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## The use of medicinal plants as stimulators of eroticism for well-being, health and self-esteem in women and men

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### Abstract

Since ancient times, plants have been used to treat human diseases in folk medicine, including sexual dysfunctions in both men and women, although it is still a taboo subject in many countries. In different cultures and populations, plants have also been used for another lesser-known purpose: the stimulation of eroticism, which not only promotes health but also increases people self-esteem. This use remains hidden for various reasons, among which are: a) the shame of talking about it, b) the urgency of addressing a sexual dysfunction, and mainly c) the lack of adequate and concise studies that deal with this topic professionally and from a human sense. Valuable information, however, is implicit in various studies on treatments for sexual dysfunction. In this study a systematic review was carried out on native plants in databases in which the improve of symptoms of sexual dysfunction in women and men favored health, well-being and increased eroticism. Also, a pilot field study was carried out in traditional markets in Mexico City and Puebla City in Mexico to learn about the plants used by the general population to improve sexual health and the willingness to talk about this issue.

**Keywords:** Eroticism, sexual dysfunction, plants, traditional medicine, well-being

### Introduction

Human sexuality has two basic and fundamental components that are not opposed but that can be even exclusive: a) the conception: The biological continuity and, b) the eroticism, for pleasurable or sexually recreational purposes for physical and mental well-being. In this sense, sexual disorder or dysfunction (difficulties to obtain sexual pleasure) in men and women (Figure 1) directly impacts in their interpersonal relationships, in self-esteem, in the emotional development of their existence and, in general, in the quality of life (Fischer *et al.* 2022) <sup>[1]</sup>. Many of these affectations in men and women have been evaluated and associated in many diseases as cardiovascular, hypertension, diabetes, obesity, metabolic syndrome, cancer among others (Imprialos *et al.* 2018; Nappi *et al.* 2022) <sup>[2, 3]</sup> and treated with pharmacotherapy (Including serotonergic antagonists and dopaminergic agonists as flibanserin or bremelanotide; hormone therapy) (Clayton and Valladares, 2017; Bala *et al.* 2018; Sousa Rodriguez Guedes *et al.* 2022) <sup>[4, 5, 6]</sup>. In addition, it is possible that some component of plant extracts can synergize with pharmacotherapy, diminishing doses, and therefore side effects (Nobili *et al.* 2021; Alam *et al.* 2022; Robledo-Cadena *et al.* 2022) <sup>[7, 8, 9]</sup>, and increasing or improving the restorative effect on the sexual dysfunction or in the increasing of sexual desire (Da Cruz *et al.* 2017) <sup>[10]</sup> for an increase in self-esteem and sexual well-being and an integral health (Figure 2).

In general, the literature is vast in indicate the medicinal herbs used in traditional medicine of many countries and provinces that are widely used to treat sexual dysfunction; however, the information available in the literature on the use of plants as sexual stimulants or as sexual recreative is limited. Through all these years, ethnobotany has taught us the benefits of plants on human health and sexual health. This should be the main motivation for the conservation of traditions and customs in the plant-human relationship.

Therefore, in this work first reviewed the general information about sexual dysfunction in women and men and the plants proposed to lessen the symptoms of a sexual dysfunction. Fatherly, we focused to the use of plants as sexual recreational and triggers of eroticism focused in the plants principally native or used in Mexico.

### **Female sexual dysfunction and plants used to improve or relieve the symptoms**

Female sexual dysfunction (hypoactive sexual desire disorder, female sexual arousal disorder, sexual pain disorders, etc.) are a set of diseases caused by hormonal and/or psychosocial imbalances and affects almost the 33 to 63% of the women population in general (Heiman, 2002; Allahdadi *et al.* 2009; Snoeren *et al.* 2011) <sup>[11, 12, 13]</sup> from very early ages There are currently few treatment options for female sexual dysfunction. The classification system for female sexual dysfunction is often confusing, which complicates its timely clinical diagnosis (Clayton and Valladares, 2019) <sup>[14]</sup>. Risk factors for female sexual dysfunction include: the relationship dissatisfaction, poor mental health, stress, poor physical health, abortion, genitourinary diseases, mutilation, sexual abuse and religion; on the other hand, factors that potentiate a better sexual life and protects against sexual dysfunction include: sex education, daily affection, older age at marriage, exercise, effective intimate communication and a positive body image (McCool-Myers *et al.* 2018) <sup>[15]</sup>. Therefore, new, appropriate and safer treatment options against these dysfunctions and a better diagnose are required.

### **Hypoactive sexual desire dysfunction**

Hypoactive sexual desire disorder (HSDD) in women is one the most common problems among women aged 45-64 (12.3% of women of these ages have HSDD) but younger women also present it (8.9% of 18-44 years old) (Parish and Hahn, 2016) <sup>[16]</sup>, and consists of the deficiency of thought, stimuli, libido and sexual feeling that occur for more than 6 months; the symptoms caused by this condition are a problem because it is associated with: loss or limited sexual desire, lower quality of life, anxiety and severe depressive disorder (Pettigrew and Novick, 2021) <sup>[17]</sup>. Causes of this disorder are due to the alteration of excitatory functions and, when there is an excessive inhibition of these functions, is when HSDD appears. The excitatory function involves the neurotransmitters dopamine and norepinephrine as well as  $\alpha$ -MSH (A neuropeptide of the melanocortin family), which probably delivers dopamine and norepinephrine promoting arousal and sexual desire (Wilson *et al.* 1991) <sup>[18]</sup>. The release of  $\alpha$ -MSH is completely directed because it is stimulated by the presence of estradiol. One of the main treatments in HSDD include Flibanserin (A type 1A serotonin agonist and type 2A receptor antagonist) in this way, increasing dopamine and norepinephrine; another treatment is Bremelanotide (an inductor of dopamine and oxytocine release), and the most amazing is that this drug directly intervenes in the clitoral nerves and the vagina, and increases the release of dopamine and oxytocin (Pfaus *et al.* 2007) <sup>[19]</sup>. Side effects experienced by women taking Flibanserin 100 mg every night were: drowsiness with (11.8%), vertigo (10.5%), and fatigue (10.3%), as well as drug interaction with ethanol caused a high increase in adverse effects (Sang *et al.* 2016) <sup>[20]</sup>. Finally, recent studies showed that women who were treated with Bremelanotide had side effects such as nausea (40%), hot flashes (20.3%), and headaches (11.3%) (Edinoff *et al.* 2022) <sup>[21]</sup> Indicating the severity of these treatments.

In premenopausal women treated with HSSD extracts of *Tribulus terrestris* (A plant of the caltrop family, widely distributed around the world) it was observed an increase of bioavailable testosterone in serum (Although the mechanisms involved are not still elucidated) and, interestingly, some symptoms as sexual arousal, excitation/lubrication or orgasms were improved versus the control group (Vale *et al.* 2018) <sup>[22]</sup>. In another study, 89 women suffering from HSSD were administered with extract of *Melissa officinalis* (a perennial herb of the Lamiaceae family), which demonstrated an improvement in: arousal, lubrication, orgasms and satisfaction (Darvish-Mofrad-Kashani *et al.* 2018) <sup>[23]</sup>.

### **Hyperactive sexual desire dysfunction**

Hyperactive sexual desire dysfunction or hypersexuality or excessive sexual desire or high interest in sex in women, is a disorder defined as a persistent or recurrent excess of sexual desire (constant intrusive sexual fantasies and thoughts) in which a woman experiences an intense and excessive need for sexual activity and it is measured by orgasms by week (Graziottin and Brotto, 2004) <sup>[24]</sup>. This disorder is associated with substance abuse as cocaine or amphetamine; iatrogenic conditions as androgen, cortisone or L-dopa administration; organic syndromes that causes amygdala damage; clinical syndromes associated with eating disorders; and, idiopathic factors (Graziottin and Brotto, 2004; Black *et al.* 1997) <sup>[24, 25]</sup>. Antidepressants have shown to have side effects on sexual desire, mainly those with serotonergic activity, and can cause mild to severe erectile dysfunction in men due to decreased libido (Montejo *et al.* 2015) <sup>[26]</sup> but there are not reports in women. Some safer antidepressants have been directly obtained from traditional herbal medicine, such is the case of *Anacyclus pyrethrum* (a plant of the daisy family of Asteraceae also called Spanish chamomile), which has shown an increase in dopamine levels. The main compound active of this plant is andrographolide which can stimulate the production of dopamine or norepinephrine without damaging the locomotor system (Moragrega and Ríos, 2021) <sup>[27]</sup> and without alterations of libido. Another plant that is commonly used in the study of antidepressant effects, and that acts as a serotonin and dopamine stimulant is *Schinus molle* (belonging to the Anacardiaceae family, native from South America, although it was introduced to tropical areas of the world) due to the fact that it contains flavonoids which stimulates the production of serotonin and dopamine mainly (Machado *et al.* 2008) <sup>[28]</sup>. This plant can be used as a good natural option for hyperactive sexual desire dysfunction caused by depression thanks to its properties, however more studies are required.

### **Orgasmic disorders in women**

The orgasm is a sensation of pleasure caused by uterine-anal contractions that generate that sensation of well-being and venting. The female orgasmic disorder can be defined as the lack, absence or delay of orgasm during sexual intercourse; this disorder is not associated with sexual desire, factors such as age, hormonal status and relationships with the partner (Babany *et al.* 2020) <sup>[29]</sup>. With respect to pharmacotherapy, the etiology must be evaluated in each case, generally opting for the diminution of the dose of antidepressants or antipsychotics, as well as the supply of testosterone and, in some cases, bupropion (which can to increase libido a norepinephrine dopamine reuptake inhibitor which, as a side effect stimulates libido and increased paraphilic fantasies) (Yasin *et al.* 2019) <sup>[30]</sup>. There are plants such as *Mucuna pruriens* (the velvet bean, a climbing plant considered a weed,

originally from southern China) that has shown a positive effect in clinical studies on the improvement of libido and semen quality in men (Chauhan *et al.* 2014) [31], however, in women there are poor evidence of its effect on orgasms although pills of *Mucuna pruriens* are sold commercially for that purpose. Due to some safe and available plants extracts can be used for improve sexual desire, lubrication and orgasms in women, and that erotic female dance or activities (pole dance, exercise, tweaking, etc.) can release pheromones and induce attraction (Fink *et al.* 2012; Verhaeghe *et al.* 2013; Prescott and Khan, 2020) [32, 33, 34] it is possible that combination of plant extracts and dance can improve sexual dysfunction and increase self-esteem and sexual well-being and integral health.

### Sexual pain disorders: Dyspareunia

Dyspareunia is defined as genitopelvic pain during or immediately after vaginal penetration (Rosen *et al.* 2022) [118]. This condition affects 7.5% of sexually active women between the ages of 16 and 74, reaching the highest prevalence of 10.4% and 9.5%, respectively at older ages (55 to 64 years) and younger ages (16 to 24 years), (Vicente-Neira *et al.* 2022) [36].

Since dyspareunia has detrimental effects on women's health, it is of the utmost importance to investigate the contributing factors of this dysfunction and search appropriate treatments. Some physical factors that can be involved in dyspareunia are: viral and fungal infections on the skin of the vulva and vagina (Principally due to vulvodynia characterized by a cutting pain in the vulvar vestibule by a light touch) (Farmer *et al.* 2011) [37] the inappropriate use of pantyhose and tight jeans; tampons; penis size, vaginismus (vaginal muscle spasm), vaginal dryness due to menopause; chafing by narrownees with the penis in the vagina during the coitus, uterine fibroids, uterine prolapse, pelvic infection, ovarian tumors and scars from previous operations. Regarding the mental state, sometimes the patient is not prepared, is tense and not excited, or has a negative attitude towards sex due to diverse circumstances that can include misinformation, guilt, religious ideas or inclusive a past of abuse. Anyway, pain negatively affects women's relationships, mental and physical health, and general well-being; dyspareunia (also provoked by vulvodynia: a chronic vulvar pain) yet it remains undiagnosed and untreated (Falsetta *et al.* 2017) [38].

Dyspareunia can be considered one of the most common pain problems in gynecological practice and, among the treatments considered for treatment stand out applied prasterone (Dehydroepiandrosterone) (Archer *et al.* 2015) [39], combined with diagnostic skills of physiotherapy and including manual techniques (Ghaderi *et al.* 2019) [40] in which the health professional must to be empathic with the patient. Prasterone (Intravaginal) is a steroid approved by the US FDA in 2016, for the treatment of moderate to severe dyspareunia. It is administered intravaginally once daily at bedtime, does not carry a boxed warning on its label, and has no restrictions on duration of use (Archer *et al.* 2015) [39]. However, this drug is contraindicated in the presence of undiagnosed abnormal genital bleeding. Prasterone is the only pharmacological treatment that exerts estrogenic and androgenic activity in all layers of the vagina (Ghaderi *et al.* 2019) [40]. Since the administration is local, this can cause various changes in the vagina (Increased cell growth, increased perfusion, increased collagen turnover, changes in receptor expression, increased neurotransmitter synthesis, etc.), (Portman *et al.* 2019) [41]. For that reason, one of the proposals for a healthy therapy was the

implementation of phytoestrogens found in a specific plant called *Pueraria mirifica* which is a medicinal herb from Thai origin; within local folklore "facilitated the rejuvenation" of both men and women; however, its studied effects are related to the regeneration of atrophic vaginal tissue and the increase of vaginal artery circulation (Warinsiriruk *et al.* 2022) [42] which could help to treat dyspareunia.

### Sexual pain disorders: Vaginismus

Vaginismus is a little-known condition and is defined as a penetration disorder, in any form, characterized by vaginal pain, previously or during the penetration, affecting approximately 1-7% of women worldwide (Pacik, 2011) [43]. Vaginismus is both a physical and emotional disorder characterizes as an involuntary fear to feel pain. In effect, in 1997, was proposes the use of botulinum toxin (BTX) to treat vaginismus and female genitourinary dysfunction and it was concluded that BTX injection is a safe and effective treatment option for female patients suffering from various sexual and genitourinary disorders (Dick *et al.* 2021) [44].

Previously, it has been described that the application of platelet concentrated, together with the application of hyaluronic acid improves the trophicity and hydration of the vaginal mucosa in postmenopausal breast cancer survivors with vaginal atrophy, in whom hormonal therapy is contraindicated for the treatment of vaginismus (Hersant *et al.* 2018) [45]. However, hyaluronic acid injection can lead to serious complications, such as pulmonary embolism and even death (Park *et al.* 2010) [46]. Plants extracts can be used for treatment of this dysfunction like for example *Melissa officinalis*, also known as lemon balm, bee balm, and honey balm. This plant is a perennial herb of the family Lamiaceae (mint), and lemon balm (*Melissa officinalis*) and belongs to a genus that includes 5 species of perennial herbs native from Europe, Central Asia and Iran (Akhlaghi *et al.* 2011) [47]. The leaves of lemon balm are used in Iranian folk medicine for its digestive, carminative, antispasmodic, sedative, analgesic, tonic and diuretic properties, as well as for functional gastrointestinal disorders, and in Persian medicine it is used to treat lack of sexual desire because it increases lubrication, orgasm and decreases the pain (Darvish-Mofrad-Kashani *et al.* 2018; Setorki *et al.* 2013) [23, 48] so, it could be used in the treatment of vaginismus.

### Sexual pain disorders: Non-coital sexual pain disorder

Non-coital pain disorder is a sexual disorder that is poorly recognized and not well studied in depth, with inefficient treatments (In their majority assays of trials and errors) is characterized as a chronic pain that occurs outside or inside the vagina without sexual stimulation (Salonia *et al.* 2004) [49] that affects both women diagnosed and, in many cases, women that tolerate pain to please their partners. This condition is multifactorial and can be present either by an infection (Candidiasis or bacterial vaginosis), anxiety at the time of sexual intercourse, neuropathic pain due to neurogenic inflammation that leads to hypersensitivity of the primary affectants (Nocioreceptors) (Geppetti *et al.* 2008; Boardman and Stockdale, 2009) [50, 51]. This medical condition is diagnosed by means of screening questions about the painful area; whether it is permanent or acquired, intensity, location, etc. as well as medical examination to rule out other pathologies.

There are treatments ranging from anesthetic creams (lidocaine, nitroglycerin, gabapentin and capsaicin) to therapy with tricyclic antidepressants, electromyographic biofeedback,

as well as behavioral cognitive sexual therapy and therapies for pain control. However, even with topical treatments, the majority of women referred to have side effects as reactions to local dermal application (erythema, rash, burning or irritation) (Davies and Galer, 2004) <sup>[52]</sup>. Moreover, the information currently available on the use of medicinal plants for the treatment of this disorder is limited, and there are no reported studies that evaluated the effect of alternative treatments on this specific disorder. In related studies, (Mazaro-Costa *et al.* 2010) <sup>[53]</sup> suggested the use of a topical formulation of *Vitex agnus-castus*, a plant native from the Mediterranean belonging to the family Lamiaceae, in the treatment of sexual pain disorders due to its dopaminergic and opioidergic actions.

### Vaginal dryness

Particularly prevalent during and after menopause, vaginal dryness remains a sexual dysfunction underrated because the patients do not want to talk about this dysfunction (Edwards and Panay, 2016) <sup>[54]</sup>. Vaginal dryness negatively impacts in the self-esteem of the patients, in their intimacy and quality of life (Simon *et al.* 2013) <sup>[55]</sup>. Hyaluronic acid vaginal gel decreased the clinical symptoms of vaginal dryness in postmenopausal women after application of 10 doses (Chen *et al.* 2013) <sup>[56]</sup>. The plant *Curcuma xanthorrhiza Roxb* (known as *Temulawak* or *Java turmeric*, belongs to the *Zingiberaceae* family and is found in many tropical regions, mainly in Indonesia and other Southeast Asian countries such as Malaysia, Thailand, Vietnam and the Philippines) has been widely used in Indonesia as a medicinal and nutritional plant for centuries the rhizome of this plant is used in medicine for its properties in the feeding such as lack of appetite, stomach disorders, rheumatism, skin rashes and interestingly vaginal dryness, and, extracts of this plant does not increased the thickness of vaginal epithelium of mice whose thinning is related to vaginal dryness (Atmaja, 2017) <sup>[57]</sup>.

### Cancer

Approximately 19% of women receiving chemotherapy with trastuzumab or bevacizumab report sexual dysfunction, as do 9% of women post-surgery (tumor resection) and 3% post radiation therapy (Sbitti *et al.* 2011) <sup>[58]</sup>. Distress related to sexual dysfunction in women with breast cancer is extremely high (Stead, 2003) <sup>[59]</sup> therefore, maintaining sexual health and communication is extremely important to the quality of life of people with cancer.

Young women with breast cancer are more vulnerable to sexual dysfunction when chemotherapy is administered to treat breast cancer because they experience premature menopause, as libido decreases due to a drastic reduction in circulating testosterone, resulting in premature menopause and a multitude of emotional and physical changes that can lead to sexual dysfunction (Ganz *et al.* 2003) <sup>[60]</sup>, such as increased body temperature, hot flashes, weight gain, fatigue, vaginal dryness, atrophy and dyspareunia (Wilmoth *et al.* 2004) <sup>[61]</sup>.

### Other diseases

Psychiatric illnesses are related to sexual disorders, such as depression, since sexual desire can be affected by antidepressants and antipsychotics, since these are also associated with decreased libido and low sexual activity. In women, these disorders in sexual life can be reflected as vaginal dryness, vaginismus and/or dyspareunia while in men it can be reflected as the inability to maintain an erection,

delayed orgasm, low level of sexual pleasure and dissatisfaction (Piontek *et al.* 2019) <sup>[62]</sup>. Another disease that causes sexual dysfunction and which is not commonly discussed is diabetes, which has effects due to cardio metabolic alterations. Diabetes mellitus affects principally sexual life in women with respect to arousal, lubrication and orgasm and mechanism are mediated by the inhibition of nitric oxide/cGMP (NO/cGMP) which regulates vaginal lubrication also, by the alteration of genital neurovascular mechanisms responsible to control vaginal and clitoral blood vessel congestion, between other mechanism which also induce hypoactive sexual desire disorder in women (Di Stasi *et al.* 2022) <sup>[63]</sup>. Treatments for sexual dysfunction in women includes low dose vaginal estrogen, intravaginal dehydroepiandrosterone, systemic hormone therapy or the use of lubricants and moisturizers.

### Sexual men dysfunction and plants used to improve symptoms

Sexual men dysfunction (premature, retrograde, delayed or inhibited ejaculation, erectile dysfunction, orgasmic and stimulation disorders) is a set of widespread problems that currently includes two broad areas difficulty in sexual intercourse and inability to conceive (Starc *et al.* 2019) <sup>[64]</sup>. Premature ejaculation is one of the most common and studied erectile dysfunction problems in many countries, and can be defined as hasty ejaculation and the inability of men to achieve one in a sexual relationship that lasts more than 3 minutes. This inability can cause adverse problems, such as increased sexual stress, low self-esteem and problems in interpersonal relationships. There are alternative treatments for premature ejaculation as tramadol, topical anesthetic agents or serotonergic antidepressants, these can be pharmaceutical, psychological, or natural, but none have been fully studied (Chung *et al.* 2015) <sup>[65]</sup> and all the adverse effects that they may have not been completely elucidated.

### Erectile dysfunction

Erectile dysfunction (ED) can be defined occasionally or habitually, as the inability to have and/or maintain a strong and long-lasting erection of the penis for a satisfactory sexual intercourse. It has been seen that this complication increases with age and some diseases, being present in 40% of men who are in the range of 40 to 70 years of age (Argiolas *et al.* 2023) <sup>[66]</sup>. Some plants extracts are known to have positive effects against erectile dysfunction, beginning with *Lepidium meyenii* (an herbaceous plant native from Peru), because its phytosterols or phytoestrogens can improve ED (Zenico *et al.* 2009) <sup>[67]</sup>. *Eurycoma longifolia* (a woody plant, native from Indonesia) helps with erectile function by increasing testosterone levels by different mechanisms including a) stimulating the release of LH by the pituitary, inducing a massive secretion of testosterone by Leydig cells; b) enhancing the action of e17 and CYP450C17 enzymes for promotion of generation of dehydroepiandrosterone and testosterone and, c) inhibiting aromatase and therefore the conversion of testosterone to estradiol or estrone (Leitão *et al.* 2021) <sup>[68]</sup>. *Anacyclus pyrethrum* (a plant of the Asteraceae family, native from Mediterranean), its extracts showed a significant increase in the erections of rats; *Alpinia calcarata Roscoe* (perennial herb cultivated in tropical countries). The experimentation with the extract of this plant showed very positive effects, increasing libido, ejaculation latency, greater vigor, and sexual performance; *Arctium lappa L* (spermatophyte plant of the Arctium genus, native from

Europe and Asia), the intake of the extract induced a greater response of penile reflexes due to the presence of alkaloids, flavonoids, saponins and lignans; *Chione venosa Sw.* (a plant that belongs to a monotypic genus of the Rubiaceae family and is one of the only species that is distributed in the neotropics), increased penile erection, ejaculation and mount frequency in male rats (Chen *et al.* 2019)<sup>[69]</sup>.

### Priapism

Priapism is a prolonged erection of the penis, which can last 4 hours or more (Moussa *et al.* 2022)<sup>[70]</sup>. There are 2 types of physiological priapism, one of them is related to previous traumas or injuries, for example, ischemic priapism, is the most recurrent and is associated with sickle cells, while non-ischemic priapism is associated with some perineal trauma (Carnicelli and Akakpo, 2018)<sup>[71]</sup>. Existing treatments depend on the type of priapism that is diagnosed, the least aggressive treatment is to extract blood from the cavernous bodies of the penis to inject drugs depending on the diseases that the patient may present, for example, epinephrine, norepinephrine, with xylocaine and phenylephrine. Another recurring treatment is angiographic embolization, which is usually accomplished with a combination of gel foam, metal coils, or autologous clot. When this treatment does not work, it is even possible to resort to surgical ligation (Bochinski *et al.* 2003)<sup>[72]</sup>. In a scheme of management of priapism, some authors indicated the use of diluted phenylephrine until the penis has detumesced or until 60 minutes (Kovac *et al.* 2013)<sup>[73]</sup>, however, in patients with heart disease and hypertension, vital signals must to be constantly monitored. Because phenylephrine it is used to alleviate hemorrhoids due to its ability to constriction of vascular smooth muscle, analogs of plant extracts with these properties can be used in the treatment of priapism.

### Peyronie's disease

Peyronie's disease (PD) is a benign condition distinguished by a penile anomaly which arises from fibrosis in the tunica albuginea where excess collagen is deposited, causing a palpable scar resulting in: penile curvatures, pain, deformity, discomfort, erectile dysfunction, and psychosocial and emotional problems (Chung *et al.* 2020)<sup>[74]</sup> to the one who suffers from it; it is a condition that affects between 5 to 10% of men (Gaffney and Kashanian, 2020)<sup>[75]</sup>. The measurement of the curvature of the erect penis allows us to know the type of treatment to which the patient can be candidate (Chen *et al.* 2018)<sup>[76]</sup>. Extracts of *Scutellaria baicalensis* (family of Lamiaceae) showed disease stabilization on symptoms of acute phase (penile plaques, erectile pain and/or penile curvature) and allowed latter surgical correction (Li *et al.* 2021)<sup>[77]</sup>. In addition, current pharmacological treatment options to treatment of PD (verapamil, diclofenac) can be potentiated with natural compounds (vitamin E, blueberries, propolis) inducing reduction of penile plaque size and curvature (Paulis *et al.* 2012)<sup>[78]</sup>.

### Premature ejaculation

Premature ejaculation is the inability to delay or control ejaculation; affects to up to 30% of all men (Parnham and Serefoglu, 2016)<sup>[79]</sup> and is referred to an unit of time called intravaginal ejaculatory latency time (IELT) which indicate the time from the vaginal penetration to ejaculation; therefore, an IELT of minus than 1 minute is named lifelong premature ejaculation and a IELT of minus than 3 minutes is an acquired premature ejaculation (Chung *et al.* 2015)<sup>[65]</sup> Pathophysiology

of premature ejaculation includes the genetic alterations in receptors of serotonin as 5-hydroxy-L-tryptophan (5-HT) and its receptors; on the other, hand acquired premature ejaculation is associated with prostatitis and hyperthyroidism (Maggi *et al.* 2013)<sup>[80]</sup>. Management of premature ejaculation includes topical anaesthetic aerosols, creams which are applied directly in the glans and contains principally lignocaine other drugs include: Dapoxetine, paqroxetine, fluoxetine, sertraline, clomipramine, tramadol, phosphodiesterase-5 inhibitors, serotonergic antidepressants, however, most of them causes side effects as nausea, diarrhoea, headache, somnolence, etc., (Chung *et al.* 2015)<sup>[65]</sup>. Some plants extracts have shown effects on ejaculation latency in animal models. This is the case of the hydroalcoholic extract of *Satureja montana* (a plant known as winter or mountain savory belonging to the family Lamiaceae, native from southern Europe) whose principal component was rosmarinic acid and was administered daily by oral gavage, during 8 consecutive days (25 and 50 mg/Kg) founding an increase in the ejaculatory latency of male rats (Zavatti *et al.* 2011)<sup>[81]</sup>, probably due to the activation of post-synaptic 5-HT receptors involved in the rise of this latency (Ahlenius and Larsson, 1997)<sup>[82]</sup> or other mechanism unknown.

### Delayed ejaculation

Delayed ejaculation is defined as the inability or delay of ejaculation during a sexual relationship and also is used the time reference (as in premature ejaculation) of the intravaginal ejaculation latency time (IELT) of 20-25 minutes or when the patients indicating the following: a) inability to decide ejaculate intravaginally in approximately 10 minutes; b) desiring ejaculate sooner and not achieve it; c) feel frustration, bother, distress and avoid intercourse (Perelman, 2017; Abdel-Hamid and Ali, 2018)<sup>[83,84]</sup>. Delayed ejaculation can occur during self-masturbation or during vaginal or anal penetration by a partner and inclusive during oral sex. There are different treatments for this condition such as psychotherapy that would include analysis of the possible originating causes and psychosexual therapy and sex education; the use of medicines depends of the medical story of the patient and includes testosterone, cabergoline, bupropion, amantadine, among others. Most of them cause different adverse effects as systemic and psychological effects (pain, depression, anxiety, nausea, headache, etc.). Another disadvantage is that these drugs do not assure normal ejaculation and give partial results (Abdel-Hamid and Ali, 2018)<sup>[84]</sup>. Then, plants with aphrodisiac properties may be useful for the treatment of this sexual disorder. This is the case of *Piper auritum* (a member of the family Piperaceae, native from Mesoamerica), the use of the aqueous extract of this plant showed prosexual effects and improves ejaculatory function related with their activating properties of the neurotransmitter systems and modifying the 5-HT system within the brain, related with sexual motivation (Estrada-Reyes *et al.* 2019)<sup>[85]</sup>.

### Hyperactive sexual desire disorder

This is a disorder that includes compulsive, impulsive and addictive behavior (Stein, 2008)<sup>[86]</sup>. This disorder is also known as "hypersexuality" and has been defined as the inability to regulate sexual desire, that is, an inability to contain the desire for a sexual relationship, this can cause mainly anguish to the people who suffer from it and cause problems at work, school, family or even legally (Walton *et al.* 2017)<sup>[87]</sup>. The problem of hyperactive sexual disorder is

not yet defined as a pathology, since much research and studies are still needed to define it as such; however, recent studies has shown that the inability to control sexual desire can cause sufferers to engage in illegal acts such as sexual, psychological or emotional abuse, and there is still no specific treatment for this condition, in most cases it is treated with psychotherapy (Knight and Du, 2021)<sup>[88]</sup>.

### Hypoactive sexual desire disorder

Hypoactive sexual desire disorder in men is a sexual dysfunction that involves lack or absence of sexual fantasies or desire of an intercourse (do not confuse with erectile dysfunction) and can be correlated with age, disease or hormonal status (testosterone and prolactin) (Brotto, 2010)<sup>[89]</sup> and psychiatric conditions such as depression (Corona and Maggi, 2022)<sup>[90]</sup>. The management of this disorder is based in psychotherapy, sex education and sex therapy, that can be accompanied with pharmacotherapy (Beck, 1995)<sup>[91]</sup> or androgen replacement therapy (Blanco *et al.* 2016)<sup>[92]</sup>; but there is no specific psychological treatment for this condition (Beck, 1995)<sup>[91]</sup>. Even though the use of medicinal plants is not reported for the management of this specific disorder, some of them have been found to possess properties to boost sexual desire and, thus they can be used for the treatment of hypoactive sexual desire disorder. This is the case of *Myristica fragrans* Houtt. (Nutmeg, member of the family Myristicaceae and native from Maluku Islands in Indonesia) which its seed has been reported to have aphrodisiac effects and it has been used in male sexual disorders in traditional medicine. An investigation shows that the ethanolic extract of this plant could increase sexual activity, sexual desire (libido) and potency in normal male rats, most likely due to its nervous stimulating properties (Tajuddin *et al.* 2005)<sup>[93]</sup>.

### Field information

The Medicinal Herbarium of the Mexican Social Security Institute (IMSS according to its acronym in Spanish) collects around 16,000 copies and 2,000 species of medicinal plants used by traditional Mexican medicine for an ample variety of conditions (Figure 3), of which two of them are described for the treatment of some symptom related to sexual disorders: *Vinca rosea* var. *alba* commonly known as “Vicaria blanca” (Apocynaceae family) it is used in Valladolid, Yucatan for “vaginal discharge” (it is not specified in what aspect), and *Turnera diffusa* (Turneraceae family) used as an aphrodisiac in Ocozocoatlá, Chiapas. The described plants in this herbarium are not indicated for their specific use in the treatment of any sexual disorder, this may be the result of social taboo around sexual issues. Thus, some plants that have shown properties for the treatment of sexual disorders or as aphrodisiacs are not documented or popularly known for such purposes in Mexico, according to the information collected by the IMSS Medicinal Herbarium; this is the case of *Schinus molle*, *Zingiber officinale*, *Montanoa tomentosa* and *Tagetes erecta* (Aguilar *et al.* 1994)<sup>[94]</sup>. In our country, there must be communities or people who currently use extracts of native or introduced plants with potential uses for sexual recreation or in the treatment of sexual dysfunction and infertility (problems of male or female infertility, frigidity, erectile dysfunction, premature ejaculation and birth control). However, there is almost no information regarding the above. Therefore, document this information directly with the people who go to traditional markets in Mexico, in the search of such plants, is required to have this information for later use. In an unpublished field pilot study of ours, an *in-situ* questionnaire

was carried out to find out the current state, in the voice of the inhabitants, on the use of these plants on markets in Mexico City and Puebla (Figure 4). Direct questions about whether the persons use this plant for the purpose of sexual stimulation was denied or not answered. However, its use as an abortifacient or as a fertilization inductor was completed reported by the users of this traditional markets. In addition, different plants are used by the general population as *Tribulus terrestris*, zarzaparilla, damiana, cihuapatli, zoapatli, yohimbe, Equisetum, maca, although its use on any sexual dysfunction is a hermetic subject which the inhabitants do not dare to speak openly.

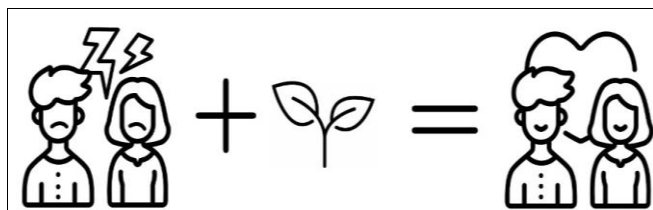
### Conclusion

Safer and ubiquitous treatments against sexual dysfunction based in plants can be used broadly for the increase in the quality of life of many persons around the world. Eroticisms and health, good nutrition and the relief in sexual dysfunctions can be achieved systematically with the use of plants or plants and pharmacotherapy in order to diminish the side effects of drugs currently used.

Eroticism is an essential part of human nature; love can arise from eroticism. Love can be preserved by the benefits that the earth gives us through its plants. Plants have always brought happiness to the inhabitants of this planet.

<b>Female sexual dysfunction</b>
Hypoactive sexual desire disorder
Hyperactive sexual desire disorder
Female sexual arousal disorders
Orgasmic disorders
Sexual pain disorders
Dyspareunia
Vaginismus
Non-coital sexual pain disorder
Vaginal dryness
<b>Male sexual dysfunction</b>
Erectile dysfunction
Priapism
Peyronie’s disease
Ejaculatory disorders
Premature ejaculation
Delayed ejaculation
Hypoactive sexual desire disorder
Hyperactive sexual desire disorder

**Fig 1:** Sexual dysfunction in women and men.



**Fig 2:** Sexual well-being, self-esteem and an integral general health can be achieved with plants used from ancestral customs.



**Fig 3:** The Medicinal Herbarium of the Mexican Social Security Institute (IMSS) in Mexico City. Specimens of damiana are shown with the label of use for the “depression”.



**Fig 4:** Traditional plants offered in markets of Mexico City and Puebla, Mexico.

#### Conflict of interest

The authors report no conflict of interest.

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