CHAPTER - FOUR
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4.0 Introduction :-

The present investigation is undertaken to study the alterationS in body weight , organ weights and histoarchitectural alterations that occur in the male reporductive tract of albino rats after administration of Ocscimum sanctum .

The results observed are derived by employing well accepted methods and techniques.

In the present chapter these results and observation are compared to those of available literature to derive a definite conclusion .

4.1 Body weight.

The body weights of all the experimental animals showed gradual increase in values in control as well as Ocscimum treated experimental animals. The average body weight of control rats in the beginning was 210±1.90mgs. and it showed gradual increase up to 120 days to become 352±2.38gm. In treated rats the average body weights was 212±1.98gms in the beginning and increased gradually up to 120 days to 378±3.40mgs at the end of experiment. This increase seems to be not related with drug administration.

But the body weights of Ocscimum treated experimental rats showed considerable increase in their control groups. Initially after 24 days treatment, the increase was negligible only 2.8% but finally the ratio of

increase was 13.5% of the total body weight . This might be due to growth during increasing age of the animals. Which was not affected by administration of the drug. Similar increase in body weight of all experimental animals was also found by kasinathan et al (1972) in Oscimum sanctum treated mice and by Akbarsha et al., (1990) in Andrographis paniculata treated rats.

4.2. **Testes** :--

O. sanctum administrated testes showed considerable reduction in the wet weights as compared to those of their controls. A significant reduction in testicular weight is observed and it became maximum at 72 days of treatment i.e.26% reduction in weight. These results were supported by number of previous investigations found after administration of various chemicals and plant extracts which were resulted into functional aspermatogenesis. Chemicals like 6 metroxyprogesterone acetate (Mc cleod 1965 ; Bhiwagade et al., 1991) , bulsulphan (Jackson 1966; Kar et al 1968) monochlorohydrin (Gunn et al., 1970) , norgesterol (Singh et al., 1974) , endosulphan (Singh and Pandey 1989) , Viniblastine and Vancristre (Parvinan 1978 ; Toro and Varute 1989 ; Murgavel and Akbarsha 1991) , and 2 MPG etc. are found to cause reduction in the weight at of testis resulting into antifertility effect. Apart from these chemicals, plant extracts and their drugs were also found to cause reduction in testicular weight

followed by antifertility effect.Many plants of flolk-lore medicines were also showed to possess antifertility activity. Ethanolic extracts of Hippophae salicifolia (Joshi et al., 1965) , Vinca rosea (Joshi and Ambhaje 1968 ; Toro 1984) , Oscimum sanctum (Kasinathan et al 1972) , Canabis and Opium (Vyas and Singh 1976) , Hibiscus rosa sinensis (Kholkute , 1977 and Mankapure 1982) , Aristlochia indica (Pakrasi and Pakrasi 1977) , alcoholic extracts of Malvavicus conzantti (Garg 1979) , Calotropis procera flower extracts ((chauhan et al ,1979) , Papaya seed (Das 1980 and Lohiya and Goyal 1992) , Garlic powder (Dixit and Joshi 1982) , Gossypool (Hoffer 1983) , Plumbagin (Bhargava 1984 and Jadhav 1988) Vitex negundo (Sohani 1985) , Daucus carota (Shah 1985) , Butea monosperma (Awati 1985) , Solanum xanthocarpum (Rao 1988) , Vinca rosea (chinnoy et al ., 1988) ,Piper betle (Toro and Hiremath 1988) , Andrographis paniculata (Akbarsha et al., 1990) O.scimum sanctum (Kantak and Gogale 1992) , Carica pappaya (Lohiya et al ., 1992) , Azadiracta indica (Anjali Joshi et al., 1996), O.sanctum (Singh et al., 1996) and Hibiscus rosa sinensis (Madhusudan Reddy (1997) etc. Showed proportional decrease in the weight of testes significantly.

At all the stages of treatment , the lighter weight of testis of control rats were mainly due to normal population of spermatogenic cells and high density in the population of sperms in the testis. Administration of

O. sanutum affects the spermatogenesis and the observed decrease in testicular weight is probably due to progressive degeneration of spermatogenic cells. Coupled with increase in the number of affected seminiferous tubules in the testis.

The present study also showed that the tubular diameter of seminiferous tubules showed progressive decrease with average diameter of control tubules was 268.5+11.0μm in the beginning and 270.62+8.5μm on 24th day of treatment. On the same day the treated testis showed reduction in the tubules diameter to232.00±8.5μm. and finally on 72nd day it was 165.75±10.5μm This is found to be 38.23% decrease in tubular O. sancutom diameter which also resembles the earlier observation made with norgesterol (Singh et al., 1972) formaldehyde (Shah et al., 1987), (kasinathan et al., 1972) Aristolochia indica (Pakarsi and Pakarsi, 1977) , Calotropis procera (Grog, 1979) gossypol (Hoffer, 1983 ;Bhiwgade 1988), Plumbagin (Jadhav 1988), vinca rosea Toro (1984) Vitex negundo (Sohani 1985) , Butea monosperma (Awati 1985) , Daucus Carota (Shah 1985) , Andrographis paniculata (Akbarsha et al., 1988 and 1990), etc.

Histological observation of testes in oscimum treated rats showed that intersting changes occur in architecture of seminferous tubules in these rats. Overall tubules showed strunken appearance due to decrease in the diameter of seminiferous tubules ,which ultimately resulted into apparent

increase in the inter tubular space and widening of inerstitum, which was full with oedomatous fluid. The interstitial cells also showed degeneration. Atrophied leyding cells were observed in theinterstitium of treated rats. These effects appeared to be duration dependent. Similar dose and time dependent palthological changes were also observed to induce necrosis in seminiferous tubules of 2-Mercapto propioneyl glycene treated rat by Rao et al., (1986) and plant extracts of Andrognaphis paniculata also induced increased interstitium in treated rat testis get filled with oedomatous fluid and degeneration of leydig cells by Akbarsha et al., (1990), and after removal of epididymal fat in albino rats. (shriniuvas, et al., (1986)), the seminiferous tubules were widely separated.

Degeneration of Leydig cells in 48 and 72 days treated rat testis were observed in the present work which were also supported by similar increase in Andrographis paniculata (Akbarsha et al., 1990) treated testis and Hibiscus rosa sinensis treted testis (Madhusddan Reddy , et al., 1997). Our studies indicated that the leaves of Ocscimum sanctum may inhibit gonadotropin release from the pituitary. So that the necessary gonadotropins like FSH and ICSH which are necessary for normal spermatogenesis and normal functioning of Leydig cells are not made available . The O. sanctum also induces degeneration of Leydig cells.

In the present study, the antispermatogenic activity of the plant has been indicated by the significant reduction in the number of spermatogenic elements like spermatogonia, spermatocytes and spermatids in the treated testes probably due to degenerative antispermapgenetic effect. These results were supported by photomicrographs of 24,48 and 72 days treated rat testes. These results are quite similar to the studies on effects of several plant extracts like M.conzantti, A.paniculata (Akbarsha et al., 1990) ,Carica papaya (Lohiya N.K.and Ravibala Goyal 1992) , Solanum xanthocarpum (rao et al., 1988) which also arrested spermalogenisis. These effects were both at spermatocyte and spermatid level probably due to non availability of gonadoropins. Leydig cells are supposed to be the source of and rogens (Eikus K.B. , Recenu prog. Hovmons Res. 1971).Observed degenerationof Leydig cells in the treated rat testis indicates inefficiency of Leydig cells to synthesize testosterone which caused final aspermatogenic effect.

Our results are contradictory to the results obtained after long term feeding of Tulsi on reproductive performance of adult albino rats. (Khanna, et al., 1986). They found that the mating behavior of both male and female rat were severely inhibited, but in some animals they observed normal pregnancy giving birth to normal pups after mating females to Tulsi treated males. They could not observe any significant effect on histology of testes and other reproductive organs.

Similar results with no marked changes in the structure of testes, epididymes and seminal vesicleswere observed by Kantak and Gogate (1992) after short term administration of Tulsi in adult male rats. They could only find significant irreversible decrease is sexual behavioral score of male rats after administration of increased doses of Tulsi plant.

The present investigation also revealed degeneration and dettachment of tunica propria and appearance of ill defined spaces in between the spermatogenic elements. Some smaller and larger vacuoles are seen in the cytoplasm as well as in the nucleus of degenerating cells. These spaces and vaculoes may be resulted due to degenerative depopulation of spermatogenic cells and cellular elements. Pycknotic nuclei and mutinucleated giant cells are also observed in side the spermatocytes and spermatids towards the lumen. These results may be explained with the help of phagocytic actions of spermatocytes which try to ingest the degenerated celular debri. Some cellular debri are also seen in the lumen of the seminiferous tubules along with dettached tails of luminal sperms. These findings are very much similar to the observation of testis after treating with DMPA (Bhiwagade et al., 1991). Their conclusion also match with our ideas that DMPA inhibits FSH and testicular androgens which in turn induce inhibition of protein synthesis in testis. They also observed many residual bodies like lysosomes which may be the phagosomes in

present discussion. They also found formation of vacuoles and multinucleated giant cells within the lumen of damaged tubules which also support our above finding.

Interestingly enough, our present work revealed some tubules adjecent to the necrosed one which are apparantly normal in appearance. These results were also supported by similar observation of Bhiwgade et al., (1991) in DMPA treated rats.

4.3 Epididymes.

Oscimum sactum administered epididymes in the present study showed considerable variations in the wet weights as compared to those of their control groups.

The caput epididymes of experimental rats showed verying degree of reduction in wet weight with progressive duration of dose. In the beginning of experiment, the weight of caput was 176.96±2.46mg./100gm of body weight. They decreased to 137.22±5.8 mg on 24th day and gradually decreased to 132.01±3.7 mg on 72nd day of treatment . After termination of termination of treatment from 72 days up to 120 days the weight decreased to 129.48±4.7mg. The weights of cauda epididumes were not changed much. Yet, they also decreased in very slowly all the experimental values are considerably less than that of their controls. This states that the weight of caput epidydimis decreased gradually with progressive increase in the

duration of dose. This states that the weight of caput epididymes decreased gradually with progressive increase in the duration of dose. These results are supported by number of previous investigations found after treatement with various chemicals and plant extracts leading to azoospermia. The chemicals like clomiphane (Nelson and Patenelli, 1962, ; Roy et al., 1964 ; kalra and Prasad, 1967, schalley V 1970 ; Roy and Dalla 1976 ; Roy et al., 1976) , cadmium chloride (Dixit 1976; chinnoy and Seth 1977) Ethylene dimethan sulphonate (Copper and Jackson 1970) , Progestin and Androgen (Flickinger, 1977) , cyclohexanol (Tyagi et al., 1979) , testeterone porpionate (Majula and Kadan 1980) , etc. have been shown to induce dose dependant reduction of caput as well as cauda epididymes in treated animals. Sah et al., (1987) reported a decrease in the weight of epididymes after administration of formaldehide to male albino rats.

After administration of β-Sitosterol to albino rats, Malini and Vanitakumari (1988) also reported a reduction in the wet weight of cauda epididymes.

A few plants and their extracts have been explored for their effects on epididymes like, Malvaviscus conzantti (Dixit , 1977) , A. Indica (Pakarsi and Pakasrsi 1977) , Calotropisprocera (Garg 1979) , Allium sativum (Dixit and Joshi, 1982) . Vinca rosea (Toro , 1984) , Vitex negundo leaf extrats

(Sohani ,1985) , Butea monosperma (Awati ,1985) , Daucus carota (Shah , 1985), Terminalia belirica (1988) , Piper betle (Hiremath and Toro 1988), Plumbagin (Jadhav and Sohani , 1988) , A. paniculata (Akbarsha et al., 1988) , Solanum xanthocarpum seeds (Rao 1988) , Carica papaya (Lohiya and Goyal 1990) etc. All these plant extract affected the wet weight of caput and cauda epididymes in extract treated rats and showed graded decrease in the wet weight of organs.

Caput epididymes showed duration dependent decrease in the wet weights in experimental groups of rats while , cauda epididymal wet weight showed interesting variations. On 24th day of treatment [illegible] as compared to those of control. But on 48th day of treatment the weight considerably increased and value was much similar to those of control group. 72nd day of treatment the values reduced to some extent which further increased after termination of treatment on 120th day, but the values are below control. These results are contradictory to the earlier observation which showed continuous graded decrease. This increase in weight of cauda epididymes only after 48 days of treatment seem to be due to accumulation of degenerated spermatogenic elements into the lumen of the tubule. These increase number of spermatogenic elemets might have come from degenerated testis via the caput epididymes and must have remained there only.

The tubular diameter of caput as well as cauda epididymal tubules was considerably decreased even if the tubules apparently showed spacious lumen due to unfolding of epithelium and disappearance of luminal sperm .These results were also found by administration of flutamide (Dhar and Setty 1987) in male rats.

The secretory epithelium showed considerable decrease in the height both in caput as well as cauda epididymal tubules. Similar finding were made by administration of formaldehyde (Shah et al., 1987), male albino rats which were reported to effects reduction in the height of epithelial cells in cauda epididymes coupled with reduction in the weight and significant reduction in the diameter of epididymal tubules. On the contrary , PMHI administrated rats showed caput and corpus epididymal tubules completely devoid of sperms without affecting the histology of luminal epithelium.

The height of stereocilia towards the adluminal surface of the epithelium was considerably reduced in oscimum sanctum treated rat epididymes in the present investigation. The epithelial cell showed granular cytoplasm and vacuolated cytoplasm as well as nucleus. Many pyctnotic nuclei were seen in the interstitium. The present study also reveals that, the interstitium was loosened and widened due to degeneration of based lamina of adjescent tubules. It contained broken fibres of connective tissue ,

irregularly dispersed, degenerated cell and pycknotic nuclei at different duration of administration of the dose. These results are supported by the findings of number of workers with various plant extract in treated rats and mice Akbarsha et al., (1988) reported reduction in the cellular height of epithelium by administration of A.paniculata leves in albino rats Verma et al., (1980) also reported atrophy cauda epididymal tubules and reduction in the cell height with M.conzantti administration to mice. Bhargava (1984) also prooved regressed epididymal epithelium and despermatizaed lumen after treatment with plumbagin. Administration of hydrocortisone in cauda epididymes also revealed granular and vacuolated cytoplasm, nuclei various stages of degeneration. They also supported degeneration of inter tubular connective tissue. Their results also supported the decrease in epithelial cell heights and number diameters in cauda epididymes of all the hydrocortisone treated animals. On the contrary contradictory results were obtained by Hibiscus rosa sinensis extract treatment which showed increase in the tubules diameter, and increase in the height of epithelial cells.

In Vincristine treated rats , caput epididymal tubular epithelium was in general regressed. The shape of cells was changed from typical tall columnar profile to a more cuboidal shape with their narrow ends resting on the basement membrane, with large vacuoles in the supra - nuclear cytoplasm. Our observations also agree with these findings the finding of

our observations also showed changes in the epithelial cell shape from tall columnar to cuboidal profile and decrease in the height of stercocilia , even though at few places columnar cells with stercocilia were seen showing patchy degeneration changes in the epithelium.

During present investigation, the density in the population of lunminal sperms also showed intersting variations in caput and cauda epididymes after administration of the dose. The lumen of caput epididymes showed degeneration spermatids and sperms in treated rats with gradual decrease in the number of luminal sperms with increase in the duration. Finally after 72 days treatment, the lumina were completely empty without any sperms in it. But the lumina of cauda epididymes became more dense due to accumulation of cellular debris, degenerated sperm tails and spermatids etc. in the form of sperm coagulum. This increase in the density, sperm coagulum may have caused increased in the weight of cauda epididyumes in treated rats at 48 days treatment. These might have also undugone degeneration due to the effect of oscimum leaves administration resulting into empty lumina in the majority of tubules at 72 days treatment.

These findings are well supported by observed of various workers by different drugs. Bhargava (1984) reported regressed epididymal epithelium and despermatized lumen after treatments with plumbagin. The results of Khanna et al., (1986) on the effects of O.sanctum treated epididymes

reported a significant decreased in the wet weights , sperm count and motility of sperms in epedidymes. Rao(1988) showed that the extract of S. xanthocarpum seeds effected sickeling of sperms in cauda epididymes. They sperm showed sickled shaped head , straight mid piece and tail. He also reported decapitation and swelling. In sperms at mid piece region coupled with regressive changes in epididymes. The motility of sperms in cauds epididymes was affected by crude chloroform extracts of Carica papaya seeds. It also showed decreased sperm count. These results also support our histological observation of despermatization decrease in luminal spermes and finally empty tubules found at the end of treatment.

Mammalian epididymis is a dynamic organ and is dependent upon testicular androgens for the maintenance of its structure as well as for its secretory , resorptive , biosynthetic and other metabolic activities. Functionaly the epididymes can be distingrished into porximal caput and corpus where the spermatozoa undergo a process of maturation and a distal part called the cauda which serves mainly as a stoye house of matured spermatozoa (Hammond) and Asdell A, (1926). It is a well established fact that mammalian spermatozoa aquire maturation, progressive morphological changes, while passing through cauda epididymes.

Hence, degeneration of epididymal tubules (both caput and cauda epididymes) observed after administration of O. Sanctum sperm motility

sperm density and an increased number of abnormal sperms in cauda which in turn may resulting the loss of fertility in treated rats.

4.4Seminal vesicles :

The present investigation revealed that : the wet weight of seminal vesicle showed gradual decrease in values with increasing duration of dose. All the experimental rat seminal vesicles showed values below control all the time. The weights in the beginning of experiment 263.53±5.4mg It gradually decreased on 72nd day of experiment, it was 213.87±5.3mg But after termination of the treatment the wet weight of seminal vesicles showed a considerable increase to 251.55±2.8mg when the weight of control seminal vesicle was more or less same with 252.45±2.6mg.

This progressive decrease in seminal vesicular weight can be attributed to the corresponding degeneration of vesicular tissues as seen from the observation. Degenerating changes started at 24 days treatment. Then first target of degeneration was the secretory epithelium that showed vacuolization in the cytoplasm as well as nucleus of the secretory cells. The height of secretory epithelial cells considerably decreased after 48 days treatment with maximum distorted architecture after 72 days. Muscle layer showed progressive damage at some places indicating patchy degeneration. The density of lamina propria was affected , which gets completely abolished at some place after 72 days treatment showing functional lamina

propria in adjescent areas. The mucous membrane of seminal vesicle gets mostly affected showing highly vacuolised cytoplasm and pycknotic nuclei in damaged parts. Depth of the mucus folds was also reduced.

These changes apparently resulted into enlarged lumen. The luminal secretion was in the form of a dense eosinophilic clot in the normal section appeared to decrease considerably and finally it disappears showing inefficiency of the secretory epithelial cells to serve the necessary nutrient content and mucous in the seminal plasma. These results in present investigation are also supported by number of workers with various chemicals and plant extracts which also showed degenerative effect on seminal vesicles resulting into decreased semen and antifertility. Similarly loss in weight of seminal vesicles were reported by treating with S. K. and F . 7690 (Saunder's et al., 1969) esnrogen administration (Elkingtan and Black show 1971) , norgesl-erol (Singh et al., 1972) L-chlorohydrin (Vickery et al., 1974) cyproterone acetate ,MPG (Flikinger, 1977) , cadmium chloride (Hundal and Mangat , 1978) Aspirin (Balsubrahmain et al., 1980) , formaldehyde (Shah et al., 1987) Flutamide (Dhar and Setty ,1987), & eugenol etc.

A few plants having antifertility activity were explored for their effect on Seminal vesicles and they also showed similar decrease in the weight. The plants like O. Sanctum (Kasinathan et al., 1972), Malvaviscs conzantti

(Dixit, 1977), Allium sativum (Dixit and Joshi 1982), Butea monosperma (Awati 1985), Vitex negnndo (Sohani 1985), O. Sanctum (Khanna et al., 1987), Piper betle (Hiremath 1988), A paniunlta (A K barsha et al., 1988), Vinca rosea (Chinnoy et al., 1988) Hibiscus rosa sinensis (Reddy et al., 1997) etc. Showed considerable decrease in the weights of seminal vesicle which also supported the present findings.

Vacuolisation in the secretory epithelial cells and degenerative effects with decreased amount of secretion in the lumen were found by administration of cadmium chloride (Hundal and mangat, 1978). Inhibition of secretory activity after chloromadinone acetate treatment (Kaur and Mangat, 1979), was also reported Balsubrahmanain et al.,(1980)reported a trophy of seminal vesicles by treating with aspirin. Aristolochia indica (Pakrasi and Pakrasi , 1977) caused complete inhibition of synthesis of decretion with no histological changes. These result are antagonistic to our degenerative effect of O. Sanctum on seminal vesicle. Malvaviscus conzantti (Verma et al., 1980) reported to cause inhibition in the arborization of secretory epithelium , reduction in cell height and in secretion. Andrographis paniculuta (Akbarsha et al., 1988), also showed degenerative changes and reduction in the lumen and secretion of seminal vesicles. Administration of Vinca rosea (Chinnoy et al., 1988) also effected the histroarchitecture of seminal vesicles Plumbagin (Jadhav 1988) caused

reduction in weight and histological alterations such as reduced thickness in muscle layer, lamina propria, Shortening of epithelial folds and empty lumen in seminal vesicle.

4.5. **Prostate gland.**

The present investigation is undertaken to study effect of O. sanctum on the weight and histoarchitecture of different Male reproductive organs.

The prostate glands of control and oscimum treated experimental animals showed interesting changes. All the control prostate glands showed increase in wet weights while the wet weights of O. sanctum treated experimental prostate glands were less than those of their control groups. On 24 days treatment , the weight of prostate was 183.58±6.3mg which decreased to 133 .28±5.8mg and 124.45±5.3mg on 48 and 72 days of treatment. And after termination of treatment, the values again increased to 143.93±6.3mg.

These results can be explained on the basis of degenerative effects of the plant showed in prostate which may have led to the corresponding decrease in the weight of organ. Similar such decrease in prostatic weight was also observed by administration of various chemicals like cyproterone acetate (Rajlaxmi , 1972) , Cadmium chloride (Chinnoy and Seth , 1977) , bromocryptine (Arunakuran et al. 1985) formaldehyde (Dhar and Shetty 1987) etc. Many plant extract studied also supported these findings. They

are Aristolochia indica (Pakrasi and Pakrasi , 1977) , Vinca rosea alkaloids (Toro ,1984) ,Vitex negundo (Sohani , 1985) , Ducus carots (Shah ,1985) , Butea monosperma (Awati 1985) , Plumbagin (Jadhav 1988) ,Piper betle (Hiremath 1988) , A. paniculata (Akbarsha et al. 1988) etc. on the other hand , contradictory results have been showed by Reddy et al. (1997) with Hibiscus rosa sinesis. These results showed significant increase in the prostate gland weight coupled with antispermatogenic effects.

The present study showed that the administration of O. sanctum caused drastic changes in the histological picture at later stages of treatment. After 48 days treatment of the dose ,complete histoarchitecture of the gland was disturbed. The cuboidal epithelial cells showed degeneration of cellular elements and secretion granules resulting into reduction in the height of secretory cells. The lumina of many alveoli were devoid of secretion. These results are also supported by the effects of many synthetic and plant extracts on prostate gland . The diameters of alveolar lumen and height of epithelium were increased after administration of prolactin , suggesting the participation of this hormone on activation, growth and maturation of prostate gland (K.Reedy and S. Govindappa ; 1986) Extract of Aristolochia indica (Pakrasi and Pakrasi .1977) resulted into decreased secretion in the lumen in mice without any change in the histology. Similar results are obtained after administration of Daucas carota seed extracts (Shah 1985).

Dry leaf powders of A paniculata caused diminished lumen by in foldings of epithelium, nuclear extrusion and phagocytic effects in the lumen of prostatic tubules was also found by Akbarshah ea tal., 1988.

It appears that , prostate is a most sensitive accessory reproductive organ having a variety of secretory products arising from different areas of gland. Its secretion contributes about 30% of total volume of the ejaculate that serves as an important source of nutrition and acts as a buffering agent which protects sperms from acidic vaginal secretion. Prostate secretions facilitate the fertilizing capacity and viability of spermatozoa (Lilja H Scaj 1980).

Therefore , when the O. sanctum extract disturbs the architecture of the gland , its function is also disturbed , stopping the prostate secretion with progress in degeneration of the gland. This ultimately results into malnutrition and mortality of sperms which may lead to infertility in animals.

4.6. Cowper's gland.

In the present investigation , cowper's glands of control and O.sanctum treated experimental rats showed significant variations in wet weight and in overall histoarchitecture of the gland. The wet weights of Cowper's gland in treated rats were less than those of control groups. The weight of Cowper's glands in treated rats showed gradual decrease with

progress of the dose. Minimum weights were recorded after 72 days treatment , then again the weight tended to increase towards the control weights.

This reduction in the weight of cowper's gland is mainly due to degenerative effects of the plant on cowper's gland. The alveoli in the gland showed distorted picture at higher periods of dose. On 48th day of treatment the alveolar epithelium lost its folds; the cells showed degeneration changes in the near by tissue and decrease in the luminal secretion.

These results are also supported by similar observations made by Rajlaxmi et al. (1970). With administration of cis and trans clomiphene citrate , cyprotenone acetate in combination. Reduction in the weights of cowper's glands were also found after administration of 2MPG (Rao et al. 1987). Decrease in the weight of coagulating glands was also observed by M.N.Anantlaxmi (1994) by administration of PMHI in male caloles.

The finding of effects of some plants like Vitex negundo (Sohani 1984) showed decrease in the wet weight and height of epithelial cells of cowper's gland. Vinca rosca (Toro 1984) , Daucus carots (Shah 1985) , plumbagin (Jadhav 1988) Piper betle A. paniculata (Akbarsha et al. 1990) Hiremath (1988) etc. also reported decrease in wet weights and atrophy of alveolar epithelium in Cowper's glands. They also reported regressive and

degenerative changes in the coagulating glands along with reduction in the fluid content of this gland. All these results strongly support our findings in present investigation.

On the other hand, Butea monosperma (Awati ,1985) showed increase in wet weight , and no change in epithelium and stroma, and slight increase in secretion in the lumen of organ after its administration in albino rats. These results are exactly opposite and contradictory to our findings.