behavior. The data's were analyzed using one way ANOVA and found to be statistically significant.

Results: The herbs showed significant positive results in improving various parameters involved in maintaining maleness. The study proves that *Cycas circinalis* and *Ionidium suffruticosum* both have aphrodisiac activity and *Ionidium suffruticosum* was proved to be more effective and almost has the similar effect of Sildenafil citrate.

Conclusion: The herbal extracts possessing aphrodisiac activity will be of great use for males suffering from sexual disorders like impotence.

Keywords: *Ionidium suffruticosum*, *Cycas circinalis*, Aphrodisiac activity, Mount frequency, Mount latency, Intromission frequency, Intromission latency, Ejaculation latency, Post ejaculatory interval, Total sexual behavior.

INTRODUCTION

Cycas circinalis .L (Family –Cycadaceae) (Cc) a sago palm commonly known as Madana Kaman in Tamilnadu. The male sago cone has aphrodisiac activity.[1] *Ionidium suffruticosum. Ging* (Family–Violaceae) (Is), a perennial herb known as Orithazthamarai. The whole plant has aphrodisiac activity and it is used as rejuvenating herb in Siddha system of Medicine.[2] The androgen influences the sexual characteristics of a male.[3] Hypogonadism in adulthood results in loss of libido, sexual activity which can be recovered by administering the synthetic androgens. Androgen contribute to penile erection by acting in concert with the other determinants of penile erectile physiology.[4] The erectile dysfunction, premature ejaculation can be significantly improved by synthetic aphrodisiacs, but it may result in irregularities of rhythm of heart, tremor, flushing, blurred vision, dilation of blood vessels causing headache and fainting.[5] The intensive search for herbs having aphrodisiac activity resulted in many herbs, some of which have been already proved, whereas 2 herbs *Cycas circinalis* (Cc) and *Ionidium suffruticosum* (Is) which has been used in Siddha system of medicine (Indian Medicine) for years together for treating male infertility, no study was carried out till date with these herbs on the male gonads and sexual activity and this is the first report of the herb proved for its aphrodisiac action. The present study was done with these herbs (Cc & Is) and the aphrodisiac property was analyzed with an intention to find a safe, powerful, natural aphrodisiac of herbal origin. The toxicity study, phytochemical screening, extraction of the plant material and the effect on male gonads of albino rats were already done and published. [6,7,8,9]

MATERIALS AND METHODS

Animal selection and drug administration

About 24 male albino rats (*Rattus norvegicus albinus*) of 8 weeks old weighing about 130 – 140 gm were procured and kept in cages in

the experimental animal lab. The rats were fed with standard pellets and fresh water *ad libitum*, acclimatized to the light - dark cycle and a period of one week was given for acclimatization before the study [10]. The experiments were performed in accordance with the CPCSEA guidelines and the study was approved by Institutional Animal Ethical Committee of Saveetha University, approval number–ANAT.005/2012. The rats were selected randomly with 6 rats in each group as follows G-1 control rats were given normal saline (2ml/kg body weight) [11], G-2 Positive control rats administered sildenafil citrate (4.5mg/ kg body weight) [11], G-3 Experimental rats administered *Cycas circinalis* extract (200mg/kg body weight), G-4 Experimental rats administered *Ionidium suffruticosum* extract (200mg/kg body weight). The drugs were administered orally using infants feeding tube to the experimental group regularly at a fixed time everyday for 30 days. Rest period of about 10 days were given to all the animals after administration of the drug.

Preparation of Male rats

The sexually active male rats were selected for testing and trained for sexual behavior 2 times a day for 10 days initially before administering the drugs. [11]

Preparation of Female rats

Adult healthy young female rats of 8 weeks old weighing about 130 – 140 gm were selected and administered benzoate oestradiol 10µg/100g body weight to bring the female rats for oestrous phase 48 hrs before copulatory study and progesterone 500µg/100g body weight was administered through subcutaneous route 4 hours before the copulatory studies.[4]

Copulatory study of the rats

The experiment was carried out in a specially designed box measuring 50×30×30 cm with a dim yellow light. One male rat marked by picric acid was kept initially in the box and two female rats which were prepared as explained above were introduced into the box. After a 15 minutes acclimatization period, the following sexual behavior such as Mount frequency (MF), Intromission frequency (IF), Mount latency (ML), Intromission latency (IL), Ejaculation latency (EL), Post-ejaculatory interval (PEI) and Total sexual behavior (TSB) includes genital grooming, anogenital sniffing, chasing of female rats was observed for one hour till ejaculation of semen in any one of the female. [4,9,11,12]

Statistical Analysis

Table 1: Sexual Behavior of the Male Albino Rats.

| S.no | Parameters | Group -1 Mean±SEM | Group -2 Mean±SEM | Group -3 Mean±SEM | Group -4 Mean±SEM |
|------|------------|----------------------|----------------------|----------------------|----------------------|
| 1 | MF | 2.48±0.32 | 12.31±1.56 | 5.32±0.77 | 7.31±0.45 *** |
| 2 | IF | 0.39±0.24 | 0.95±0.31 | 0.68±0.21 | 0.58±0.28# |
| 3 | ML(sec.) | 339.4±7.41 | 132±7.24 | 302±7.71 | 238±7.48 *** |
| 4 | IL(sec.) | 843.21±9.14 | 280.63±7.61 | 639±8.48 | 302±7.71*** |
| 5 | EL(min.) | 6.21±0.71 | 13.2±1.12 | 8.23±1.14 | 7.18±1.05*** |
| 6 | PEI(min.) | 16.4±1.12 | 6.2±1.14 | 10.3±1.12 | 9.40±1.08*** |
| 7 | TSB | 195.20 ± 0.96 | 214.30 ± 0.98 | 198.14±0.98 | 221.37± 0.9*** |

Mount frequency (MF), Intromission frequency (IF), Mount latency (ML), Intromission latency (IL), Ejaculation latency (EL), Post-ejaculatory interval (PEI), Total sexual behavior (TSB), sec - seconds, min - Minutes. G-1 control rats given normal saline, G-2 Positive control rats administered sildenafil citrate, G-3 Experimental rats administered *Cycas circinalis* extract, G-4 Experimental rats administered *Ionidium suffruticosum* extract. (n=6 in each group) Sec - seconds, Min - Minutes.

*P<0.05, **P< 0.01, ***P<0.001, # - Statistically not significant, n - number of animals, SEM - Standard Error Mean.

Table 2: Post Hoc pair wise comparison

| S. no | Pair wise comparison | MF | IF | ML | IL | EL | PEI | TSB |
|-------|----------------------|-----|-----|----|----|-----|-----|-----|
| 1. | G1 vs. G2 | S | n\s | S | S | S | S | S |
| 2. | G1 vs. G3 | n\s | n\s | S | S | n\s | S | S |
| 3. | G1 vs. G4 | S | n\s | S | S | n\s | S | n\s |
| 4. | G2 vs. G3 | S | n\s | S | S | S | n\s | S |
| 5. | G2 vs. G4 | S | n\s | S | S | S | n\s | S |
| 6. | G3 vs. G4 | n\s | n\s | S | S | n\s | n\s | S |

G-1 Control rats given normal saline, G-2 Positive control rats administered sildenafil citrate, G-3 Experimental rats administered *Cycas circinalis* extract, G-4 Experimental rats administered *Ionidium suffruticosum* extract, S - Statistically significant (P<0.05), n\s - Statistically not significant,

DISCUSSION

Cycas circinalis and *Ionidium suffruticosum* are the herbs taken for the study and no work was done for its aphrodisiac activity, this is the first study throwing light on these unrevealed herbs. The aphrodisiac activity of some of the herbs such as *Tribulus terrestris*, *Withania somnifera*, *Asparagus racemosus*, were proved.

Gautham et al worked on aphrodisiac activity of *Tribulus terrestris* with the positive control administering sildenafil citrate and most of the parameters of positive control such as mount frequency (2.16±0.47), Intromission frequency (0.33±0.21 sec.) and mount latency (307.50±6.80) correlated with the present study. [4] Mount frequency is the number of mounts made in one hour by the male rats after introducing the female rats. The normal control rats has the least mounting index and the highest is the positive control rats whereas *Is* extract administered rats were having higher mounting index when compared to *Cc* extract administered male rats. The

The sexual behavior of the control and experimental rats were recorded for each male rat in all the four groups. The data's were tabulated and analyzed by one way ANOVA and Post-Hoc pair wise comparison for statistically significance using free online graph pad calculator.

RESULTS

The data's of sexual performance was given in Table 1. The parameters such as of the sexual behavior were highly statistically significant for Mount frequency (MF), Intromission frequency (IF), Mount latency (ML), Ejaculation latency (EL), Post-ejaculatory interval (PEI) and Total sexual behavior (TSB) (P<0.001). The Intromission latency (IL) was not statistically significant. The Post hoc pair wise comparison was done among the groups G1, G2, G3 and G4 (Table 2).

parameter was highly significant when compared among the four groups (P<0.001) (Table 1). The post comparison was not significant between normal control G1 and experimental rats given *Cc* extract G3 and also between experimental rats given *Cc* extract G3 and experimental rats given *Is* extract G4 (Table 2). Intromission frequency is the time taken for the first mount by the male rat. The intromission frequency of all the rats were within the same range was not significant (Table 1 & 2). Mount latency is the number of intromissions until ejaculation. Mount latency is less in positive control (132±7.24 sec.) and next is the *Is* administered group (238±7.48 sec.) and all four group shows statistical significant (P<0.001) (Table 1). Post comparison among all the four groups were significant (P<0.05) (Table 2).

Intromission latency is the interval from the time of introduction of the female to the first intromission by the male (characterized by pelvic thrusting and springing dismount). [4] The positive control intromission latency was less (280.63±7.6 sec.) and for *Is* administered group (302±7.71 sec.). The parameter is statistically significant (P<0.001) (Table 1). The post comparison among all the groups was also significant (P<0.05). Ejaculation latency is the time interval between the first intromission and ejaculation. This parameter was more for Positive control (13.2±1.12 min.) followed by *Is* group (8.23±1.14 min.). The groups show high statistical significant. The post comparison was not significant between G1-G3, G1-G4 & G3-G4, rest groups are significant (Table 2)

Post-ejaculatory interval is the time interval between ejaculation and the first intromission. The parameter show less in positive control (10.3±1.12 min.) followed by *Is* extract administered group (9.40±1.08 min.) Table 1 and parameter was significant. The post comparison was not significant between the groups G2-G3, G2-G4 & G3-G4, rest groups are significant (Table 2). The total sexual behavior includes genital grooming, anogenital sniffing, chasing of female rats.[11] The *Is* administered rat showed increase in total sexual behavior (221.37± 0.9) when compared to that of positive control (214.30 ± 0.98) and the data was significant (P<0.001). The post comparison showed only the comparison of G1 with G4 was not significant and all other groups were highly significant (Table 2).

CONCLUSION

The study proves that *Cycas circinalis* (*Cc*) and *Ionidium suffruticosum* (*Is*) both have aphrodisiac activity which was compared with a positive control administered with Sildenafil citrate. The positive control showed the increase in sexual performance followed by *Is* extract administered group. The total

sexual behavior was more in the Is administered rat when even compared to positive control. The Is was proved to be more effective for sexual performance than the Cc. The outcome of this study will also constitute a source of baseline data. The study is further extended to identify the component responsible for the aphrodisiac activity in both the herbs and the extraction of active compounds from the extract is under process.

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