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EXPERIMENTAL EVALUATION OF VAJIKARANA KARMA OF TILAGOKSHURA SIDDA DUGDA WITH SPECIAL REFERENCE TO APHRODISIAC ACTIVITY

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ABSTRACT

Infertility is a disease of the male or female reproductive system defined by the failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse. Estimates suggest that approximately one in every six people of reproductive age worldwide experience infertility in their lifetime. Conventional management need long term therapy and are not devoid of ADR's. *Vajikarana* is one among *Astanga Ayurveda* that deals with the preservation and amplification of sexual potency of a healthy man and conception of healthy progeny. Vajikarana yogas helpful in management of *Shukra dusti* and *Vandytava* were documented in the classics. *'TilaGokshura Sidda Dugdha'* is one such formulation explained by *Chakradatta* in *Vajikarana* chapter indicated in *Shandatva* (Impotency). The ingredients of yoga are *Tila and Gokshura* processed in *Aja ksheera (Gaot milk)* which are having *Shukrala* and *Vrishya karma.* Thus, yoga was selected to evaluate the *Vajikarana karma*. Also, an additional attempt is made to evaluate the same yoga by changing the processing agent as *Go-Dugda(Cow milk)* in another group. MATERIAL AND METHODS : Wister rats were grouped in to 5 groups of 6 animals each. Experimental period was 28 days study. Oligospermia was induced by administrating Metronidazole for initial 14 days. Group one as Normal, Group 2 as Disease control, Group 3 was treated with Clomiphene citrate, Group 4 and Group 5 were treated with *Tila Gokshura Sidda Dugda (Aja Dugda Saditha)* and *Tila Gokshura Sidda Dug-da (Go-Dugda Saditha)* respectively for next 14 days. Sexual Behaviour Pattern, Sperm count, Serum parameters, Tissue parameters and Histopathological changes in testis tissue were Observed. DISCUSSIONS

AND CONCLUSION : *Tila Gokshura Sidda Dugda (Aja Dugda Saditha)* showed effective *Vajikarana karma* in experimental rats when compared to standard drug. RESULTS : The results of the experimental study reveal that *TilaGokshura Sidda Dugda* has significant *Vajikarana karma* when compared with standard drug.

Key words: *Vajikarana Karma* ,*Shukra kshaya*, Infertility, Tila, Gokshura , Aphrodisiac Activity

INTRODUCTION

In the area of human health and well-being, sexual health has a profound impact on the physical, emotional, and psychological dimensions. As the foundational pillar of procreation and the preservation of the human species, sexual health and fertility have garnered significant attention in medical research. Infertility is a disease of the male or female reproductive system defined by the failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse.[1] Estimates suggest that approximately one in every six people of reproductive age worldwide experience infertility in their lifetime.[2] A recent report about the status of infertility in India states that approximately 50% of infertility is related to reproductive anomalies or disorders in males.[3] Conventional management with Human chorionic gonadotropin (hCG) and Clomiphene citrate, etc., need long-term therapy and are not devoid of ADRs like Gynecomastia, Headache, Hyperglycaemia, Depression and Gastrointestinal disturbances, etc.[4] It is a need of the hour to find a simple, effective, preventive, curative solution to this growing problem. *Ayurveda* has bestowed positive and comprehensive healthcare to humanity. *Vajikarana* is one among *Astanga Ayurveda* that deals with the preservation and amplification of sexual potency of a healthy man and conception of healthy progeny as well as management of defective semen, disturbed sexual potency, and spermatogenesis along with treatment of seminal-related disorders in man.[5] Several single herbs possessing *Vrishya karma* and various *Vajikarana yogas* which are helpful in the management of *Shukra dusti* and *Vandyatwa* were documented in the classics. Among several yogas, *'Tila Gokshura Sidda Dugdha'* is one such formulation explained in *Chakradatta* chapter on *Vajikarana*. This formulation is simple and unique, with ingredients like *Tila and Gokshura* processed with *Aja ksheera* (goat milk) and indicated in *Shandatva* (impotence).[6] The key ingredients *Tila* and *Gokshura* are well-known for their *Shukrala* and *Vrishya karma*, respectively. Since the yoga is *Ksheera* based, *Ksheera* being *Sadhyo Shukakara*, helps in *Dhatu poshana*, and will also be easier to administer. Hence, the study is undertaken to evaluate the efficacy of *Tila Gokshura Siddha Dugda* for its *Vajikarana karma* with respect to Aphrodisiac activity. Also, an additional attempt is made to compare the effectiveness of *Tila Gokshura Siddha Dugda* yoga by using *Go-dugda* (cow milk) with that of *Tila Gokshura Sidda Dugda* (goat milk) to find whether *Go-dugda* can be substituted in place of *Aja-dugda* as the latter is not readily available.

OBJECTIVES OF THE STUDY

1.To evaluate *Vajikarana Karma* of *Tila Gokshura Sidda Dugdha* with respect to Aphrodisiac activity through experimental study.

Materials and Method

Preparation of Vajikarana Yoga

Yoga: Tila Gokshura Sidda Dugda

Tila Gokshura Siddha Dugdha

Tila and *Gokshura* processed with *Aja Dugdha*(goat milk) is indicated in impotency, administered along with honey.[7] All ingredients in this yoga are commonly attributed to *Madhura rasa, Madhura vipaka* properties *and Deepana, Vrushya, Shukrala, and Balya* pharmacological activities.

PREPARATION OF DOSAGE FORMS:

Preparation of Ksheerapaka:

Ksheerapaka was prepared using the method mentioned in *Sharangadhara Samhita madhyama khanda* 2/161. *Ksheerapaka* was freshly prepared every day for study purposes.

PLACE OF WORK:

The Experimental study was conducted at PES College of Pharmacy, Hanumanth Nagar, Bengaluru.

The Haematological parameters, Mating Behaviour Parameters, Sperm Count, Testes - Body Weight, and Serum Testosterone studies were done at PES College of Pharmacy, Hanumanth Nagar, Bangalore.

SOURCE OF MATERIALS REQUIRED:

• Metronidazole and Clomiphene citrate were purchased from a local Pharmacy in Bangalore

Experimental animals:

Wister Albino rats weighing around 150-250 g of either sex housed in standard conditions of temperature (22 ± 2°C), relative humidity (55 ± 5%), and light (12 hrs light/dark cycles) were used. They were fed with a standard pellet diet and water ad libitum. The experimental procedure was carried out according to the ethical guidelines for animals proposed by the Government of India. Ethical clearance was obtained from PES College of Pharmacy, Hanumanth Nagar, Bangalore, as per the protocol outlined in the publication of the Committee for Control and Supervision of Experiments on Animals standard guidelines (CPCSEA), and approval was obtained from the Institutional Animal Ethics Committee (IAEC) with reference no: PESCP/IAEC/133/2022

Acute toxicity evaluation and treatment schedule

The acute toxicity study of Tila Gokshura Sidda Dugda was done by the up-and-down method. The rats fasted for 18 hours with water and libitum. The Tila Gokshura Sidda Dugda was administered in six doses: 175, 550, 1750 and 5560 mg/kg body weight, per oral. The animals were observed for clinical signs and symptoms of toxicity every 30 min up to 6 hours on the first day and after that, every day up to 7 days. Acute toxicity studies showed no mortality or changes in behaviour observed at the dose up to 5000 mg/kg.

The dose selected for aphrodisiac activity was 500mg/kg.

Experimental study:

Thirty albino Wistar rats were divided into five groups; each group contained six animals. Group I was usually administered with potable water ad libitum for 28 days; Group II was oligospermia control induced by Metronidazole (400mg/kg bw) for 14 days orally. Group III referenced the standard group treated with Clomiphene citrate of 0.3mg/kg bw orally for 28 days. Group IV animals received Metronidazole for 14 days, followed by *Tila Gokshura Sidda Dugdha* (Goat milk) from the 15th day to the 28th day. Group V animals received Metronidazole for 14 days, followed by *Tila Gokshura Sidda Dugdha* (Cow milk) from the 15th day to the 28th day. The Sexual behaviour pattern of the male rats was assessed on 29-30th day.

Observation and result

Mating behaviour study : Mating behaviour studies were conducted in a separate room under dim red illumination according to the standard procedure. Healthy male albino rats showing brisk sexual activity and female animals showing regular oestrus cycles were selected for the study. The male rats were placed in a rectangular cage chamber 10 minutes before the introduction of a primed female and to get acclimatised to the chamber conditions. The primed female was introduced into the chamber with a one-female-to-one-male ratio, and the mating behaviours were observed after the TilaGokshuraSidda Dugda (TGSD) treatment. The following mating behaviour parameters were recorded:

Initial arousal period • Peak arousal period • Mounting behaviour • Mount latency • Ejaculatory reflex • Time interval to mount again, Sperm Count. • Measurement of body and reproductive organ weight (testes and epididymis). • Estimation of serum parameters –Serum Testosterone. • Estimation of Testes Tissue Parameters – SOD, Catalase and LPO. • Histopathology: Histopathology of Testes. The experimental animals were sacrificed the next day after the completion of the behavioural study. The testis, epididymis, vas deferens, seminal vesicles, and prostate glands were dissected, freed from surrounding fat and connective tissue, and weighed to the nearest milligram on the electronic balance. The organ weights were calculated per 100gm body weight using the following formula. GSI = (Organ weight/ Total body weight) X 100. Then, the organ from one side of each

animal was fixed in bounds fluid for histological studies, whereas the other was processed for bio-chemical estimation.

Statistical analysis:

All the animal experimental values was expressed in Mean+/-Standard Deviation, and data was analysed with ANOVA followed by Dunnett's test using Prism software

Results

EXPERIMENTAL STUDY OBSERVATION AND RESULT

Experimental animal behaviour study

Table no 01 : Mean± SD of Animal behaviour pattern

Sl.No	SAMPLE	INITIAL AROUSAL PERIOD IN SECONDS	PEAK AROUSAL PERIOD IN SECONDS	NO OF MOUNTS IN 30 MIN	EJACULATORY REFLEX	TIME INTERVAL TO MOUNT AGAIN IN SECONDS
1	**NC**	40 ± 0	160 ± 0	5 ± 0	5 ± 0	360 ± 0
2	**DC**	153.33 ± 16.6667	280 ± 11	2.5 ± 0.2236	2.5 ± 0.2	575 ± 44
3	**STD**	34.33 ± 1.5634	130 ± 8.9	5.17 ± 0.3073	5.17 0.3	257 ± 24
4	**TGM**	27 ± 2.0494	82.67 ± 4.4	7.17 ± 0.3073	7.17 ± 0.3	179 ± 7.9
5	**TCM**	26 ± 1.5491	77.5 ± 5.1	6.83 ± 0.3073	6.83 ± 0.3	167 ± 6.7

Table no 1 : Nc : Normal control, DC : Disease control, STD : Standard group (Clomiphene citrate), TGM : TilaGokshura Sidda Dugda – goat milk processed, TCM : TilaGokshura Sidda Dugda – Cow milk processed.

Initial Arousal period

Disease Control vs. Other groups

Result: The initial arousal period in group II (Disease control) has significantly increased (153.33 ± 16.6667s) with ****P< 0.0001 when compared to the normal (40 ± 0s). In group III (Standard treatment), group IV (TGM), group V (TCM) has significantly decreased (34.33 ± 1.5634, 27 ± 2.0494, and 26 ± 1.5491 respectively) with ****P< 0.0001 when compared to the disease control.

Data were expressed as mean± SEM. Metronidazole-treated oligospermia disease control (Group II) was compared with normal (Group I), Clomiphene citrate treated standard control (Group III), Test drug in goat milk (Group IV), Test drug in cow milk (Group V).

Peak Arousal period

Disease Control vs. Other groups

Result: The peak arousal period in group II (Disease Control) has significantly increased (280 ± 11s) with ****P< 0.0001 when compared to the normal (160 ± 0s). In group III (Standard treatment), group IV (TGM), and group V (TCM), the peak arousal period has significantly decreased (130 ± 8.9, 82.67 ± 4.4, and 77.5 ± 5.1 respectively) with ****P< 0.0001 when compared to the disease control.

Data were expressed as mean± SEM. Metronidazole-treated oligospermia disease control (Group II) was compared with normal (Group I), Clomiphene citrate treated standard control (Group III), Test drug in goat milk (Group IV), Test drug in cow milk (Group V).

Number of mounts in 30 Seconds

Disease Control vs. Other groups

Result: The number of mounts in 30 minutes in group II (Disease Control) has significantly decreased (2.5 ± 0.2236) with ****P< 0.0001 when compared to the normal (5 ± 0). In group III (Standard treatment), group IV (TGM), and group V (TCM), the number of mounts in 30 seconds has significantly increased (5.17 ± 0.3073, 7.17 ± 0.3073, and 6.83 ± 0.3073 respectively) with ****P< 0.0001 when compared to the disease control.

Data were expressed as mean± SEM. Metronidazole-treated oligospermia disease control (Group II) was compared with normal (Group I), Clomiphene citrate treated standard control (Group III), Test drug in

goat milk (Group IV), Test drug in cow milk (Group V).

Ejaculatory Reflex

Disease Control vs. Other groups

Result: The ejaculatory reflex in group II has significantly decreased (2.5 ± 0.2) with ****P< 0.0001 when compared to the normal (5 ± 0). In group III (Standard treatment), group IV (TGM), and group V (TCM), the ejaculatory reflex has significantly increased (5.17 0.3, 7.17 ± 0.3, and 6.83 ± 0.3 respectively) with ****P< 0.0001 when compared to the disease control.

Data were expressed as mean± SEM. Metronidazole-treated oligospermia disease control (Group II) was compared with normal (Group I), Clomiphene citrate treated standard control (Group III), Test drug in goat milk (Group IV), Test drug in cow milk (Group V).

Time interval to mount again in seconds

Disease Control vs. Other groups

Result: The time interval to mount again in group II (Disease Control) has significantly increased (575 ± 44) with ****P< 0.0001 when compared to normal (360 ± 0). In group III (Standard treatment), group IV (TGM), and group V (TCM) the time interval to mount again has significantly decreased (257 ± 24, 179 ± 7.9, and 167 ± 6.7) with ****P< 0.0001 when compared to the disease control.

Data were expressed as mean± SEM. Metronidazole-treated oligospermia disease control (Group II) was compared with normal (Group I), Clomiphene citrate treated standard control (Group III), Test drug in goat milk (Group IV), Test drug in cow milk (Group V).

Sperm Count

Table no 2 **:** Mean± SD value of sperm count

Sperm Count		
Sl No	**Sample**	**Sperm Count (Cells/mm3)**
1	**NC**	271701 ± 2610.355
2	**DC**	178182 ± 76363.61
3	**STD**	257272 ± 6636.5
4	**TGM**	325454 ± 27272.6
5	**TCM**	259482 ± 1301.5

Disease Control vs. Other groups

Result: The Sperm count in group II (Disease control) has decreased (178182 ± 76363.61) with ****P = 0.4283 when compared to normal (271701 ± 2610.355). In group III (Standard treatment), group IV (TGM), and group V (TCM) has increased (257272 ± 6636.5, 325454 ± 27272.6, and 259482 ± 1301.5 respectively) with P = 0.6218, 0.2444, and 0.6053 respectively when compared to disease control.

Data were expressed as mean± SEM. Metronidazole-treated oligospermia disease control (Group II) was compared with normal (Group I), Clomiphene citrate treated standard control (Group III), Test drug in goat milk (Group IV), Test drug in cow milk (Group V).

Reproductive organ weight

Table no 3: Mean± SD of Reproductive organ weight

Sl.no	Group	Reproductive organ weight (g)	GSI
1	NC	2.80± 0.0856	1.111± 0.0856
2	DC	1.61± 0.1376	0.6768±0.1376
3	STD	1.77± 0.2789	0.8376±0.2789
4	TGM	1.71± 0.1433	0.6579±0.1433
5	TCM	1.88± 0.2598	0.7875±0.2598

Disease Control vs. Other groups

Result: The reproductive organ weight of the rats in group II (Disease control) was decreased (1.61± 0.1376 with GSI of 0.6768±0.1376) with P = 0.3211 when compared to the normal (2.80± 0.0856 with GSI of 1.111± 0.0856). In group III (Standard treatment), group IV (TGM), and group V(TCM), the reproductive organ weight has slightly increased (1.77± 0.2789 with GSI of 0.8376±0.2789, 1.71± 0.1433 with GSI of 0.6579±0.1433, and 1.88± 0.2598 with GSI of 0.7875±0.2598 respectively) with P = 0.9200, 0.9780, and 0.7038 respectively when compared to the disease control.

Data were expressed as mean± SEM. Metronidazole-treated oligospermia disease control (Group II) was compared with normal (Group I), Clomiphene citrate treated standard control (Group III), Test drug in goat milk (Group IV), Test drug in cow milk (Group V).

Testosterone

Table no 04: Mean± SD of Testosterone

Testosterone (Total) Report			
Sl No	**Sample**	**Observed Value, ng/mL**	**Total Testosterone Value(ng/mL)**
1	**NC**	3	3 ± 0
		3	
2	**DC**	0.487	2.087 ± 0.5565
		1.6	
3	**STD**	0.952	4.232 ± 1.164
		3.28	
4	**TGM**	0.974	3.654 ± 0.853
		2.68	
5	**TCM**	5.98	6.872 ± 2.544
		0.892	

Disease Control vs. Other groups

Result: The testosterone level in group II (Disease control) has decreased (2.087 ± 0.5565) with P = 0.7030 when compared to the normal (3 ± 0). In group III (Standard treatment), group IV (TGM), and group V (TCM) testosterone levels has increased (4.232 ± 1.164, 3.654 ± 0.853, and 6.872 ± 2.544 respectively) with P = 0.9175, 0.9633, and 0.5838 respectively when compared to the disease control.

Data were expressed as mean± SEM. Metronidazole-treated oligospermia disease control (Group II) was compared with normal (Group I), Clomiphene citrate treated standard control (Group III), Test drug in goat milk (Group IV), Test drug in cow milk (Group V).

Observation:

Table no 05 : Mean± SD of Tissue parameters

Group		SOD	Catalase	LPO
1	NC	1.6923 ± 0.0769	201.464 ± 31.433	64.46 ± 5.572713
2	DC	1.9265 ± 0.0064	175.10 ± 50.090	10.22 ± 1.953059
3	STD	1.8868 ± 0.0017	266.607 ± 61.606	7.09 ± 0.941099
4	TGM	1.8779 ± 0.0028	154.179 ± 11.239	8.19 ± 2.53285
5	TCM	1.9362 ± 0.0026	103.357 ± 17.178	7.06 ± 0.659976

1. Superoxide Dismutase Activity Disease Control vs. Other groups

Result: The SOD in group II (Disease control) has significantly increased (1.9265 ± 0.0064) with **** P <0.0001 when compared to normal rats (1.6923 ± 0.0769). In group III (Standard treatment), and group IV (TGM) the SOD activity has significantly decreased (1.8868 ± 0.0017, and 1.8779 ± 0.0028 respectively) with ****P< 0.0001 when compared to the disease control.

Data were expressed as mean ± SEM. Metronidazole-treated oligospermia disease control (Group II) was compared with normal (Group I), Clomiphene citrate treated standard control (Group III), Test drug in goat milk (Group IV), Test drug in cow milk (Group V).

2. Catalase Activity

Disease Control vs. Other groups

Result: The Catalase activity in group II (Disease control) has decreased (175.10 ± 50.090) with P = 0.3294 when compared to normal (201.464 ± 31.433). In group III (Standard treatment), the catalase activity was increased (266.607 ± 61.606) with P = 0.2931 when compared to the disease control. In group IV(TGM) and group V (TCM), the catalase activity has decreased (154.179 ± 11.239 and 103.357 ± 17.178) with P = 0.9687 and 0.4779 respectively when compared with the disease control.

Data were expressed as mean± SEM. Metronidazole-treated oligospermia disease control (Group II) was compared with normal (Group I), Clomiphene citrate treated standard control (Group III), Test drug in goat milk (Group IV), Test drug in cow milk (Group V).

3. Lipid Peroxidation (LPO)

Disease Control vs. Other groups

Result: The LPO in group II (Disease control) has significantly decreased (10.22 ± 1.95305) with *P = 0.0381 when compared to normal (64.46 ± 5.572713). In group III (Standard treatment), group IV (TGM), and group V (TCM), the LPO has decreased (7.09 ± 0.941099, 8.19 ± 2.53285, and 7.06 ± 0.659976 respectively) with P = 0.4376, 0.7341, and 0.4310 respectively when compared to the disease control.

Data were expressed as mean± SEM. Metronidazole-treated oligospermia disease control (Group II) was compared with normal (Group I), Clomiphene citrate treated standard control (Group III), Test drug in goat milk (Group IV), Test drug in cow milk (Group V).

Histopathology of Testis

Group 2 : Disease Control

Group 2: Histopathological studies of tissue samples from the testis disease control specimen show Shrunken seminiferous tubules with disorganization of spermatogenic germ cells. Many of the germ cells show intraepithelial vacuolization, few showing necrosis. Seminiferous lumen show sloughed and exfoliated debris. Interstitium show edema and congested blood vessels..

Group 3 : Standard Drug

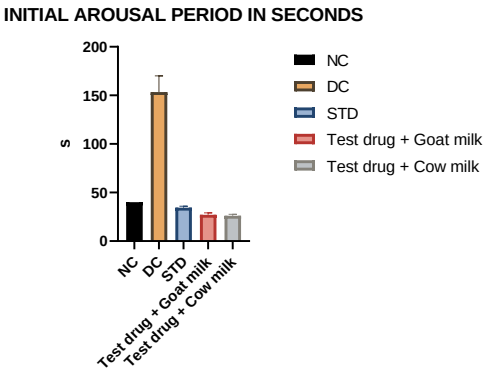
Histopathological studies of testis tissue sample show variable sized tubules with normal to few shrunken seminiferous tubules. Seminiferous tubules contain germ cells in various stages of development. Many of the tubules show different stage germ cells containing spermatogonia, spermatocytes and spermatids. Few tubules show sparse late spermatids and spermatids with condensed nuclei. Interstitium show loose fibro collagenous tissue.

Group 4 : TILA GOSKHURA SIDDA DUGDA – AJADUGDA SADITHA (Goat milk)

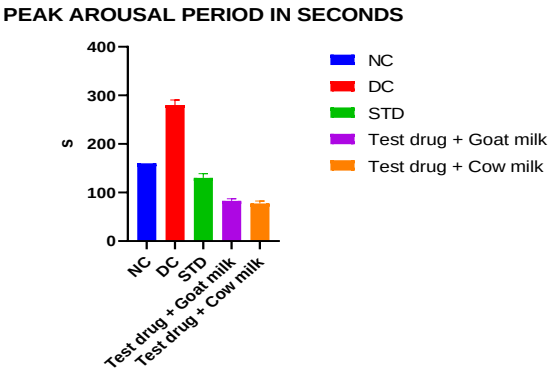
Histopathological studies of testis tissue sample show variable sized tubules with normal to occasional shrunken seminiferous tubules. Seminiferous tubules contain germ cells in various stages of development. Tubules show spermatogonia, spermatocytes, early spermatids and sparse late stage germ cells. Interstitium show loose fibro collagenous tissue.

Group 5 : TILA GOSKHURA SIDDA DUGDA – GO-DUGDA SADITHA(Cow milk)

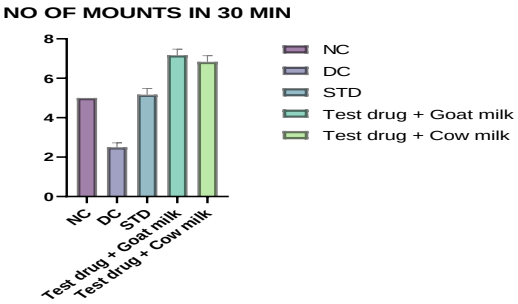
Histopathological studies of testis tissue sample show variable sized seminiferous tubules. Seminiferous tubules contain germ cells in various stages of development. Tubules show spermatogonia, spermatocytes early spermatids, late spermatids and spermatozoa. Interstitium is compact with fibro collagenous tissue and normal appearing Leydig cells.



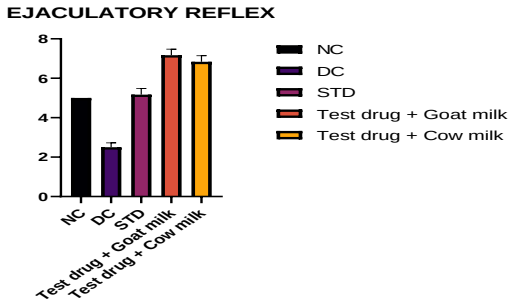
Graph no01: Mean value of Initial Arousal Period in seconds



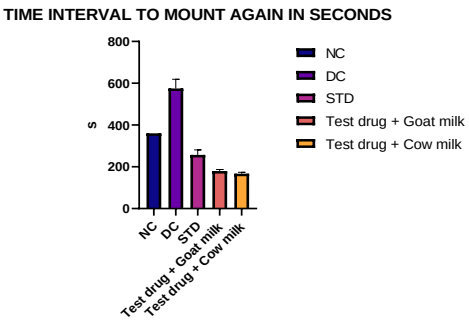
Graph no 2: Mean value of Peak Arousal Period in seconds



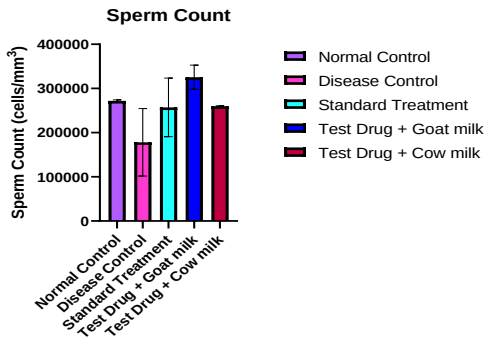
Graph no 3: Mean value of Number of Mounts in 30 min



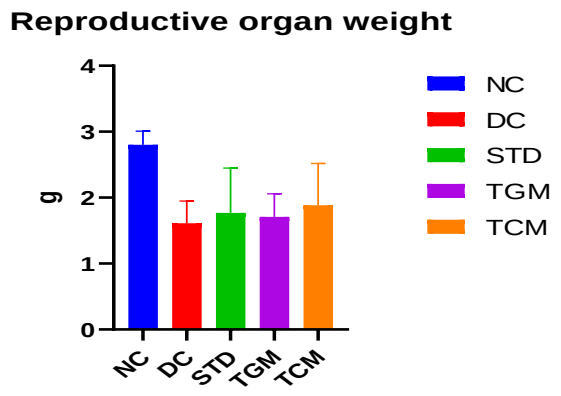
Graph no 4: Mean value of Ejaculatory reflex



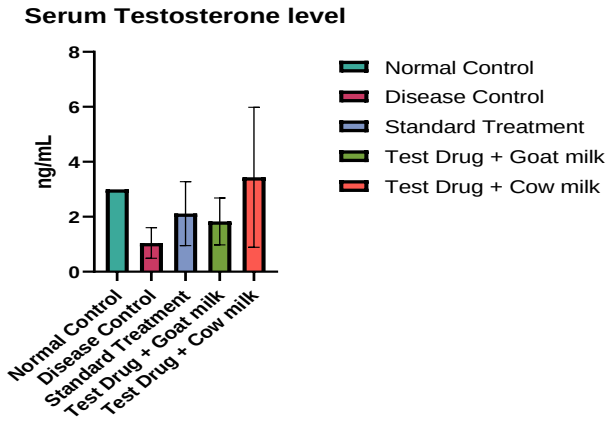
Graph no 5: Mean value of Time interval to mount again



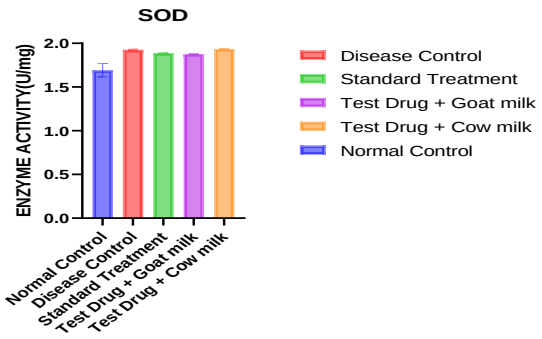
Graph no 6: Mean value of Sperm count.



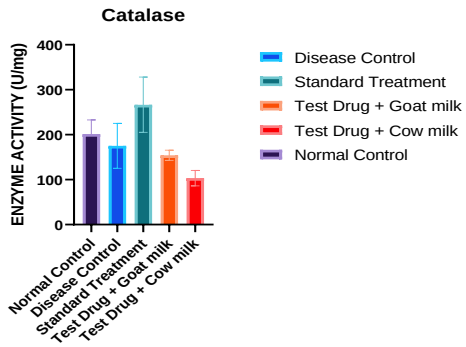
Graph no 7: Mean value of Reproductive organ weight



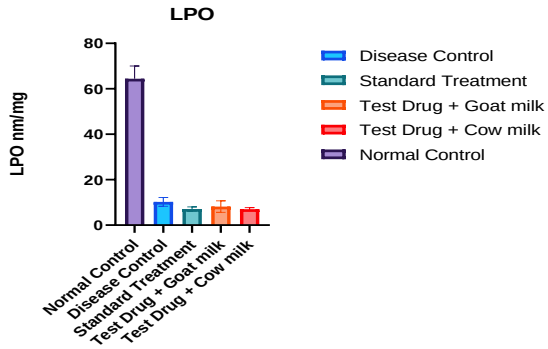
Graph no 8: Mean value of serum Testosterone



Graph no 9: Mean value of SOD



Graph no 10: Mean value of Catalase



Graph no 11: Mean value of LPO

Histopathology of Experimental Animal Testis:

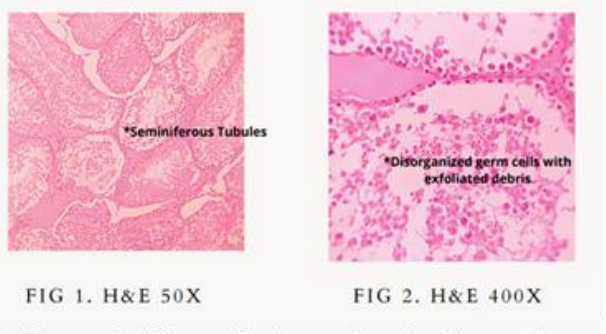


Fig no 1: Histopathology of testis -Group 2

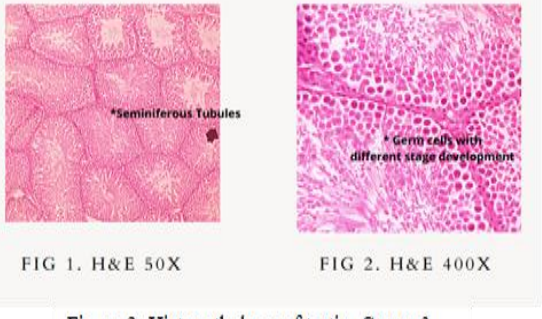


Fig no 2: Histopathology of testis -Group 3

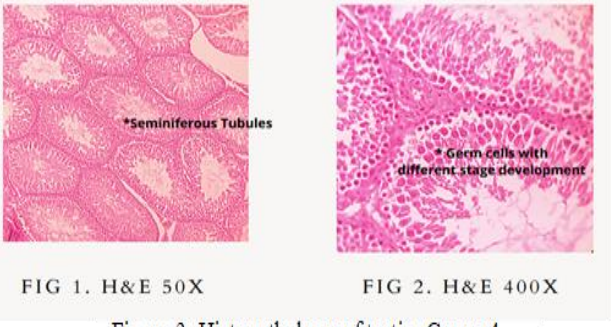


Fig no 3: Histopathology of testis -Group 4

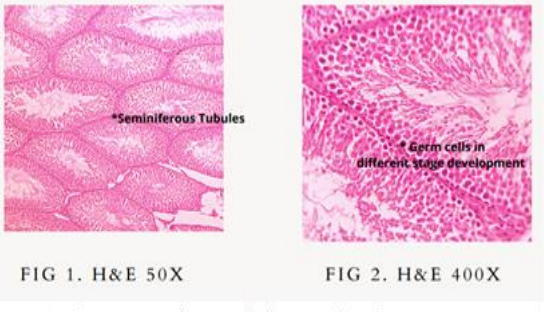


Fig no 4: Histopathology of testis -Group 5

DISCUSSION

Sexual Behaviour Parameters:

The trial group *"Tila Gokshura Sidda Dugda"* has shown effectiveness in improving sexual behaviour then when compared to the standard drug group. This might be because of the combined effect of *Gokshura* and *Tila* processed in milk, which has properties like *Vrishya, Shukrala, Balya, and Rasayana*. The compound is rich in saponin, flavonoids, vitamins, and micronutrients, which act as effective antioxidants in reducing oxidative stress levels, correcting nutritional deficits, decreasing cellular damage, and helping increase testosterone hormone production. Thus, improving the Sexual behaviour among experimental Wister rats.

Discussion on Testosterone

Serum testosterone value is more significant in the Trail drug *Tila Gokshura Sidda Dugda* (cow milk) group when compared to other groups. The presence of phytoconstituents Saponin (Protodioscin) and quercetin present in the trail drugs and rich micronutrients in cow milk of *Tila Gokshura Sidda Dugda* (cow milk) might have contributed to increasing the testosterone level in the group.[8]

Discussion on Sperm count

The value of sperm count in *Tila Gokshura Sidda Dugda* (goat milk) is higher than in all other groups. This might be because of the combined effect of *Gokshura* and *Tila* processed in goat milk, which has properties like *Vrishya, Shukrala, Balya, and Rasayana*, and this compound is rich in Flavonoids; Saponins act as antioxidants and have hormone regulatory roles.

Mode of Action

Gokshura: Tribulus terrestris

Gokshura is attributed to *Madura rasa, guru, Snigda guna, Sheeta Veerya, and Madhura Vipaka. Madura rasa*: The drugs having madura rasa act as *Shukravardhaaka* [9] *Snigda guna* said to be *Vatahara* and exhibit *Vrishya karma*.[10] *Snigda veerya* exhibits *Vajikarana* and *Vayastapana karma.*[11] *Madura vipaka dravyas* acts as *Shukrala***.** *Vrishya, Vajikara* prop-

erties help in *Shukra Vardhana* and management of infertility.

Tribulus terrestris is rich in saponins and flavonoids. Saponins, such as protodioscine, are the essential active compounds in *Tribulus terrestris*. Studies suggest that saponins may influence hormone levels, including luteinising hormone (LH) and testosterone, which could potentially impact fertility.[12]

Flavonoids and Antioxidants: The flavonoids and antioxidants present in *Tribulus Terrestris* may contribute to its ability to protect sperm from oxidative stress, which can impact sperm health and fertility.

Tila: Sesamum indicum[13]

Tila is attributed to *Madhura, Tikta, Katu, and Kashaya rasa. Guru, Snigda* guna. Drugs attributed with *Guru – Snigda guna* exhibits *Vrishya karma*. *Vata dusti* is one of the *nidana* for *Shukra dosha*, *Tila* being *Vatagna* helps in *prashamana of vata*. *Shukrala karma* enhances the sperm count. *Agnivardaka* and *Balya karma* help correct the Agni and improve *Bala*. Sesamum indicum is rich in Phytosterols, Fatty acids, Minerals and Antioxidants. Sesame seeds contain phytosterols, positively impacting prostate health, and may support overall reproductive function. Vitamin E and lignans (sesamin and sesamoline) present in sesame are effective antioxidants that help protect cells from oxidative stress, which can impact sperm quality. Sesame seeds are a good source of minerals like zinc and selenium, essential for male reproductive health. Zinc, in particular, plays a crucial role in sperm production and function.

Aja Ksheera[14-17]

The *Laghu Guna* of *Aja Ksheera* helps for its easy digestion and aids the proper functioning of *Dhatvagni*. *Deepana guna* of *Ajaksheera* stimulates the digestive fire, which helps correct the imbalance of Dhathvagni, thereby enhancing the production of *Dhatuja* bhava of *Sthanika and Sarvadahika Shukra*. As Shukra dhatu is formed by Prasada bhaga of Ahara rasa, both Laghu guna and Deepana karma of Aja Ksheera contribute to the proper functioning of jataragni and dhatvagni and thus help in the formation of Prasada bhaga. *Aja Ksheera* is attributed with *Shukrala karma*, which increases the sperm count and is helpful in oligospermia. Nutritional components and micronutrients in goat milk can contribute to male fertility because of Zinc, Vitamins A, B, D, and E, protein, fatty acids, etc., which are effective antioxidants and nutritional supplements to the skeletal tissues.

Go-Ksheera:[18]

Goksheera is *Sadyo Shukrakara, Attributed to ten guns*, similar to *OJUS*. Thus, it helps in the adequate nourishment of *sapta dhatu*. Being *Bhramana, Rasayana* helps in correcting *Shukra dosha* caused by *kshayaja nidana.* Nutritional components and micronutrients in goat milk can potentially contribute to male fertility because of the presence of Zinc, Vitamins A, B12, Vit D, protein, Omega-3 fatty acids, etc., which serve as effective antioxidants and nutritional supplements to the skeletal tissues. Vitamin B12 is essential for nerve function and DNA synthesis, relevant to sperm development and overall reproductive health.

CONCLUSION

Tilagokshura sidda Dugda is the yoga explained in *Vajikarana Adhaya* of *Chakradatta* text. The present experimental study was to evaluate the Vajikarana karma of yoga with respect to the *Aphrodisiac activity*. The intervention of *Tila Gokshura Sidda Dugda* has shown statistically significant results in improving the Sexual behaviour parameters of experimental animals. *Tila Gokshura Sidda Dugda yoga* processed in Goat and Cow milk showed effective Vajikarana karma compared to standard drugs.

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