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Research Article

EFFECT OF *OPERCULINA TURPETHUM* ON BODY WEIGHT, ORGAN WEIGHT AND FERTILITY OF MALE AND FEMALE ALBINO RATS

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A B S T R A C T

In the present study, the effect of Operculina turpethum on body weight, organ weight of male and female albino rats were observed. The oral administration of Operculina turpethum produced structural changes in reproductive organs in male and female rat. Histological changes revealed increasing seminiferous tubules that contain mature sperm stages. Seminal vesicles, the main supplier of sperm nutritive material showed increasing mucosal fold and epithelial lining height. From above results, it was concluded that fertility of male and female albino rats were increased due to *Operculina turpethum.*

INTRODUCTION

Fertility is the natural capability to produce offspring. As a measure, fertility rate is the number of offspring born per mating pair, individual or population. Fertility differs from fecundity, which is defined as the potential for reproduction. A lack of fertility is infertility while a lack of fecundity would be called sterility.

Infertility is a complex disorder with significant medical, psychological and economic aspects About 25% of couples do not achieve pregnancy within 1 year, and seek medical treatment for infertility. Medicinal plants are of great value in the field of treatment and cure of diseases. In addition, plants have a long folklore of use in aiding fertility, including fertility-enhancing properties and aphrodisiacal qualities. In the present study, the effect of *Operculina turpethum* on body weight, organ weight of male and female albino rats were observed.[1]

Classification of *Operculina turpethum*[2]*:*

Kingdom	**:** Plantae
Subkingdom	**:** Tracheobionta
Superdivision	**:** Spermatophyta
Division	**:** Magnoliophyta
Class	**:** Magnoliopsida
Subclass	**:** Asteridae
Order	**:**Solanales
Family	**:** Convolvulaceae
Genus	**:** Operculina
Species	**:** O.turpethum

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Morphology of Operculina turpethum[2]

Operculina turpethum (convolvulaceae) found throughout India and cultivated in Ceylon, tropical America, Mauritius, Philippines, tropical Africa and Australia.

This Plant is also known as Trivrit in Sanskrit and Nishottara in Marathi.

Trivrit has two varieties as Aruna or Shweta (i.e. having whitish or reddish collared root) and Shyama (i.e. having blackish root)

The botanical name is Aruna or Shweta trivrit is Operculina turpethum (L.). Silva Manso (syn, Ipomoea turpethun and Syama is Ipomea petaloides chois. Aruna or Shweta is best amongst the herbs used for Virechana (therapeutic purgation). Shyama with its drastic purgative action can treat the conditions like intoxication and abdominal tumours. However Shyama is interior in properties and lass fainting burning sensation giddiness contusion, chest pain and roughness of throad and hence is rarely used in median.

Operculina turpethum has been used for centuries as a medicinal plant in ayurvedic medicines because of its resin content (10 %) known as turpethin, jalapine and convolvuline glycoside and essential oil contents.

Operculina turpethum is paramedical plant with milky juice, root is long, slender, fleshy, twining and much twisted together angled and winged, pubescent, tough, and brown when old.

MATERIALS AND METHODS[3,5]

Root of *Operculina turpethum* was purchased from shrishail medicinal plants from (supplier), Nagpur and authenticated by Dr.A.S.Upadhye Agarkar Research Institute, Pune where a sample specimen (Voucher Number R-148) has been deposited.

Powder Extraction

To study the effect of this plant the dried of Operculina turpethum root are powdered using electric grinder and passed through sieve (No.601)

The plant roots were shade dried thoroughly till it loses all its moisture. The roots were made fine to course powder. The powdered material was extracted by suspending 200gm of powder sample in 1200ml distilled water and extracted by decoction process for 2 hours at 80◦c. After filtration was concentrated and dried under reduced pressure to yield a brown colour semisolid form extract. The extract was stored in desiccators until use.

Animal

Six month old male and female albino rats (*Mus musculus* L) were used for present study. They were bred and reared in departmental animal house of Arvind Gavali College, Jaitapur. They were supplied with rat feed (Agro Industries, Pune) and water *ad libitum.* Rat were divided into 4 groups; control and experimental groups (n= 5).

Control group: The six month male rats were given subcutaneous injection of 0.5 ml distilled water/ day/ animal for 20 days.

D-galactose treated group: The six month male rats were given subcutaneous injection of 5% D-galactose 0.5 ml/ day/ animal for 20 days to induce aging.

Determination of body weight of mice

Animals were weighed before starting experiment, during respective treatment and also after completion of each treatment. The record of these observations was maintained.

Determination of organ weight of mice

The animals from respective groups were killed by cervical dislocation after completion of treatment. Liver, pancreas, Testes ovaries, and thyroid were dissected out and then dried with the help of blotting paper and weight of tissue was measured using digital scale balance. The record of these observations was maintained.

Histology by HE technique[4]

For the histological study Liver, pancreas, Testes ovaries, and thyroid was removed after cervical dislocation of the rat and fixed in 2% calcium acetate formaldehyde (CAF) solution for 24 hours. Then it was dehydrated through alcoholic grades, then cleared in xylene and embedded in paraffin wax. The sections were cut at a thickness of 5µm. and stained with Haematoxylin-Eosin (HE), for histochemical studies. After completion of staining sections were observed under microscope for histopathological changes as described previously

Standard HE technique[4]

The pancreas was stained by double staining. To differentiate the nucleus and cytoplasm, the basic dye haematoxylin and the acid dye eosin were used.

Procedure

1. The sections were dewaxed in xylene and hydrated with decreasing grades of alcohol then rinsed with distilled water.
2. Afterward, the sections were stained with Haematoxylin for 5 minutes.
3. Washed under running tap water for 5 minutes.
4. Transferred in ascending series of alcoholic grades.
5. Stained with alcoholic eosin (prepared in 90% alcohol) after staining washed in 90% alcohol and dehydrate in absolute alcohol.
6. Cleared in xylene and mounted in D.P.X. (Disterene Diphenyl phthalate xylene).

RESULTS

The change in body weight is an important parameter considered in most of the studies to recommend health status of animals during the experiment The extract of *Operculina turpethum* administered to adult male and female rat in conc^{n}. of 116mg/kg, 117mg/kg,118mg/kg…….. lead to significant variation of body mass along the experiment, as compared to control group.

Body weight and weight of reproductive organ: There was significant difference in body weight in control group and treated rat with Operculina turpethum resulted in significant decrease in testis, ovary, liver and pancreas weight.

Table no.1 Decreased body weight of rat in gram

Sr No.	Female rat		Male rat	
	Control	Treated	Control	Treated
1	254	310	340	368
2	254	290	340	365
3	251	285	341	360
4	255	280	340	353
5	250	278	339	349
6	255	262	341	341
7	252	251	343	340
8	255	242	341	337
9	251	239	341	335

Table no 2 Organ weight of rat in gram

Sr.No.	Organ	Female		Male	
		Control	Treated	Control	Treated
1	Overy	0.076	0.066	-	-
2	Testies	-	-	2.077	1.233
3	Liver	8.795	6.855	13.762	9.888
4	Pancrease	2.665	2.418	1.846	0.943

Hormone level assay: Plasma level of progesterone and estrogens were significantly increased in treatment group compared to the control. There were higher changes in testosterone level. Hormonal changes in rat given as below:

Table No. 3 Hormone level

Name of Hormone	Normal value	Non treated sample	Treated sample
Progesteron:	0.14-2.03ng/ml	0.18ng/ml	1.06ng/ml
Estrogen:	50.40Pico/ml	32 Picogm/ml	39Pico/ml
Testesteron:	300-1000ng/ml	440ng/ml	495ng/ml

Histological changes in reproductive organs

The nucleus in each stained cell was dark blue and the cytoplasm stained pinkish to red in colour

Testes:-The normal histological structure in testes, epididymis and seminal vesicle stained with haematoxylin-Eosin (HE). Histological normal structure observed in control group i. e. rounded seminiferous tubules with regular outlines. In which we observed spermatogonia, primary spermatocytes, and secondary spermatocytes, round spermatids constituent with general spermatogenesis. Sertoli cells are large, slender. The interstitial space between the lobular containing leading cells and some blood capillaries. The treated group contain rregular shaped seminiferous tubules. The normal structure of testes was disturbed. All the cells in seminiferous tubules were get disturbed and their number was increased.

Spermatogenic cell is at different stages of spermatogenesis was also observed. Blood vessels are enlarged and intact interstitial cells were observed as compared with normal group. Structure was resulting to normal as that observed in control group of mice.

Epididymis- In case of epididymis, control group of rat showed normal structure. Epididymis epithelium enclosed a lumen containing spermatozoa. The lining of tubule showed pseudostratified epithelium. It consists low basal and columnar cells. The treated rat showed epididymis lost the structural integrity decreased number of sperm, from lumen and disappearance of muscle layer as compared with control group.

Seminal vesicle- The seminal vesicle in control group of rat there was normal structure observed. The mucosa was folded, forming numerous irregular crypts. The epithelium composed of cuboidal and columnar cells. Basal cells are regular shaped. The laminar propria rise in elastic fibres and forms continuous layer around vesicle. In treated group seminal vesicle lost the structural integrity.

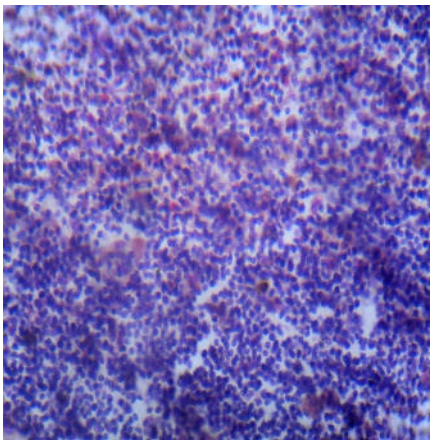

Fig No 1 Histological changes in Testes

Ovary

The normal ovary contains tunica albuginea, primary follicles, oocytes, granulosa cell secondary follicles, vesicular follicles, graphian follicles primordial follicles corpus luteum.

Tunica albuginea: The tunica albuginea in control group contains whitish capsule of dense irregular connective tissue located immediately inside the germinal epithelium. In terated group tunica albuginea also contains increasing number of connective tissue.

Ovary shows cyclic changes during menstrual cycle. Cortical region shows different stages of development of ovarian follicle or graphian follicles.

Treated group contains increasing number of primary follicles oocytes secondary follicles and graphian follicles.Graphian follicles secrete estrogen which is increased in treated group.

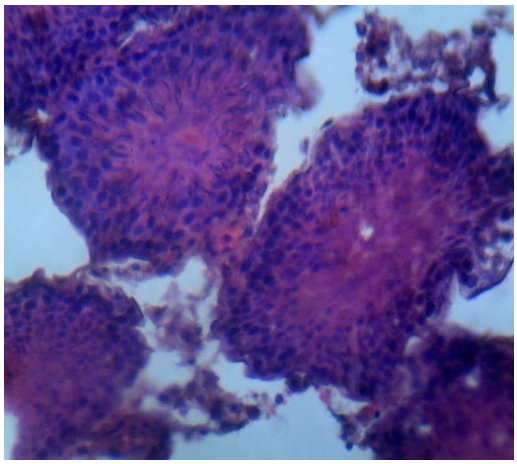

Fig No.2 Histological changes in Ovary

DISCUSSION

In the present study, it was observed that oral administration of *Operculina turpethum* produced structural changes in reproductive organs in male and female rat. Histological changes revealed increasing seminiferous tubules that contain mature sperm stages. Seminal vesicles, the main supplier of sperm nutritive material showed increasing mucosal fold and epithelial lining height.

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