LITERATURE REVIEW:

Thakur M. et al., (2009) stated that the term aphrodisiac originated from the Greek word Aphrodite, eulogizing the Greek goddess of love and romance. In modern times, this term has been used for substances that enhance sexual activity and are helpful in treating sexual dysfunction.

Musa TY. et al., (2008) mentioned that Massularia acuminata, one of many plants is commonly used as chewing sticks due to its antimicrobial activity and the aqueous extract of its stem as an aphrodisiac. This study therefore sought to assess the androgenic potentials of aqueous extract of Massularia acuminata stem in male rats for 21 days. Male rats weighing between 220 and 260 g were completely randomized into four groups: A, B, C and D. Group A, the control received orally 1 ml of distilled water while groups B, C and D were orally administered with 1ml each corresponding to 250, 500 and 1000 mg/kg body weight of the plant extract, respectively for 21 days. Rats were sacrificed 24 h after 1, 7 and 21 days. Compared with the control, extract administration at all the doses produced significant increase \((P < 0.05)\) in testes–body weight ratio, testicular protein, glycogen, sialic acid, cholesterol, testosterone, luteinizing and follicle stimulating hormone concentrations throughout the period of administration. The available evidence in this study suggests that aqueous extract of Massularia acuminata stem has androgenic.

Ramachandran S. et al., (2004) discovered that the aphrodisiac activity of Butea frondonsa Koen. ex Roxb (Papillionaceae) bark extract. The extract (400 mg/kg body wt./day) was administered orally by gavage for 28 days. Mount latency (ML), intromission latency (IL), ejaculation latency (EL), mounting frequency (MF), intromission frequency (IF), ejaculation frequency (EF) and post-ejaculatory interval (PEI) were the parameters observed before and during the sexual behavior study at day 0, 7, 10, 14, 21, and 28. The extract reduced significantly ML, IL, EL and PEI \((p < 0.05)\). The extract also increased significantly MF, IF and EF. These effects were observed in sexually active and inactive male rats.

Guohua Hu, et al., (2009) examined the effect of Allium tuberosum seeds extract upon the expression of male rat sexual behavior, in order to know whether Allium tuberosum seeds extract possess aphrodisiac property. The aphrodisiac activity of Allium tuberosum seeds n-BuOH extract was investigated in male rats. The extract and L-dopa were administered orally
by gavages for 40 days. Mount latency (ML), intromission latency (IL), ejaculation latency (EL), mounting frequency (MF), intromission frequency (IF), ejaculation frequency (EF) and post ejaculatory interval (PEI) were the parameters observed before and during the sexual behavior study at day 0, 10, 20, 30 and 40. The $n$-BuOH extract reduced significantly ML, IL, EL and PEI. The extract also increased significantly MF, IF and EF. These effects were observed in sexually active and inactive male rats. Present findings provide experimental evidence that the $n$-BuOH extract preparation of *Allium tuberosum* seeds possesses aphrodisiac property.

Carro Juarez M. *et al.*, (2004) revealed that Cihuapatli, the Mexican zoapatle (*Montanoa tomentosa*) has an extensive ethnomedical history of use as a traditional remedy for reproductive impairments. During the study of the ejaculatory function in rats and by testing a set of Mexican plants with medicinal properties, they observed that crude extracts of *M. tomentosa* facilitated ejaculation. Thus, they decided to analyze the possibility that this plant possessed sexual stimulant properties. To that aim, copulatory behavior of sexually active male rats receiving doses of 38, 75 and 150 mg/kg of the aqueous crude extract of *M. tomentosa*, as it is prepared in traditional medicine, was assessed. Altogether, these data reveal a facilitatory action of this extract on sexual activity and particularly on sexual arousal. Present findings provide experimental evidence that the crude extract preparation of *M. tomentosa*, used as a traditional remedy, possesses aphrodisiac properties.

Subramoniam A, *et al.*, (1997) written as administration of *Trichopus zeylanicus* leaf (ethanol extract) to male mice stimulated their sexual behaviour as evidenced by an increase in number of mounts and mating performance. This activity of the ethanol extract was concentration dependent and destroyed by heat treatment at 100°C for 15 min. Although oral administration of a single dose (200 mg:kg) was effective, daily administration of the extract for 6 days was found to be more effective. The pups fathered by the drug treated mice were found to be normal with reference to foetal growth, litter size and sex ratio. The water as well as $n$-hexane extracts of the plant leaf were inactive. The present study reveals for the first time the aphrodisiac activity of *Trichopus zeylanicus*, an endemic herb of India.

Alexis Z. *et al.*, (2008) reported that *C. benthamiana* roots are rich in phenolic compounds (gallic acid, resveratrol and tannins). The results showed that AECB had significant vasorelaxing properties. The extract also had a strong radical activity against ROS in cell-free
and cellular systems and stimulated eNOS mRNA expression. As for the aphrodisiac activity of AECB in male rats, results have shown that sexual parameters are stimulated. Furthermore, after oral administration at high dose, AECB causes no mortality or changes in rats’ behaviour. Conclusion: AECB enhanced the sexual activity of male rats. This could be partly explained

**Bastiaan J. et al., (2008)** mentioned that the in case three herbal aphrodisiacs (Libidfit, Satibo and Viamax) were investigated for the presence of regular pharmaceuticals against erectile dysfunction. However, high-performance liquid chromatography with diode array detection and mass spectrometry (HPLC-DAD–MS) and nuclear magnetic resonance (NMR) analyses revealed the presence of ingredients, having a molecular structure strongly resembling those of sildenafil (Viagra) and vardenafil (Levitra). The health risk posed by these analogous substances is high because they were found to be potent phosphodiesterase 5 (PDE5) inhibitors used in pharmacologically relevant quantities having no known safety profile. Based on structural and functional analogy these analogs represent a new class of designer drugs and should be taken off the market for being unapproved drug substances. In the Libidfit court case this was done successfully, setting a precedent.

**Ratnasooriya W. D. et al., (2008)** discovered that in Sri Lankan traditional medicine black tea brew (BTB) of *Camellia sinensis* (L.) O. Kuntze (Theaceae) is claimed to have male sexual stimulant activity. As this claim is not scientifically tested and proven, this study was undertaken to evaluate the effects of BTB on male sexual competence. Different doses of BTB made from Sri Lankan high grown dust grade no 1 tea or water were orally administered to separate groups of rats and 3 h later their sexual behaviour were monitored using receptive females. The overall results showed that BTB possesses marked aphrodisiac activity prolongation of latency of ejaculation shortening of mount- and intromission latencies and elevation of serum testosterone level. Further, this aphrodisiac action was not associated with impairment of other sexual parameters like libido, sexual motivation, sexual arousal, sexual vigour or penile erection. It is concluded that BTB can function as a quick acting, safe, oral aphrodisiac which may also be useful in certain forms of sexual inadequacies such as premature ejaculation and impaired libido and other sexual functions.

**Chauhan N.S. et al., (2007)** reported that the rhizomes of Curculigo orchioides have been traditionally used as aphrodisiac. In the present study ethanolic extract of rhizomes was
evaluated for its effect on sexual behavior in rats. Administration of 100 mg/kg of extract change significantly the sexual behavior as assessed by determining parameters such as penile erection, mating performance, mount frequency and mount latency. Moreover a pronounced anabolic and spermatogenic effect was evidenced by weight gains of reproductive organs. The treatment also markedly affected sexual behavior of animals as reflected in reduction of mount latency, an increase in mount frequency and enhanced attractability towards female. Penile erection index was also incremented in treated group.

Zamble A. et al., (2008) stated in the present study, that aphrodisiac properties of Microdesmis keayana J. Le´onard root extract and major isolated alkaloids were evaluated by observing the sexual behavior of male rats. Aqueous extract (150 mg/kg body weight) and pure alkaloids were administered orally by gavage to male rats. Latent times of observation, intromission and ejaculation, mounting behavior, number of intromissions and mating performances were evaluated and compared to those obtained with untreated rats in the presence of receptive and non-receptive females. The results have shown that aqueous extract and alkaloids of M. keayana stimulate sexual parameters in rats’ sexual behavior. A short-term toxicity study undertaken to establish the therapeutic index of aqueous extract, showed that a high dose of the extract (2 g/kg body weight) caused no mortality or changes in rats’ behavior.

Yakubu M. T et al., (2007) reported that sexual dysfunction, that is the repeated inability to achieve normal sexual intercourse, which include various forms like premature ejaculation, retrograded, retarded or inhibited ejaculation, erectile dysfunction, arousal difficulties (reduced libido), compulsive sexual behaviour, orgasmic disorder and failure of detumesence, are on the increase worldwide because of aging population and other increasing etiological factors. The search for natural supplement from medicinal plants is being intensified probably, because of its reduced side effect, its ready availability and reduced cost. Therefore, the increasing search for medicinal plants with aphrodisiac potentials has necessitated the need to review methods available for screening medicinal plants with aphrodisiac potentials in males.

Miguel CJ. et al., (2006) has mentioned that the pro-sexual effect of the cihuapatli (Montanoa tomentosa) and its possible pro-ejaculatory properties in spinal male rats were examined. Systemic administration of the aqueous crude extracts of Montanoa tomentosa
exerted a pro-ejaculatory effect and produced an increase in the number of discharges in the ejaculatory motor patterns in the spinal rats. The cihuapatli-induced ejaculatory motor patterns were similar to that obtained after systemic oxytocin. Cihuapatli- and oxytocin-induced ejaculatory motor responses and the penile erections and movements were abolished by the pre-treatment with hexamethonium, a selective oxytocin antagonist. Present data show that the cihuapatli extract acts directly at the spinal system in charge of the expression of the ejaculatory motor patterns and suggest that the aqueous crude extract exerts its aphrodisiacs properties by increasing sexual potency acting as an oxytocic agent.

Prapapan T. et al., (2008) discovered that PDE inhibitors have been used for treatment of many indications such as cardiovascular diseases, chronic obstructive pulmonary diseases, erectile dysfunction. The aim of the study was to search for sources of PDE inhibitors from Thai biodiversity. Some Thai medicinal plants used as aphrodisiac and neurotonic agents together with plants from Leguminosae collected from the North of Thailand were screened for PDE inhibitory activity using a radioassay. Neurotonic plants as well as Leguminosae plants showed potent PDE inhibitory activity. The concentrations that could inhibit 50% PDE activity (IC50) of the active extracts were determined in comparison to the standard inhibitor, 3-isobutyl-1-methylxanthine (IBMX). Betula alnoides, Hiptage benghalensis, Leea indica and Senna surrattensis showed IC50 values in the range of microgram per milliliter while IBMX standard showed an IC50 value of 0.68±0.13 g/ml. Thai biodiversity was the great sources of PDE inhibitors. Ayurvedic/herbal healthcare products are considered safe under the impression that they are derived from natural products. But recently, there have been several reports worldwide on the adulteration of synthetic PDE-5 inhibitors in aphrodisiac herbal formulations. Therefore, the objective of the present study was to explore the presence of synthetic PDE-5 inhibitors (sildenafil, tadalafil and/or vardenafil) in ayurvedic/herbal healthcare products sold in Indian market for aphrodisiac/related uses. In total, 85 herbal formulations (HFs) were included in the study. The formulations were extracted with methanol and subjected to centrifugation. The supernatant was analysed by HPLC and LC–MS/TOF. Early detection of the presence of sildenafil, tadalafil and vardenafil in the herbal samples was done by the study of extracted ion mass chromatograms at their m/z values of respective parent ions, and two prominent fragments of each. In case of sildenafil and tadalafil, adulteration was also detected by comparing the relative retention times (RRT) and UV spectra. Further substantiation was done through comparison of accurate mass spectra with those of the two available standards. Of the 85 HFs tested, only one was eventually found...
to be adulterated with sildenafil. The extent of adulterant in this sample was determined to the therapeutic dose in the formulation. The study thus indicates emergence of the problem of adulteration of Indian herbal products with PDE-5 inhibitors.

**Akash A. et al., (2010)** stated that the Ginseng is the root of the perennial herbs of *Panax quinquefolium* and *Panax ginseng* which contain a series of tetracyclic triterpenoid saponins ginsenosides. as active ingredients. It is considered a tonic or adaptogenic that enhances physical performance _including sexual_, promotes vitality and increases resistance to stress and ageing. The adaptogenic properties of ginseng are believed to be due to its effects on hypothalamic[pituitary]adrenal axis, resulting in elevated plasma corticotropin and corticosteroids levels. When used appropriately, ginseng appears to be safe. Nevertheless, documented side effects include hypertension, diarrhoea, restlessness, mastalgia and vaginal bleeding.

**Neelesh M. et al., (2011)** reported that the aphrodisiac is a type of food or drink that has the effect of making those who eat or drink it more aroused in a sexual way. Aphrodisiacs can be categorized according to their mode of action into three groups: substances that increase libido (i.e., sexual desire, arousal), substances that increase sexual potency (i.e., effectiveness of erection) and substances that increase sexual pleasure. Some well-known aphrodisiacs are *Tribulus terrestris*, *Withania somnifera*, *Eurycoma longifolia*, *Avena sativa*, *Ginko biloba*, and *Psoralea coryifolia*. Ethnobotanical surveys have indicated a large number of plants as aphrodisiacs. The paper reviews the recent scientific validation on traditionally used herbal plants as aphrodisiac herbs for the management of sexual disorder erectile dysfunction.

**Jackson G. et al., (2011)** studied that a significant proportion of men with erectile dysfunction (ED) exhibit early signs of coronary artery disease (CAD), and this group may develop more severe CAD than men without ED (Level 1, Grade A). The time interval among the onset of ED symptoms and the occurrence of CAD symptoms and cardiovascular events is estimated at 2–3 years and 3–5 years respectively; this interval allows for risk factor reduction (Level 2, Grade B). ED is associated with increased ll-cause mortality primarily due to increased cardiovascular mortality (Level 1, Grade A). All men with ED should undergo a thorough medical assessment, including testosterone, fasting lipids, fasting glucose and blood pressure measurement. Following assessment, patients should be stratified according to the risk of future cardiovascular events. Those at high risk of cardiovascular
disease should be evaluated by stress testing with selective use of computed tomography (CT) or coronary angiography (Level 1, Grade A).

**Solomon H. et al., (2003)** mentioned that the Hot water extract of Alpinia calcarata (A. calcarata) at 150, 250 and 500 mg/kg, p.o. in rats was found to prolong the EL. Mapohrrreodviesria, a cth aec tEioLn a. nd IL were reduced, indicating a strong testosterone level anAdt w5a0s0 fmougn/kdg ,n opn.ot.o,x iitc [e110e].vates

**Gauthaman K. et al., (2002)** suggested that *Tribulus terrestris* (TT) has long been used in the traditional Chinese and Indian systems of medicine for the treatment of various ailments and is popularly claimed to improve sexual functions in man. Sexual behaviour and intracavernous pressure (ICP) were studied in both normal and castrated rats to further understand the role of TT containing protodioscin (PTN) as an aphrodisiac. Adult Sprague-Dawley rats were divided into five groups of 8 each that included distilled water treated (normal and castrated), testosterone treated (normal and castrated, 10 mg/kg body weight, subcutaneously, bi-weekly) and TT treated (castrated, 5 mg/kg body weight, orally once daily). Decreases in body weight, prostate weight and ICP were observed among the castrated groups of rats compared to the intact group. There was an overall reduction in the sexual behaviour parameters in the castrated groups of rats as reflected by decrease in mount and intromission frequencies (MF and IF) and increase in mount, intromission, ejaculation latencies (ML, IL, EL) as well as post-ejaculatory interval (PEI). Compared to the castrated control, treatment of castrated rats (with either testosterone or TT extract) showed increase in prostate weight and ICP that were statistically significant. There was also a mild to moderate improvement of the sexual behaviour parameters as evidenced by increase in MF and IF; decrease in ML, IL and PEI. These results were statistically significant. It is concluded that TT extract appears to possess aphrodisiac activity probably due to androgen increasing property of TT (observed in our earlier study on primates).

**Misra L. et al., (2004)** studied that the seeds of *Mucuna pruriens* (L.) DC. after chemical analysis afforded four tetrahydroisoquinoline alkaloids which have been isolated for the first time from *M. pruriens*. Out of them, two are new whose structures have been elucidated by spectroscopic methods.
Calliste C. A. et al., (2010) Stated that the Nutmeg (Myristica fragrans and Myristica argentea) is a spice widely used in food. Argenteane is a dilignan which has been isolated from nutmeg mace (the lace-like seed membrane of nutmeg). On the basis of the experimental measurements of the lipid peroxidation inhibition, argenteane appeared to be an antioxidant as powerful as vitamin E. The present joint experimental and theoretical study helped to understand the mechanism of action of this compound. The density functional theory (DFT) calculations of the O–H bond dissociation enthalpies (BDEs) correlated with the capacity to scavenge free radicals. We demonstrated that the central moiety is able to release one or two H atom(s) to the free radicals. This mechanism was confirmed by (i) the BDE calculations and (ii) the free radical-scavenging capacity measurements of two lignans and 3,30-dimethoxy-1,10-biphenyl-4,40-diol (i.e., the argenteane central moiety). In addition to this active part, two lipophilic chains participate in the molecule’s capacity to react with the oxidative species generated in the membrane vicinity.

Phi Hung N. et al., (2010) reported that the AMP-activated protein kinase (AMPK) is a potential therapeutic target for the treatment of metabolic syndrome including obesity and type-2 diabetes. As part of an ongoing search for new AMPK activators from plants, this study found that the total extract of Myristica fragrans (nutmeg) activated the AMPK enzyme in differentiated C2C12 cells. As active constituents, seven 2,5-bis-aryl-3,4-dimethyltetrahydrofuran lignans, tetrahydrofuroguaiacin B (1), saucernetindiol (2), verrucosin (3), nectandrin B (4), nectandrin A (5), fragransin C1 (6), and galbacin (7) were isolated from this extract. Among the isolates, compounds 1, 4, and 5 at 5 lM produced strong AMPK stimulation in differentiated C2C12 cells. In addition, the preventive effect of a tetrahydrofuran mixture (THF) on weight gain in a diet-induced animal model was further examined. These results suggest that nutmeg and its active constituents can be used not only for the development of agents to treat obesity and possibly type-2 diabetes but may also be beneficial for other metabolic disorders.

Shamshad A. et al., (2003) reported that Spices are considered as sexual invigorators in the Unani System of Medicine. In order to explore the sexual function improving effect of Myristica fragrans Houtt. (nutmeg) and Syzygium aromaticum (L) Merr. & Perry. (clove) an experimental study was conducted in normal male mice. Methods The extracts (50% ethanolic) of nutmeg and clove were administered (500 mg/kg; p.o.) to different groups of male Swiss mice. Mounting behaviour, mating performance, and general short term toxicity
of the test drugs were determined and compared with the standard drug Penegra (Sildenafil citrate). Results The extracts of the nutmeg and clove were found to stimulate the mounting behaviour of male mice, and also to significantly increase their mating performance. The drugs were devoid of any conspicuous general short term toxicity. Conclusion The extracts (50% ethanolic) of nutmeg and clove enhanced the sexual behaviour of male mice.

**Gauthaman K. et al., (2003)** mentioned that the Tribulus terrestris has long been used in the traditional Chinese and Indian systems of medicine for the treatment of various ailments and is popularly claimed to improve sexual functions in man. Sexual behaviour and intracavernous pressure (ICP) were studied in both normal and castrated rats to further understand the role of TT containing protodioscin (PTN) as an aphrodisiac. Decreases in body weight, prostate weight and ICP were observed among the castrated groups of rats compared to the intact group. There was an overall reduction in the sexual behaviour parameters in the castrated groups of rats as reflected by decrease in mount and intromission frequencies and increase in mount, intromission, ejaculation latencies as well as post-ejaculatory interval. Compared to the castrated control, treatment of castrated rats (with either testosterone or TT extract) showed increase in prostate weight and ICP that were statistically significant. There was also a mild to moderate improvement of the sexual behaviour parameters as evidenced by increase in MF and IF; decrease in ML, IL and PEI. These results were statistically significant. It is concluded that TT extract appears to possess aphrodisiac activity probably due to androgen increasing property of TT

**Kamalipour M et al (2009)** discovered that the Depression is a heterogeneous disorder often manifested with symptoms at the psychological, behavioral and physiological levels. Full remission is achieved in fewer than 50% of patients. Therefore, antidepressant or medications that achieve a better rate of success are urgently needed. Herbal medicine has a long and respected history, and holds a valuable place in the treatment of depression. According to medical studies, saffron can be used to treat depression. This paper reviews the clinical studied regarding the antidepressant effect of saffron

**Agha Hosseini M. et al., (2008)** mentioned that the aim of this double-blind and placebo-controlled trial was to investigate whether saffron could relieve symptoms of premenstrual syndrome. Double-blind, randomised and placebo-controlled trial. Departments of Gynaecology/Obstetrics and Psychiatry, Tehran and Zanjan University of Medical Sciences.
Women aged 20-45 years with regular menstrual cycles and experience of PMS symptoms for at least 6 months were eligible for the study. Women were randomly assigned to receive capsule saffron 30 mg/day (15 mg twice a day; morning and evening) (group A) or capsule placebo (twice a day) for a two menstrual cycles (cycles 3 and 4). In this trial, saffron was found to be effective in relieving symptoms of PMS. A significant difference was observed in efficacy of saffron in cycles 3 and 4 in the Total Premenstrual Daily Symptoms and Hamilton Depression Rating Scale.

Viqar Uddin Ahmad et al., (2003) reported that one new phenolic glycoside named benzoysalireposide (1) along with one known phenolic glycoside named salireposide (2) have been isolated from Symlocos racemosa. Four other known compounds i.e. b-amyrin (3), oleonolic acid (4), b-sitosterol (5) and b-sitosterol glycoside (6) were also isolated from this plant. The structure elucidation of the isolated compounds was based primarily on 1D- and 2D-NMR analysis, including COSY, HMQC, and HMBC correlations. The compound 1 and 2 showed inhibitory activity against snake venom phosphodiesterase I.

Choudhary MI. et al., (2004) stated that the Cytotoxicity and kinetic studies of phenolic glycosides, benzoyl salireposide (1) and salireposide (2), isolated from Symlocos racemosa, were performed against phosphodiesterase I enzyme from snake venom and human nucleotide pyrophosphatase phosphodiesterase-1. Lineweaver–Burk and Dixon plots and their secondary replots showed that these compounds are pure noncompetitive inhibitors of both enzymes. Ki Values of compounds 1 and 2 were found to be 360 and 1000lM, respectively, against human nucleotide pyrophosphatase phosphodiesterase, and 525 and 1100lM, respectively, against snake venom phosphodiesterase. IC50 values of compounds 1 and 2 are 90lM ± 0.04 and 383lM ± 0.03, respectively, against human nucleotide pyrophosphatase phosphodiesterase and 171lM ± 0.02 and 544lM ± 0.021, respectively, against snake venom phosphodiesterase. Both compounds were found to be nontoxic up to concentration of 500lM/mL as >90% cells were viable after 3h of incubation. These compounds are potential candidates for the therapy of arthritis. 29

Akhondzadeh S. et al., (2005) reported that the Depression is a serious disorder in today's society, with estimates of lifetime prevalence as high as 21% of the general population in some developed countries. As a therapeutic plant, saffron is considered excellent for stomach ailments and as an antispasmodic, to help digestion and to increase appetite. It is also used for depression in Persian traditional medicine. Our objective was to assess the efficacy of the
stigmas of Crocus sativus (saffron) in the treatment of mild to moderate depression in a 6-week double-blind, placebo-controlled and randomized trial. Forty adult outpatients who met the Diagnostic and Statistical Manual of Mental Disorders, 4th edition for major depression based on the structured clinical interview for DSM IV participated in the trial. Patients had a baseline Hamilton rating scale for depression score of at least 18. In this double-blind, placebo-controlled, single-centre and randomized trial, patients were randomly assigned to receive a capsule of saffron 30 mg[sol ]day (BD) (Group 1) or a capsule of placebo (BD) (Group 2) for a 6-week study. At 6 weeks, Crocus sativus produced a significantly better outcome on the Hamilton depression rating scale than the placebo (d.f. = 1, F = 18.89, p < 0.001). There were no significant differences in the two groups in terms of the observed side effects. The results of this study indicate the efficacy of Crocus sativus in the treatment of mild to moderate depression. A large-scale trial is justified.

Kanjwani DG et al., (2008) reported that many of the disorders today are based on the imbalances of immunological processes. This necessitates the search for newer and safer immunomodulators. Thus, the objective of the present study was to explore the immunomodulatory activity of the methanolic extract of Piper betel L. (MPb) (Family: Piperaceae). The MPb consists of mixture of phenols, flavonoids, tannins and polysaccharides. Both in vitro as well as in vivo evaluation was carried out. The effects of MPb on lymphocyte proliferation, interferon-gamma receptors and the production of nitric oxide were measured in vitro. Further, the extract at different dose levels was studied in vivo for the humoral and cellular immune responses on mice immunized with sheep red blood cells. P. betel significantly suppressed phytohaemagglutinin stimulated peripheral blood lymphocyte proliferation in a dose-dependent manner. The decrease in antibody titre and increased suppression of inflammation suggests possible immunosuppressive effect of extract on cellular and humoral response in mice. Thus, the MPb could be explored extensively as a therapeutic agent to treat various immune disorders including autoimmune disorders.

Singh A. et al., (2011) studied that about 90% of the word’s contraceptive users are women. Contraceptive choices are available but with lot of side effects. Condom, vasectomy, withdrawal are very few contraceptive choices are available for males. However, as noted earlier, exploratory research has indicated that certain Piper betle and Calendula officinalis ingredients have contraceptive properties. This work gives a view mainly on the contraceptive properties of these plant extracts. Plant samples were collected from different states of India. Motility of sperm depends on mitochondrial activity present in mid-piece of
sperm. In the present study, the mitochondrial activity of sperm was evaluated after treating semen with different concentrations of Piper betle and Calendula officinalis. The mitochondrial activity was also evaluated after subjecting the semen samples for different incubation time periods. Test was done on more than 75% motile normozoospermic semen sample. It was found that as the concentration of extracts increases the mitochondrial activity decreases significantly (p < 0.001), similar results were observed when constant concentration of extracts with increasing time intervals. The mitochondrial activity decreases significantly (p < 0.001) in 5 minutes to 20 minutes incubation time. Experiment indicates that Piper betle and Calendula officinalis have properties to decrease mitochondrial activity in human sperm.