INTRODUCTION
Fertility control is an issue of global and national public health concern. There is a global need to support individuals in family-planning due to the increasing growth rate of the world's population with its negative impact on environment, economic growth and poverty reduction in underdeveloped countries. About 90% of the world's contraceptive users are women. Though considerable progress has been made in the development of highly effective, acceptable and reversible methods of contraception in females, progress and possibilities on males are still slow and limited. Awareness of this responsibility, health organizations and pharmaceutical companies continue to financially support or actively pursue research towards new contraceptive approaches. Current methods of contraception result in an unacceptable rate of unintended pregnancies and many side effects also. A large number of chemical agents have been known but all tend to lead to total spermatogenic arrest and, ultimately, to irreversible sterility. As concerns regarding side effects of existing male contraceptive methods prevent universal acceptance, the development of additional male methods of fertility control can provide tremendous social and public health benefits. There are relatively few realistic approaches currently being pursued which include (a) the suppression of sperm production, (b) disruption of sperm maturation and/or function, and (c) interruption of sperm transport. Contraceptive vaccines, and inhibitors of spermatogenesis and sperm motility, provide a potential for nonhormonal male contraceptives. It has, therefore, become necessary to use biologically active botanical substances or fertility-regulating agents of plant origin which are ecofriendly. The natural plant substances possessing mild inherent estrogenic and antiestrogenic properties offer themselves as an effective nonconventional source of contraception with less deleterious side effects. Plants showing antifertility potential in males are listed in table 1 and some of them are discussed below.

Curcuma longa

Curcuma longa Linn., commonly known as Turmeric, Indian saffron or Haldi belongs to family Zingiberaceae, is a perennial herb cultivated throughout India and is widely used as an antibiotic in folk medicines and as spices. Its tubers, rhizomes and oil have great importance. C. longa also possesses antimutagenic and anticarcinogenic properties. Phenolic diketone, curcumin (diferuloylmethane) (3–4%) is responsible for the yellow colour, and comprises curcumin I (94%), curcumin II (6%) and curcumin III (0.3%) of the extract. Various medicinal plant extracts have been tested for their antifertility activity both in male and female. Some of these plants had spermicidal effects; other caused reduction in the sperm counts and altered the mobility of the sperms. Some of them caused testicular changes and altered hormone levels. It is necessary to use biologically active botanical substances or fertility-regulating agents of plant origin which are ecofriendly. The natural plant substances possessing mild inherent estrogenic and antiestrogenic properties offer themselves as an effective nonconventional source of contraception with less deleterious side effects.

Several plant products inhibit male and female fertility and may be developed into contraceptives. Even though, many indigenous plants have been shown to prevent the birth, only few plants have so far been investigated for antifertility activity. The World Health Organization (WHO) has set up a Task Force on Plant Research for fertility regulation with an objective to find new orally active non-steroidal contraceptive compounds. Various medicinal plant extracts have been tested for their antifertility activity both in male and female. Some of these plants had spermicidal effects; other caused reduction in the sperm counts and altered the mobility of the sperms. Some of them caused testicular changes and altered hormone levels. It is necessary to use biologically active botanical substances or fertility-regulating agents of plant origin which are ecofriendly. The natural plant substances possessing mild inherent estrogenic and antiestrogenic properties offer themselves as an effective nonconventional source of contraception with less deleterious side effects.
Curcumin found to inhibit 5a-reductase, which converts testosterone to 5a-dihydrotestosterone, thereby inhibiting the growth of flank organs in hamster. Curcumin also inhibited human sperm motility and has the potential for the development of a novel intravaginal contraceptive24,25.

Rats fed with Curcuma longa aqueous and 70 % alcoholic extract for 60 days (500 mg.kg⁻¹.day⁻¹) showed a reduction in sperm motility and density. C. longa may have affected the androgen synthesis either by inhibiting the Leydig cell function or the hypothalamus-pituitary axis and as a result, spermatogenesis is arrested26.

Male mice of the Parkes (P) strain were orally administered aqueous rhizome extract of C. longa (600 mg/kg body weight per day for 56 and 84 days) showed adverse effect of on various male reproductive organs and fertility. The treatment had adverse effects on motility, viability, morphology and number of spermatozoa in the cauda epididymidis, serum level of testosterone and on fertility. By 56 days of treatment withdrawal, however, the above parameters recovered to control levels. The results show that C. longa treatment causes reversible suppression of spermatogenesis and fertility, thereby suggesting the potential of this plant in the regulation of male fertility27.

**Abrus precatorius**

The plant Abrus precatorius Linn, popularly known as Rosary pea belong to the family leguminoses (Fabaceae), is found throughout India in hedges and bushes in exposed areas28. Usually seeds are used against leucoderma, wounds, alopecia, asthma, tubercular glands, leprosy, fever, ulcer and tumor29. Precatorine, trigonelline, choline and abrine are present in the seeds. Abricin and abridin, two steroids were also reported in the seeds; the latter exhibited anti-fertility property30.

![Abrocin](image1)

**Abridin**

The contraceptive and toxicologic effects were observed with administration of methanolic extract (70%) of the seeds of A. precatorius (L.) (Fabaceae) (20 and 40 mg/kg b.wt./day) for 45 days. Treatment caused a significant decrease in caudal sperm motility, count and viability. There was a complete suppression of fertility at 40 mg/kg dose level. The decrease in weights of testis and cauda epididymis of mice at 40mg/kg level could be attributed to a loss of spermatogenic elements in testis and absence of sperms in cauda epididymis31.

The inhibitory effects of a methanolic extract of A. precatorius seeds (5 and 20 mg/ml) on the motility of washed human spermatozoa was noticed. The extract caused a concentration-related impairment of percentage sperm motility. With the highest concentration tested (20 mg/ml), the onset of the antimotility action was almost immediate. In addition, this concentration impaired the functional integrity of the plasma membrane (hypoosmotic swelling test) and viability (nigrosin-eosin stain) of spermatozoa. In contrast, with a lower concentration (5.0 mg/ml), such effects were not evident. It is concluded that at the lower concentrations the antimotility action may result from a rise in intracellular calcium (not via influx) and/or a decline in cAMP content and/or enhanced generation of a reactive oxygen species32.

The ethanolic extract of A. precatorius seeds intraperitoneally administered with 20, 40 and 60 mg/kg doses for 20 days showed disrupted arrangement of seminiferous tubules, loosening of germinal epithelium and low counts of leydig cells, germ cells and sperm cells. Histomorphology of the epididymus showed a decrease in tubule size, epithelial height and a reduction in sperm number in the tubular lumen. Plasma testosterone levels decreased significantly with a higher dose (60 mg/kg) compared to controls. This suggests that A. precatorius seed extract with higher dose (60 mg/kg) tends to suppress spermatogenesis and is hence liable to cause infertility in male mice33.

**Barleria prionitis**

*Barleria prionitis* L. (Family Acanthaceae) is commonly known as Vajradanti. In indigenous system of medicine in India, the aerial parts (stem, leaf & flower) are used in fever, toothache, inflammation, as diuretic and gastrointestinal disorders; bark in whooping cough as an expectorant; the whole plant and especially the roots are used as tonic34.

From the aerial parts of B. prionitis, one new phenylethanoid glycoside, barlerinoside along with six known iridoid glycosides, namely, shanzhiside methyl ester, 6-O-trans-p-coumaroyl-8-O-acetylsanzhiside methyl ester, barerin, acetylbarerin, 7-methoxydideroside, and lupulinoside were isolated35.

![Abrocin](image2)

**Barlerinoside**

**Lupulinoside**

**7-methoxydideroside**
Male rats treated with isolated fractions of the *B. prionitis* root methanolic extract (100 mg/kg for 60 days) showed a significant reduction on spermatogenesis without affecting general body metabolism. Sperm motility as well density in cauda epididymides was reduced significantly. The population of various spermatic cells such as primary spermatocytes, secondary spermatocytes and round spermatids were declined significantly in treated animals.

Oral administration of root extract of *B. prionitis* L. to male rats (100 mg/rat per day) for the period of 60 days did not cause body weight loss. The root extract brought about an interference with spermatogenesis. The round spermatids were decreased by 73.6% (P< or =0.001). The extract reduced the fertility of male rats by 100%. Cross sectional surface area of Sertoli cells and mature Leydig cell numbers were significantly reduced (36.9%). Testicular glycogen contents were low. Antifertility effects of *Barleria* seemed to be mediated by disturbances in testicular somatic cells functions (Leydig and Sertoli cells) resulting in the physio-morphological events of spermatogenesis.

**Piper nigrum**

*Piper nigrum* L. commonly known as black pepper belongs to family *Piperaceae*. The fruits of *P. nigrum* are not only important as a spice or flavoring agent, but have also been prescribed for cholera, dyspepsia, diarrhea, various gastric ailments, and paralytic and arthritic disorders. It mainly contains amide alkaloids, and piperine is the major active component.

Oral administration of fruit powder of *P. nigrum* (25 and 100 mg/kg body weight/day for 20 and 90 days) to male mice of the Parkes (P) strain adversely affects sperm parameters and also caused marked alterations in male reproductive organs.

Piperine (1-piperoylpiperidine) is an alkaloid present in the fruits of black pepper (*Piper nigrum*), long pepper (*Piper longum*) and other *piper* species. Piperine is the major pungent substance present in these plants and is commonly used as a spice all over the world for seasoning and flavoring food. The weights of the caput, corpus and cauda regions of the epididymis significantly decreased at dose of 100 mg/kg. Epididymal sperm count and motility decreased at 10 mg/kg and 100 mg/kg, and sperm viability decreased significantly at 100 mg/kg. Piperine could damage the epididymal environment and sperm function.

**Capparis aphylla**

*Capparis aphylla* (syn: *C. decidua*), family *Capparidaceae*, is commonly known as desert broom (Eng.); Swartstrom, Babejaanarm (Afr.); Sengam, Kuzhalaathondai (Tamil). The plants were used in several medicines such as anthelmintics, muscular injury, swelling, jaundice, appetizer, cardiac diseases, pyorrhea, cholera, dysentery, rheumatism, constipation, stomach disorder and skin diseases.

It contains capparin, capparilin, capparinin, caparidisine, capparisine, capparisisine, sitosterole, 1-stachydrin, n-pentacosane and n-triacontanol.

Ethanol extract of *C. aphylla* was evaluated for possible spermatotoxic effect in 90 days old male rat. The ethanol extract of *C. aphylla* at the doses of 50, 100 and 200 mg/kg of body weight when administered intra peritoneally for 55 days revealed spermatotoxic effect in 90 days old male rat. The fertility of the treated rats was reduced drastically. The sperm concentration in the epididymis and sperm motility decreased, whereas sperm abnormalities increased in particular sperm abnormalities like flexed head, detached head and coiling of end tail. Thus *C. aphylla* treatment resulted in impairment of male fertility in the rat by affecting both spermatogenesis and cauda epididymal spermatozoa.

**Bacopa monnieri**

*Bacopa monnieri* L. (Family Scrophulariaceae) commonly known as Brahmi has been used in the Ayurvedic system of medicine for centuries.

Main chemical components are saponins, bacosides, bacopasides, monnieriin, brahmine, nicotine, herpestine and hersaponin.
Oral administration of Brahmi (250 mg/kg body weight/day, for 28 and 56 days) to male mice of the Parkes (P) strain caused reduction in motility, viability, morphology, and number of spermatozoa in cauda epididymidis. Histologically, testes in mice treated with the plant extract showed alterations in the seminiferous tubules. These results thus suggest that Brahmi treatment causes suppression of spermatogenesis and fertility, without producing apparent toxic effects.

**Allamanda cathartica**

*Allamanda cathartica* Linn. (Apocynaceae) is widely growing perennial shrub. The leaves are smooth and thick. The roots are used against jaundice, complications with malaria and enlarged spleen in traditional medicine. The flowers act as a laxative. Moreover, yellow Allamanda has also antibiotic action against *Staphylococcus*.

All parts of the plant contain allamandin, a toxic iridoid lactone. Leaves and stems yield ursolic acid, β-amyrin and β-sitosterol. Plumericin and isoplumericin are extracted from stem and root-bark, also from leaves and roots, besides plumieride and long chain esters.

**Dendrophthoe falcate**

*Dendrophthoe falcate* (L.f.) Ettingsh. (known as mistletoe) is a perennial, climbing woody parasitic plant of the family Loranthaceae. In India, it is widely distributed and is commonly known as 'bandaa' and 'bandhulu'. It is used ethnomedicinally for treating ulcers, asthma, impotence, paralysis, skin diseases, and wounds.

Leaves contain flavonoids such as Quercetin, quercetrin; Tannins comprising of gallic and chebulinic acid. Young shoots contain nearly 10 percent tannins and the stem contains β-amyrin-0-acetate, oleonolic acid its methyl ester acetate, β-sitosterol and stigmasterol. Root contains Catechin and leucocynidin in the bark.
An oral administration of 70% methanolic extract of stem of *D. falcata* at a dose level of 100 mg/kg wt/day fed to male albino rats for 60 days did not decrease body weight, while the testes and epididymides weight were significantly reduced, and the seminal vesicles and ventral prostate also showed a significant reduction ($P < 0.01$). Treated animals showed a notable depression of spermatogenesis. The reduced sperm count and motility resulted in 100% negative fertility at 100 mg/kg dose level.

**Aegle marmelos**

*Aegle marmelos* (Linn), family Rutaceae, commonly known as Bael, is a sacred tree for Hindu Religion. Alcoholic extracts of the roots and fruits showed hypoglycemic and antidiabetic activity. With respect to clinical applications, it should be noted that the roots are astringent, bitter and febrifuge. They are useful in diarrhea, dysentery, dyspepsia and stomachalgia.

Several chemical constituents have been isolated and from various parts of the bael tree. These include alkaloids, coumarins and steroids. The leaves contain dianinanice, sterol and aegelin. The active constituent of the fruit is marmolosin, which is identical to imperatorin. Other coumarins contained in the fruits are altimperatorin and B-sitosterol. Roots of the tree have been found to contain psoralin, xanthotoxin, scopoletin and tembamide.

50 % ethanolic extract from the leaves of *A. marmelos* (AMLEt) (100, 200 and 300 mg(-1) kg (-1) day(-1) for each rat for 60 days) caused a reduction in weight of all the major accessory sex organs. There was a marked decline in motility and density of the sperm derived from cauda epididymis of the treated animals. *A. marmelos* reduced fertility of male rats by 100% at the 300-mg dose level. Serum testosterone levels also decreased significantly. Thus, the leaf extract of *A. marmelos* (AMLEt) suppresses fertility in male rats. A dose related reduction in the testicular sperm count, epididymal sperm count and motility and abnormal sperm count was observed when the animals were administered the aqueous leaf extract (250mg/kg body wt., and 350mg/kg body wt.)

**Tinospora cordifolia**

*Tinospora cordifolia* (Willd.) belongs to the Menispermaeae family and known as Gulancha in English, Guduchi in Sanskrit, and Giloya in Hindi. It is reported to possess anti-spasmodic, antiinflammatory, anti-allergic, anti-diabetic, antioxidant properties. The chemical constituents reported from this shrub belong to different classes, such as alkaloids, diterpenoid lactones, glycosides, steroids, sesquiterpenoid, phenolics, aliphatic compounds and polysaccharides. Tinosporin, β-sitosterol, cordifol, columbin, chasmanthin, tinosporid, tinosporin, tinosporavid, cordifolid and palmarin are the main.
Oral administration of 70% methanolic extract of *T. cordifolia* stem to male rats at the dose level of 100 mg/rat/day for 60 days did not cause body weight loss but decreased the weight of testes, epididymis, seminal vesicle and ventral prostate in a significant manner. Sperm motility as well as sperm density were reduced significantly which resulted in reduction of male fertility by 100%. The stem extract brought about an interference with spermatogenesis. These results suggested antifertility effects of the stem extract of *T. cordifolia* in male rats.

*Martynia annua* L. (Family Martyniaceae), commonly known as scorpion (in Hindi, Bichchhu or Baghnukh), possess different medicinal properties. Fruit is used as anti-inflammatory. Leaves are antiseptic and are used in epilepsy. Roots used treatment of snake bite. Entire plant used to treat menstrual disorders. Dried entire plant has analgesic activity, anticonvulsant activity whilst p-hydroxy benzoic acid and snapic acid, and gentisic acid, respectively, are present in leaves and fruits, in addition to the p-hydroxy benzoic acid.

The 50% ethanol extract of *M. annua* L. root at dose level of 50 mg, 100 mg and 200 mg/kg body weight daily for a period of 60 days showed adverse effect on reproduction of male rats. Significant decrease in the weights of testes, epididymides, seminal vesicle and ventral prostate was noticed. There was a dose related reduction in the testicular sperm count, epididymal sperm count and motility. Significant reduction in serum concentration of luteinizing hormone and testosterone was also observed. It is concluded that the 50% ethanol extract of *M. annua* root have dose related effects on male reproduction without altering general body metabolism.

*Momordica charantia* Linn, belonging to the family of Cucurbitaceae, is an indigenous medicinal and vegetable plant found in the tropical and subtropical regions of the world and is commonly known as bitter gourd or bitter melon. *M. charantia* is one of the most promising plants for diabetes today. Bitter melon has some interesting biological and pharmacological activities, e.g. anticancer, antiviral, antibacterial, analgesic, anti-inflammatory, hypotensive, anti-fertility, hepatotoxicity and antioxidant.

Petroleum ether, benzene and alcohol extracts of the seeds of *M. charantia* tested in rats at the dose level of 25 mg/100 g body weight for 35 days showed antispermatogenic activity as the number of spermatocytes, spermatids and spermatozoa was decreased. Increase in cholesterol level and Sudanophilic lipid accumulation indicates inhibition in the steroidogenesis. Out of the three extracts, the alcohol extract was more potent in its antispermatogenic, antisteroidogenic and androgenic activities.

*Rosmarinus officinalis* L. (Labiatae) is an edible evergreen shrub native to the Mediterranean area. The leaves of the plant are commonly used as a spice and as a source of antioxidant compounds employed in food conservation.

Phytochemical studies revealed the presence of several compounds in *R. officinalis* including phenolic diterpenes, diterpenoid quinines, flavonoids and essential oils. Flavonoids have been shown to produce antiandrogenic activity and affect fertility in male dogs. Flavonoids include diosmetin, diosmin, genkwanin and derivatives, luteolin and derivatives, hispidulin, neptin, nepitrin and apigenin.
Ingestion of rosemary (*R. officinalis* L.) at levels of 250 and 500 mg/kg body wt for 63 days caused a significant decline in spermatogenesis in testes due to a decrease in the number of primary and secondary spermatocytes and spermatids and is attributed to a significant decrease in testosterone. Sperm motility and density were also significantly decreased in the cauda epididymis and in the testes of rosemary-treated male rats.

**Syzygium aromaticum**

*S. aromaticum* L., commonly known as clove, belongs to the family Myrtaceae. It is used as a spice to add flavor to exotic food preparations.

Important constituents of clove oil include eugenol, beta-caryophyllene, and vanillin; crategolic acid; tannins; gallotannic acid; methyl salicylate (painkiller); the flavonoids eugenin, kaempferol, rhamnetin, and eugenitin; triterpenoids like oleanolic acid, stigmasterol, and campesterol; and several sesquiterpenes.

**Eugenol**

Oral exposure of hexane extract of flower buds of *S. aromaticum* in three doses (15 mg, 30 mg, and 60 mg/kg BW) for a single spermatogenic cycle (35 days) in Parkes (P) strain mice induced non-uniform degenerative changes in the seminiferous tubules associated with decrease in daily sperm production and depletion of round and elongated spermatids population.

**β-caryophyllene**

The flower buds of *S. aromatium* (clove), a common food flavor, have been used as indigenous medicine for the treatment of male sexual disorders in Asian countries. Oral exposure of a single spermatogenic cycle (35 days) in Parkes (P) strain mice revealed a significant reduction in testicular body weight ratio and histological examination revealed disruption in the arrangement of seminiferous tubules with no distinct basement membrane. These changes were accompanied by reduction in the number of spermatozoa. All these results indicated that aqueous extract of *C. odoratum* leaves possesses antiandrogenic property by interfering with steroidogenesis at the testicular level and this will adversely affect the functional capacity of the testes and the fertility of the animal.

**CONCLUSION**

Plants have been a source of medicine in the past centuries and today scientists and the general public recognize their value as a source of new or complimentary medicinal products. Recently, wide array of research investigations highlight the potential health beneficial principles from phytal sources. Medicinal plants constitute one of the main sources of new pharmaceuticals and health care products.

There has been an increase in demand for the phytopharmaceuticals all over the world because of the fact that the allopathic drugs have more side effects. This review makes an
attempt to compile some of antifertility plants from Ayurveda as well as from foreign origin so as to give scientific account on usage of anti-fertility plants. Various phytoconstituents like alkaloids, flavonoids, tannins, xanthones, triterpenes, quinones etc. were involved in anti-fertility activity. Although a number of plants have been reported to possess cent percent antifertility activity but till date these plants have not yet come up at the level of clinical trials. Standardization of methods, quality control, data on safety and efficacy need for proper understanding of the use of herbal medicines.

Table 1: Summary of work done on indigenous antifertility plants on males

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of plant</th>
<th>Vernacular Name</th>
<th>Part used</th>
<th>Type of plant extract</th>
<th>Dose</th>
<th>Duration</th>
<th>Animal model</th>
<th>Activities</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><em>Abrus precatorius</em></td>
<td>Chirmi</td>
<td>Seed</td>
<td>Alcoholic extract</td>
<td>20 and 40 mg/kg</td>
<td>45 days</td>
<td>Rat</td>
<td>Antifertility effect</td>
<td>31</td>
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<td></td>
<td></td>
<td>Seed</td>
<td>Ethanol extract</td>
<td>20, 40 and 60 mg/kg</td>
<td>20 days</td>
<td>Mice</td>
<td>Antifertility effect</td>
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<td><em>Aegle marmelos</em></td>
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<td>60 days</td>
<td>Rat</td>
<td>Antifertility effect</td>
<td>65</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Leaf</td>
<td>50% ethanol extract</td>
<td>200 and 300 mg/kg b. wt./day</td>
<td>60 days</td>
<td>Rat</td>
<td>Antifertility effect</td>
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<tr>
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<td>Leaf</td>
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<td>250mg/kg body wt. and 350mg/kg b wt</td>
<td>45 days</td>
<td>Rat</td>
<td>Antifertility effect</td>
<td>66</td>
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<td>Bark</td>
<td>Methanolic extract</td>
<td>100 mg/rat/day</td>
<td>60 days</td>
<td>Rat</td>
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<td>Antifertility effect</td>
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<td>Kiryat</td>
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<td>Alcoholic extract</td>
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<td>30 and 60 days</td>
<td>Rat</td>
<td>Antifertility effect</td>
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<td>Rat</td>
<td>Antifertility effect</td>
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<td>6 days</td>
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<td>Antifertility effect</td>
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<td>Leaves</td>
<td>Aqueous extract</td>
<td>100 mg/rat/day</td>
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<td>Seeds</td>
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<td>100 mg/kg</td>
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<td>Leaves</td>
<td>Aqueous extract</td>
<td>50, 100, and 200 mg/kg b. wt./day</td>
<td>28 days</td>
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<td>Antispermatogenic activity</td>
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<td>Leaves</td>
<td>Aqueous extract</td>
<td>5.0%, 10.0% and 15.0% neem leaf meal</td>
<td>16 weeks</td>
<td>Rabbits</td>
<td>Antispermatogenic effect</td>
<td>118</td>
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<tr>
<td></td>
<td>Neem oil</td>
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<td></td>
<td>0.6 and 1.2 mL of neem oil/animal</td>
<td>6 weeks</td>
<td>Rat</td>
<td>Structural changes</td>
<td>119</td>
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<td>S. No.</td>
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<td>Part</td>
<td>Treatment</td>
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<td>Species</td>
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<td>12</td>
<td><em>Bacopa monnieri</em></td>
<td>Leaves</td>
<td>Aqueous extract</td>
<td>250 and 350 mg/kg body wt.</td>
<td>30 days</td>
<td>Rat</td>
<td>Spermicidal Activity 120</td>
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<td>13</td>
<td><em>Barleria prionitis</em></td>
<td>Root</td>
<td>Methanolic extract</td>
<td>100 mg/kg</td>
<td>60 days</td>
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<td>14</td>
<td><em>Cannabis sativa</em></td>
<td>Root</td>
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<td>60 days</td>
<td>Rat</td>
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<td>15</td>
<td><em>Capparis aphylla</em></td>
<td>Kair</td>
<td>Ethanolic extract</td>
<td>50, 100 and 200 mg/kg</td>
<td>55 days</td>
<td>Rat</td>
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<td><em>Carica papaya</em></td>
<td>Seeds</td>
<td>Aqueous extract</td>
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<td>8 weeks</td>
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<td>Antispermatogenic Activity 122</td>
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<td>Alcoholic extract</td>
<td>0.5 mg/kg</td>
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<td>Chloroform extract</td>
<td>50 mg/kg</td>
<td>360 days</td>
<td>Monkey</td>
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<td>Alcoholic extract</td>
<td>100, 200 and 300 mg/kg b.wt.</td>
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<td>Chloroform extract</td>
<td>10 mg/rat/day</td>
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<td>Ultrastructural changes in the testis 126</td>
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<td>Rat</td>
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<td>Rat</td>
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<td>Rabbit</td>
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<td>14 days</td>
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<td>Antidiagnostic effects 104</td>
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<td>50% methanolic extract</td>
<td>50, 100 and 200 mg/kg b.wt./day</td>
<td>60 days</td>
<td>Rat</td>
<td>Antispermatogenic Activity 130</td>
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<td>100 mg/kg/day</td>
<td>20, 40, and 60 days</td>
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<td><em>Colebrookia oppositifolia</em></td>
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<td>Ethanol extract</td>
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<td>8-10 weeks</td>
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<td><em>Crotalaria juncea</em></td>
<td>Indian Hemp</td>
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<td>Methanolic extract</td>
<td>18, 50 and 100 mg/kg b.wt.</td>
<td>30 days</td>
<td>Mice</td>
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<td>21</td>
<td><em>Curcuma longa</em></td>
<td>Haldi</td>
<td>Rhizome Methanolic extract</td>
<td>500 mg/kg/day</td>
<td>60 days</td>
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<td>Rhizome Aqueous extract</td>
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<td>600 mg/kg b.wt./day</td>
<td>56 and 84 days</td>
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<td>60 days</td>
<td>Rat</td>
<td>Depression of spermatogenesis 59</td>
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<td><em>Dendrophthoe falcati</em></td>
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<td>18, 50 and 100 mg/kg b.wt.</td>
<td>28 days</td>
<td>Rat</td>
<td>Adverse effects on the male rat testicular function 134</td>
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<td>Ethanol extract</td>
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<td>21 consecutive days</td>
<td>Rat</td>
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<td><em>Juniperus phoenica</em></td>
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<td>Ethanolic extract</td>
<td>100, 200, 400 and 800 mg/kg b.wt./day</td>
<td>60 days</td>
<td>Rat</td>
<td>Antispermatogenic Activity 136</td>
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<td><em>Leptadenia hastata</em></td>
<td>Leaves and stem</td>
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<td>200 mg/kg b.wt./day</td>
<td>20 days</td>
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<td><em>Madhuca indica</em></td>
<td>Mahua</td>
<td>Alcoholic extract</td>
<td>50% ethanol</td>
<td>60 days</td>
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<td>Mentha arvensis</td>
<td>Pudhina</td>
<td>Leaf</td>
<td>Petroleum ether</td>
<td>10 and 20</td>
<td>20, 40</td>
<td>Mice</td>
<td>Antifertility property</td>
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<td>Momordica charantia</td>
<td>Karela</td>
<td>Seeds</td>
<td>Petroleum ether, benzene and alcohol extracts</td>
<td>25 mg/100 g body weight</td>
<td>35 days</td>
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<td>Morinda lucida</td>
<td>Indian mulberry</td>
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<td>Hexane extract</td>
<td>500 and 1000 mg/kg b.wt.</td>
<td>30 days</td>
<td>Rat</td>
<td>Antifertility activities</td>
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<td>Mucuna Urens</td>
<td>Mucuna Urens</td>
<td>Leaf</td>
<td>Leaf extract</td>
<td>400 mg/(kg-d)</td>
<td>13 weeks</td>
<td>Rat</td>
<td>Antispermatogenic properties</td>
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<td>Ocimum sanctum</td>
<td>Tulsi</td>
<td>leaves</td>
<td>Benzene extract</td>
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<td>Pan</td>
<td>Leaf stalk</td>
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<td>60 days</td>
<td>Mice</td>
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<td>Fruit</td>
<td>Dry powder</td>
<td>25 and 100 mg/kg</td>
<td>20 and 90 days</td>
<td>Mice</td>
<td>Antispermatogenic activity</td>
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<td>36</td>
<td>Quassia amara</td>
<td>Surinam wood</td>
<td>Bark</td>
<td>Chlorofor m extracts</td>
<td>different dilutions</td>
<td>Single daily intramuscular injections of the extract for 15 days</td>
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<td>Rosmarinus officinalis</td>
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<td>63 days</td>
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<td>Ruta graveolens</td>
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<td>Alcoholic extract</td>
<td>20 mg/day</td>
<td>20 consecutive days</td>
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<td>Sapindus emarginatus</td>
<td>Ritha</td>
<td>Alcoholic extract</td>
<td>70% methanol</td>
<td>50 mg/day/rat</td>
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<td>60 days</td>
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<td>60 days</td>
<td>Rat</td>
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34. Ata A, Kaflihari KA, Saruasekera R. Chemical constituents of Barleria prionitis and their enzyme inhibitory and free radical
45. Gupta AK, Tandon N, Shama M. Quality Standards of Indian Medicinal Plant Medicinal Plants Unit: Published by Indian Council of Medical Research, New Delhi, 2008; 3:99-105.


