WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 7.523
Volume 7, Issue 2, 1180-1187. Research Article ISSN 2277 – 7105

DEGENERATIVE EFFECT OF LEAF EXTRACTS OF *CATHARANTHUS ROSEUS LINN.* (NAYANTARA) ON HISTOLOGICAL STRUCTURES OF TESTES AND EPIDIDYMIS OF ALBINO RAT

[1]Kartik Shaw, [2]Krishna Nandi, [3]Ramjyoti Ganguly and [4]*Dr. Chandan Roy

[1]M.Sc, Dept. of Physiology, Krishnath College, University of Kalyani.

[2]Associate Professor and H.O.D., Undergraduate section, Dept. of Physiology, Krishnath College, University of Kalyani.

[3]Ex – H.O.D. and Associate Professor, Postgraduate section, Dept. of Physiology, Krishnath College, University of Kalyani.

[4]Guest Lecturer, Dept. of Physiology, Berhampore Girls' College, University of Kalyani.

Article Received on
01 December 2017,

Revised on 22 Dec. 2017,
Accepted on 12 Jan 2018

DOI: 10.20959/wjpr20182-10753

***Corresponding Author**
Dr. Chandan Roy
Guest Lecturer, Dept. of Physiology, Berhampore Girls' College, University of Kalyani.

ABSTRACT

Male reproductive system is a multifaceted process that involves the testes, epididymis, accessory glands and associated hormones. Testes performs two highly organized and intricative events, called spermatogenesis and steroidogenesis, which are vital for the perpetuation of life. On the other hand, *Catharanthus roseus Linn.* (Nayantara) has an effect on blood sugar. It reduces blood sugar, in rural areas people often take some leaves of this ornamental plant and chew it. This project shows that long term use of the leaves of Nayantara (Nayantara leaf extract) causes reduction in epididymal sperm count. There was two set of animals having 3 subsets. Main two sets were before treatment group and other was after treatment group. The subsets were normal group, low dose group and high dose group. Leaves were collected and water extract was made and then administered orally to the animals daily for 30 days. After 30 days of treatment with extract, animals were sacrificed and the parameters were checked. In this project, it has been seen that Nayantara treatment severely causes lower count of epididymal sperm, and apoptosis occurred in testes and epididymis cells. Loss of spermatozoa and destruction of leydig cells seen severely in high dose group animals and moderately in low dose group animals.

KEYWORDS: Male reproductive system, *Catharanthus roseus* Linn., Nayantara, Epididymal sperm count, Spermatozoa, Leydig cells.

INTRODUCTION

Catharanthus roseus Linn. (Nayantara), *Azadirachta indica* (Neem), *Allium sativum* (Garlic) are medicinal plants, used in Ayurveda for treating various diseases, one of which is diabetes mellitus. In the present study of 12 months period from January to December 2007, aqueous extract of this plants were prepared and blood glucose lowering effect and improvement of body weight gain in Streptozotocin (50 mg/kg body weight i.p.) induced diabetic rats were measured and compared with that of a patent drug glimepride in the Department of Pharmacology, Bangladesh Agricultural University, Mymensingh. Rats were administered *Catharanthus roseus, Azadirachta indica, Allium sativum* extracts at the dose rate of 1g/kg, 500 mg/kg and1g/kg bwt orally for 14 days, respectively. Blood glucose level and body weight was measured by Glucotrend kit and electronic balance and that compared with a patent drug Glimepride at a dose of 100 mg/kg body weight. The data were compared statistically by using student's unpaired *t*-test. The herbal preparations of these plants significantly increased body weight gain and decreased blood glucose as compared with the patent drug. The present study clearly indicated the significant antidiabetic activity of *Catharanthus roseus, Azadirachta indica* and *Allium sativum* and supports the traditional usage of theherbal preparations by Ayurvedic physicians for the therapy of diabetics.[1]

Antitumor activity of methanol leaf extracts of *C.roseus* was assayed using potato disc bioassay through *Agrobacterium tumefaciens* infection. Significant ($p<0.05$) percentage of tumor inhibition was observed at 10ppm, 100ppm and 1000ppm of leaf extracts. Maximum tumor inhibition 80.96, 83.68 and 84.96% were observed at 1000ppm for *A. tumefaciens* strains.[2]

There is a high incidence of adverse reactions by the administration of vincristine and L-asparaginase; the reactions of highest incidence were: nausea, vomiting, neutropenia, diarrhea, constipation, mucositis, headache, and abdominal pain. It is important to promote the detection, collection, reporting, assessment and treatment of ARD's in children. It is necessary to promote the conduct further studies on pharmacovigilance with this type of treatments and to increase the duration of the studies.[3]

In this review, we discuss on the effect of Nayantara extract that hampers the functionality of the testis, thereby leading to infertility. The sacred knowledge about the healing powers of plants was initially passed down orally through generations, and as civilizations grew written records were prepared for the benefit of the population.[4]

Oral administration of *Catharanthus roseus* Linn. leaf extract caused widespread testicular necrosis, hyalinization of tubules and scrotal –cell-only syndrome. Biochemical studies revealed notable reduction in glycogen and fructose levels in reproductive tissues.[5,6]

So, the aims of our study are to study of degenerative action of *Catharanthus roseus* on histological changes of seminiferous tubules, leydig cells and spermatozoa of adult albino rats.

MATERIALS AND METHODS

Collection of C. Roseus leaves

Matured leaves of *Catharanthus Roseus* were collected from Krishnath College's compound and some of my friend's garden. Collected leaves were green and matured with a size of 5-6 cm long and 2-3 cm flattened.

Extraction of C. Roseus leaves

Collected leaves were washed thoroughly to wash out the unwanted dust and soil. Then the leaves were left for about 30 minutes to remove the water droplets due to washing. Water extraction of the leaves was done by weighing leaves and water. The ratio of leave and water was 1:2; it means 10 gm of leave paste was mixed with 20 gm of water. First of all water and leaves were weighed accurately in digital weighing machine provided by the college. Then in a motor-pestle leaves were crushed as much as possible and a paste was made. Then added the water in the paste and mixed thoroughly by crushing again and again. After that the mixture was filtered using filter paper and collected in a glass tube.

Doses

Two varieties of doses were prepared. One of them was high dose containing the crude extract and the second was low dose diluting the crude extract 10 times. 0.5 ml/ 100 gm of body weight of the prepared drug was given orally to the rats. It was continued for 4 weeks regularly. After completion of the duration of 4 weeks, several tests were done to measure the effect of the drug induced.

Histological studies

1. Tissue sections were taken and fixed in 4% Formol solution.
2. Dehydrated, Embedded and blocks were made.
3. Sliced with the help of Microtome and stained with Eosin - Haematoxylin staining procedure.
4. Observed under light microscope.

RESULTS AND DISCUSSION

Histological effect on epididymis:

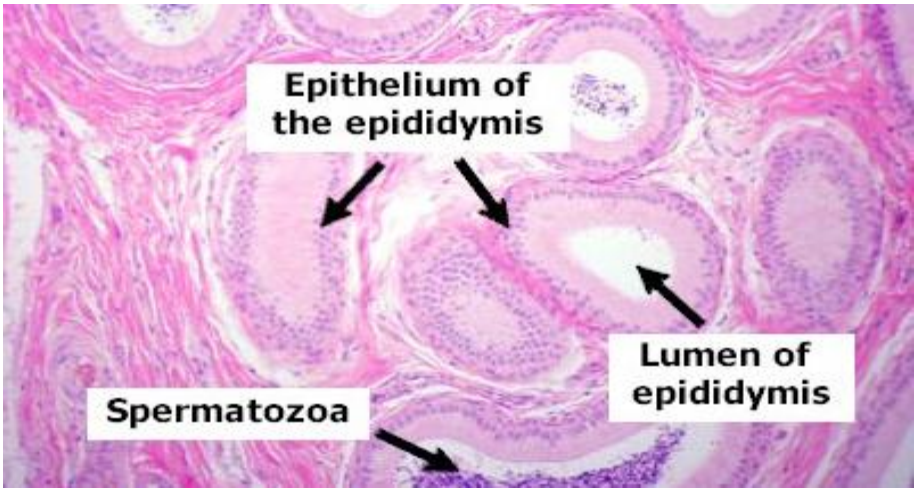

Fig 1: Normal epididymis.

Low doses:

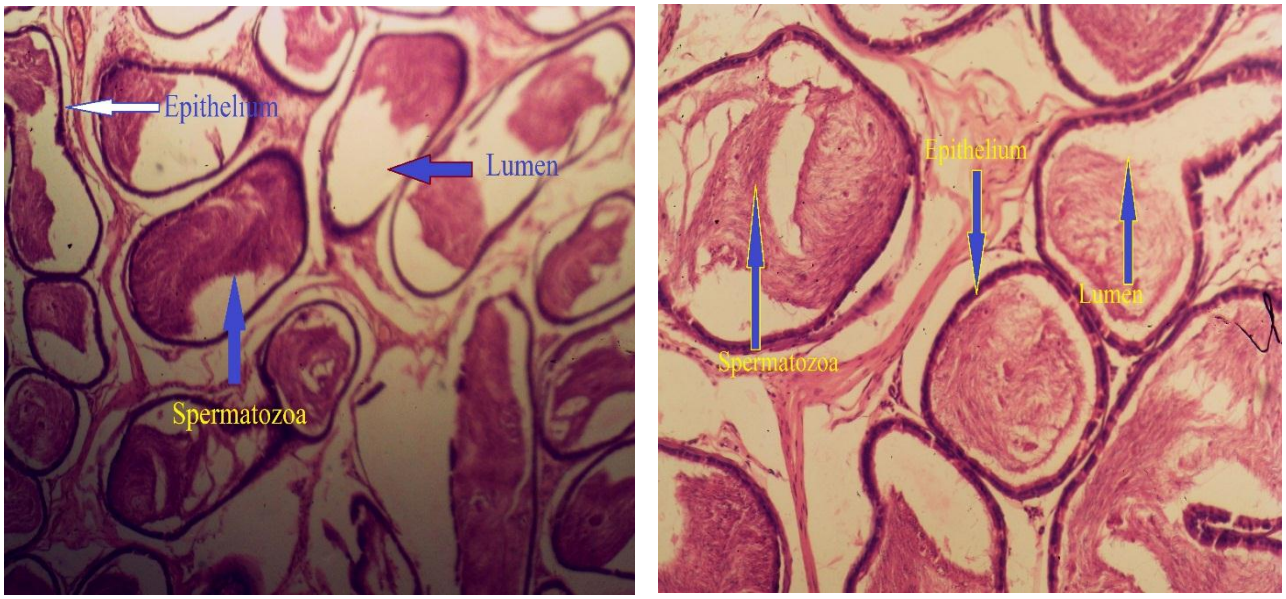

Fig 2: Low dose effect of *C. roseus* on epididymis.

High doses:

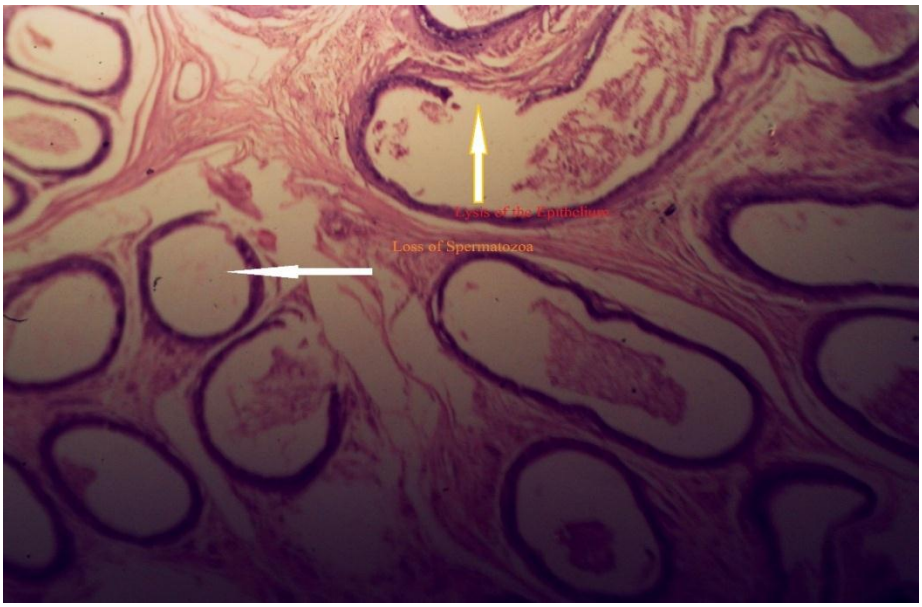

Fig 3: High dose effect of *C. roseus* on epididymis.

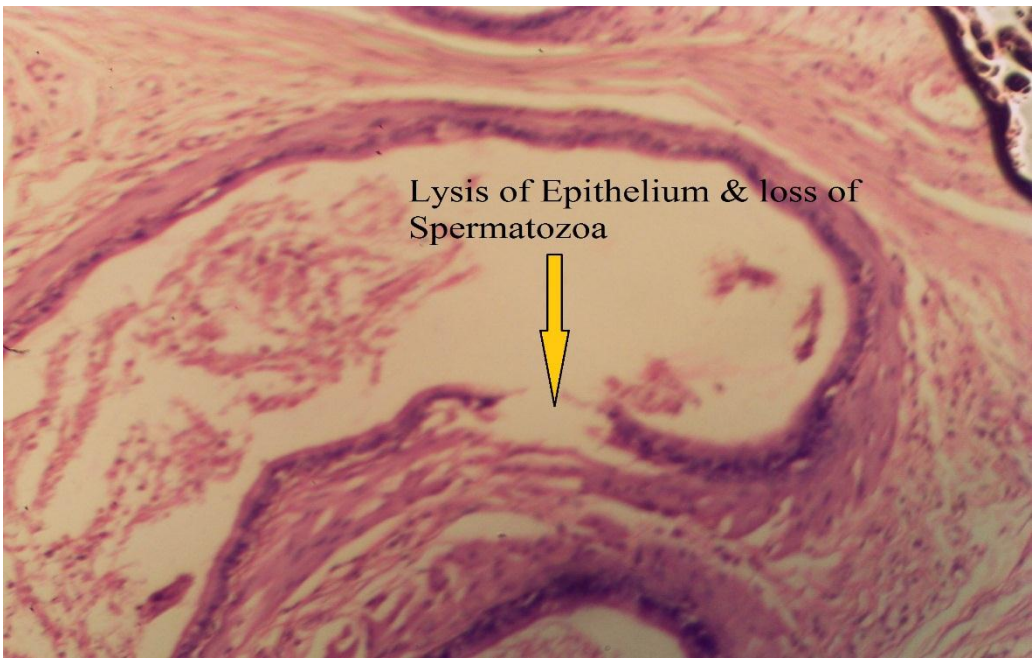

Fig 4: Lysis of epithelium and loss of spermatozoa.

In Eididymis, low dose of the extract do not affect that much, but in case of high dose group this affects so much. Lysis of columnar epithelium has been seen to get lysed and loss of spermatozoa.

Histological effects on testes:

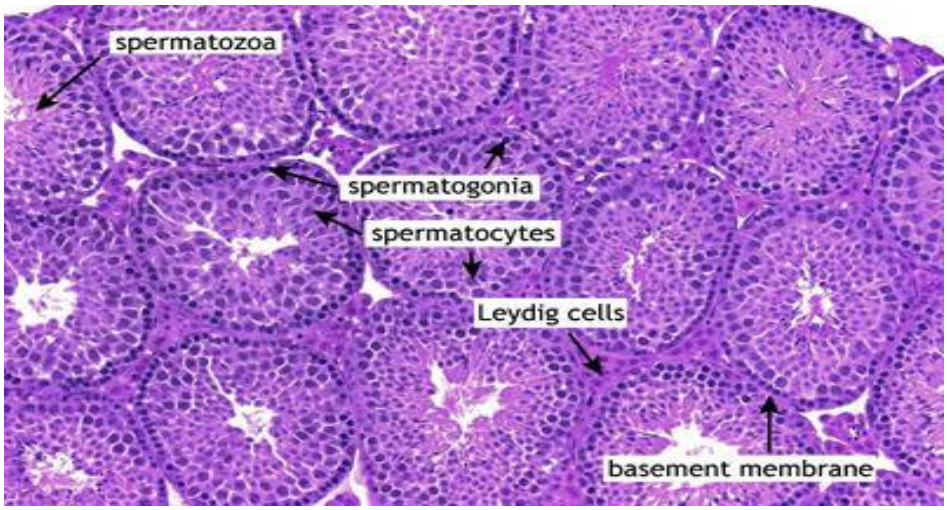

Fig 5: Testes of a control rat.

Low doses:

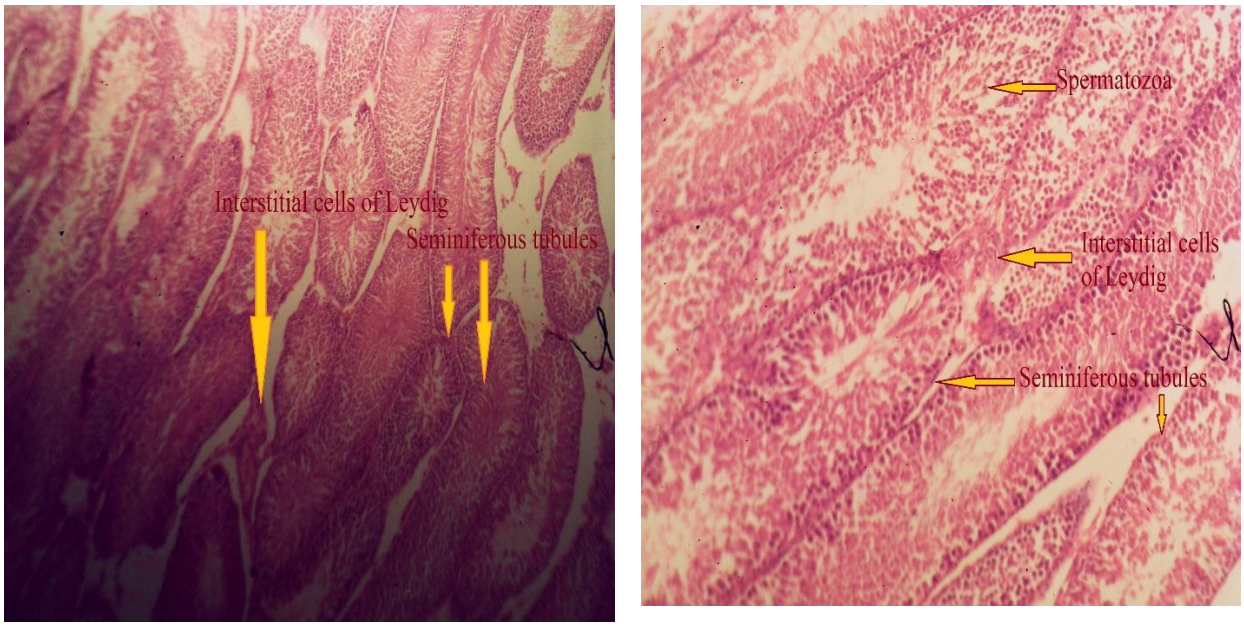

Fig 6: Low dose effect of *C. roseus* on testes.

High doses:

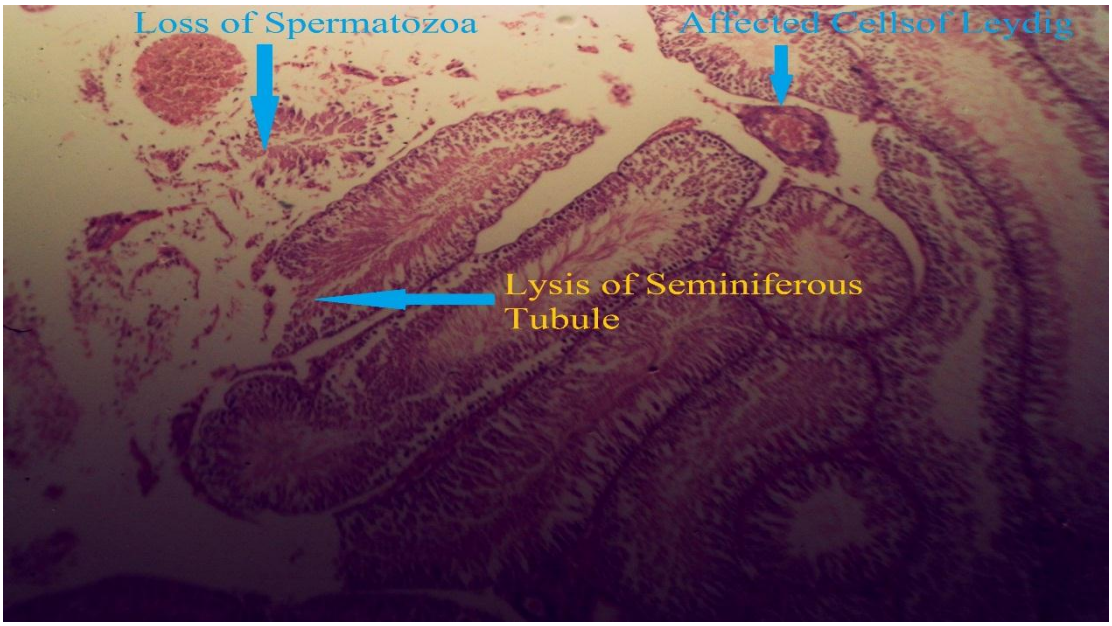

Fig 7: High dose effect of *C. roseus* on testes.

Lysis of Seminiferous tubules, and loss of spermatozoa, leydig cells destruction has been seen maximally in high dose group. But in case of normal and low dose group, there are minute changes.

From our present observation, high dose of *C. roseus* produced a severe loss of spermatozoa along with lesion of epithelium as compared to that of its low doses. High doses of *C. roseus* produced lysis of seminiferous tubules and a marked destruction of leydig cells as compared to its low doses.

CONCLUSION

From our present investigation, it may be concluded that treatment with leaf extract of *C. roseus* produced lysis of seminiferous tubules, destruction of leydig cells and loss of spermatozoa in albino rats.

ACKNOWLEDGEMENTS

We are expressing our sincere thanks to Mr. Subrata Kumar Das, Laboratory attendant, Post Graduate Dept. of Physiology, Krishnath College (K.U.) for his co-operation. This project was solely designed by Dr. Ramjyoti Ganguly, and we had a complete assistance of our madam Dr. Krishna Nandi.

REFERENCES

1. Antidiabetic effects of *Catharanthus roseus in experimentally diabetic induced rat.* M. Mostofa, M. E. Choudhury, M. A. Hossain, M. Z. Islam, M. S. Islam and M. H. Sumon. 2007, Bangl. J. Vet. Med., Vol. 5, pp. 99–102.
2. *Antitumor activity of Leaf extracts of Catharanthus Roseus.* MA Sayeed, Mst. H Jesmin, TC Sarker, MM Rahman and MF Alam. 2014, Plant Environment Development, Vol. 3, pp. 24-30.
3. *Side effects of Vincristine and L- Asparaginase in patients with Acute Lymphoblastic Leukemia in a Mexican pediatric Hospital.* Mario I. Ortiz, Sandra River-Roldan, Marco A. Escamilla-Acosta, Georgina Romo-Hernandez, Hector A. Ponce-Monter, Rita Escarcega-Angeles. 2013, Pharmacology and Pharmacy., Vol. 4, pp. 347-354.
4. Indian Medicinal Plants. Kritiker KR, Basu BD. 1975, Vol. 8, pp. 785–8.
5. Mathur R and Chaudan S (1985). Antifertility efficacy of Catharanthus roseus Linn: a biochemical and histological study. Acta Eur Fertil., 16: 203-205.
6. Shaw K, Nandi K, Ganguly R and Roy C (2017). Role of *Catharanthus roseus* Linn. (Nayantara) on sperm count and serum testosterone level of adult male albino rat. World Journal of Pharmaceutical Research., 6(15): 1087-1096.