

## Natural Aphrodisiacs—A Review of Selected Sexual Enhancers

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### ABSTRACT

**Introduction.** The Food and Drug Administration defines an aphrodisiac drug product as “any product that bears labeling claims that it will arouse or increase sexual desire, or that it will improve sexual performance.” Presently, there are no approved medications for the treatment of lowered desire for women, and many opt for “natural” products.

**Aim.** The aim of this article was to review the most popular and currently used aphrodisiac products marketed in the United States. The safety and efficacy of animal- and plant-based aphrodisiacs, vitamins and minerals, and popular over-the-counter combination supplements have been reviewed.

**Methods.** An English PubMed literature search was performed using the key words “sexuality,” “sex,” “aphrodisiac,” and “sexual enhancer.” Approximately 50 articles were reviewed by the authors. The authors used relevant case series, case-controlled, and randomized clinical trial data.

**Main Outcome Measures.** Products were evaluated based on the quality of research, and their known efficacy and safety considerations. Products with low risk and potential benefit for sexual response based on prior research studies were highlighted.

**Results.** Research has demonstrated that the risks of yohimbine, Spanish fly, mad honey, and Bufo toad may outweigh any benefit, and these products should be avoided. Other products, such as Maca, Tribulus, Ginkgo, and ginseng, have limited but emerging data. Randomized clinical trial data are often lacking, but future research should be performed to further elucidate the efficacy and safety of these products.

**Conclusion.** Future randomized clinical trials are warranted before health care practitioners can recommend most aphrodisiac products. There remain some medical concerns with drug interactions, purity, reliability, and safety.  
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**Key Words.** Natural Aphrodisiacs; Sexual Enhancers

### Introduction

For centuries, man has searched for the secret to sexual satisfaction. Nearly every ancient civilization touted the benefit of a different herb or food for sexual vitality, enhancement, or desire. In the age of modern medicine, pharmaceuticals such as phosphodiesterase type 5 inhibitors and testosterone tablets gels and implantable pellets are designed to address similar sexually related problems. Yet, with so much pharmaceutical

advancement, there is presently no medically approved treatment for women, and thus it is not surprising that so many patients still look to the herbal world for a solution. Additionally, patients often seek natural aphrodisiacs because they are perceived as “organic,” “wholesome,” and possibly as safer options. Especially with the advent of the online marketplace, patients now have access to a seemingly endless array of products from across the world. These products can be purchased in the privacy of one’s home, which circumvents the need

for a patient to approach his/her physician about the sensitive subject of sexual dysfunction. Unfortunately, the Food and Drug Administration (FDA) does not regulate the production of herbs and supplements, nor are the purveyors of these products under regulation. Little is known about the content, consistency, and reliability of specific products that can be purchased online and in health food stores without a medical prescription unless a product is Informed-Choice certified, which is 100% guaranteed to contain exactly what is on the label, in the quantities listed, without any fillers or contaminants and are tested and verified to be effective and not damaged by heat, humidity or light. With self-medication and self-prescription of supplements more popular than ever before, it is critical that health care practitioners inquire and understand the risks and benefits of such products.

The FDA defines an aphrodisiac drug product as “any product that bears labeling claims that it will arouse or increase sexual desire, or that it will improve sexual performance” [1]. The most common concerns female patients aim to improve with supplements are disorders of sexual arousal and orgasm. This article aims to review a selection of the most popular natural aphrodisiac products marketed in the United States and worldwide. The safety and efficacy of animal- and plant-based aphrodisiacs, vitamins and minerals, and popular over-the-counter combination supplements will be reviewed.

## Methods

A review of available literature was conducted using PubMed.gov using key search criteria, such as “aphrodisiac,” “natural supplement,” “sexual enhancers,” “complementary medicine,” “herbal,” and “sexual stimulant.” Fifty articles were identified. Articles were reviewed that matched criteria and provided evidence-based review of the supplements included. The choice of supplements reviewed in this article was selected based on the quality of available literature. Supplements studied by randomized control trials (RCTs) were included, as were products with well-studied mechanisms of action. In addition, a selection of popular supplements was included as these supplements are commonly used by the public, and their inclusion in the review was thought to benefit interested practitioners. Specific supplements were excluded if they were rarely used in the United States, and there were no available data to substantiate their use.

## Animal-Based Aphrodisiacs

### Bufo Toad

The Bufo genus of toads can be found throughout the world, and their skin and venom contain a psychoactive toxin, bufotenin, which has serotonin-like activity. Oral ingestion and topical application of the venom have long been used as a hallucinogen, street drug, and in the Chinese aphrodisiac, *chan'su*, and the West Indian aphrodisiac, *love stone* [1]. There have been several reported cases of poisoning and at least one death after ingestion of Bufo toad [2]. The FDA has banned Bufo toad consumption due to its potential lethality.

### Honey

Honey is a popular aphrodisiac used for centuries to bring romance into marriages. The term “honeymoon” is said to have come from the tradition of newlyweds drinking mead, a fermented honey beverage, until the first new moon of their marriage. While there are no RCTs to support its aphrodisiac properties, there is one variety of honey famed for its alleged sexual stimulation. Honey made from the nectar of *Rhododendron ponticum* is termed “mad honey” and contains grayanotoxin. “Mad honey” is marketed as a sexual stimulant for both men and women, and is produced mainly in the Black Sea region of Turkey. Grayanotoxin binds and activates neural sodium ion channels, leading to continuous vagal stimulation. Low doses of grayanotoxin cause hypotension and bradycardia, while high doses cause syncope, atrioventricular block, and asystole [3]. There is a case report in the scientific literature of a married couple both suffering from myocardial infarctions within hours of ingesting the product [4]. While standard honey is safe for consumption, there are no data to support its use as an aphrodisiac. “Mad honey” is a potentially lethal toxin and should be avoided.

### Oysters

Because the goddess Aphrodite was said to be born from the sea, many types of seafood have legendary aphrodisiac properties—the most famous of which is the oyster. Casanova was said to consume 50 oysters per day in order to boost his sexual virility and stamina. Oysters contain zinc, an essential nutrient for testosterone production and spermatogenesis. In addition, it is thought that oysters contain specific amino acids and serotonin, which are integral in the neural pathway of the pleasure response. However, there are no RCT

data to confirm that oysters have any beneficial effects on sexual responsiveness or satisfaction.

#### Rhinoceros Horn

Poachers have brought rhinoceros to the edge of extinction because of the legendary horn. For centuries, the horn has been used for sculptural carvings and ground into a fine powder for its proposed healing and sexual properties. The similarity of the shape of the rhinoceros horn to the penis is credited for its worldwide reputation as an aphrodisiac. In Asia, the rhinoceros horn is so coveted that a horn sells for \$30,000 [5]. Comprised mostly of keratin, the horn contains calcium and phosphorus—the same components of hair, fingernails, and animal hooves. Thus, there is no component of the horn that has any inherent aphrodisiac property, and no data exist to support its use.

#### Spanish Fly

Spanish fly, or cantharides, is derived from dried beetle remains and is legendary for its sexual-enhancing properties. Consumption, however, can be lethal. Spanish fly inhibits phosphodiesterase and protein phosphatase and stimulates beta-receptors. The result is vascular congestion of the sex organs and inflammation of the urogenital tract [6]. However, the toxin can burn the mouth and throat, and can lead to genitourinary infections, hematuria, and scarring of the urethra. Excess consumption also causes renal failure, gastrointestinal hemorrhage, and death [7,8]. The ingestion of live beetles (*Palembus dermestoides*) in Southeast Asia and triatomids in Mexico may have a similar mechanism of action and should also be avoided.

#### Plant-Based Aphrodisiacs

##### Chasteberry

Chasteberry, or *Vitex agnus-castus*, is derived from the fruit of the chaste tree, and has been used since the time of Hippocrates [9] for dysmenorrhea and menopausal symptoms [10]. Chasteberry is thought to indirectly affect prolactin and progesterone levels. At low doses, the berry decreases estrogen levels and increases progesterone and prolactin levels, possibly through inhibition of follicle-stimulating hormone (FSH) and stimulation of luteinizing hormone (LH). Higher doses of chasteberry will lower prolactin levels and do not change FSH and LH [11]. Clinical studies in women suggest the berry is effective at reducing symptoms of premenstrual syndrome and cyclical

breast discomfort, but there is no evidence to prove its effectiveness for sexual complaints [12]. Because chasteberry has hormonal activity, it may interact with oral contraceptives and other hormonal therapy, as well as dopamine antagonists (i.e., haloperidol, prochlorperazine) [13,14]. Reported adverse effects include nausea, rash, headache, and agitation [15]. With no evidence to suggest benefit to sexual desire, this berry is not recommended for use as a sexual enhancer.

##### Chocolate (Cacao)

Famed for its association with romance and seduction, the Aztecs referred to chocolate as “nourishment of the Gods.” According to legend, the emperor Montezuma would drink chocolate to bolster his virility before visiting his harem of wives [16]. Chocolate contains biogenic amines tyramine and phenylethylamine, methylxanthines, and cannabinoid-like fatty acids, which are proposed to give chocolate its aphrodisiac abilities [17] and are linked to increased serotonin levels in the brain [18]. However, researchers have found no supportive evidence. After controlling for age, Salonia et al. found no difference in sexual function between chocolate consumers vs. non-consumers as measured by the Female Sexual Function Index (FSFI) [19]. Thus, while it is tempting that chocolate may have some positive effects on sexual function, the myth is not supported in the existing medical literature.

##### Damiana (*Turnera diffusa*)

Damiana is an extract from a shrub found in Mexico. It is used for medical problems such as diabetes, anxiety, and as a sexual performance enhancer for both men and women. The extract contains compounds such as apigenin 7-glucoside and Z-echinacin, which have estrogenic activity [20]. While clinical trials have not been conducted to evaluate its safety and efficacy in humans, there have also been animal studies demonstrating that Damiana restores copulation ability in sexually exhausted rats [21,22]. These studies are promising, but there are too few data to recommend its use in humans for the treatment of sexual problems. Despite this, Damiana is an ingredient in ArginMax, a botanical formula marketed for the treatment of sexual dysfunction in women.

##### Fenugreek

Fenugreek, or *Trigonella foenum-graecum*, has long been used in Ayurvedic medicine as an anti-inflammatory, a galactagogue, and for libido. The

herb contains steroidal saponins that serve as hormonal precursors to estrogen and testosterone. There has been limited research on its use for enhancement of libido in men without erectile dysfunction. One small, double-blind, placebo-controlled study demonstrated fenugreek supplements increased male sexual arousal and orgasm, while testosterone levels remained within reference range [23]. In addition, new data that will be published in 2015 by Rao et al. showed in an RCT that 300 mg BID of fenugreek is able to improve sexual function (arousal, lubrication, satisfaction) in premenopausal women, as measured by the FSFI. The fenugreek users showed increased levels of estradiol and testosterone; however, both hormones remained within the reference range [24]. Due to its estrogenic properties, fenugreek has been shown to stimulate breast cancer cells in vitro, and thus should not be used in patients with hormonally active cancers [25,26]. Fenugreek is generally well tolerated and can cause minor gastrointestinal side effects. However, it may interact with anticoagulants and should not be used in patients on warfarin [27].

#### *Ginkgo biloba*

Extract of *Ginkgo biloba*, which comes from the world's oldest species of tree, has been used in traditional Chinese medicine to treat a multitude of ailments, including depression and sexual dysfunction. With regard to sexual dysfunction, it is thought that Ginkgo causes release of endothelium-derived relaxing factor and prostacyclin, with resultant vasodilatation [28]. Additionally, Ginkgo modulates the nitric oxide (NO) pathway, causing vascular relaxation and increased blood flow to peripheral tissues [29–31]. One small but promising study showed significant improvement in sexual dysfunction in both men and women suffering from selective serotonin reuptake inhibitor (SSRI)-associated sexual dysfunction [32]; however, a follow-up RCT did not show any statistically significant benefit [33]. While Ginkgo is generally well tolerated, it can cause significant bleeding risks, especially if taken with anticoagulant medication. Ginkgo should be discontinued preoperatively and should not be used by patients with bleeding disorders. Ginkgo can have additive anticoagulant/antiplatelet effects and thus should be used with caution with nonsteroidal anti-inflammatory drugs [34].

#### Ginseng

Ginseng is a popular herb used for athletic performance, cancer prevention, and male sexual

enhancement. Korean red ginseng, which is harvested, steamed, and dried from a 6-year-old tree, is widely known for its benefits in erectile dysfunction. The proposed mechanism of action is through NO release from the smooth muscle of the corpus cavernosum [35]. There have been seven double-blind, placebo-controlled studies comparing ginseng to placebo for treatment of erectile dysfunction—review of these studies showed overall effectiveness of ginseng [36]. However, the studies differ in their dosage of ginseng and the type of placebo product used. While studies in women are more limited, there has been research to show Korean red ginseng improves sexual arousal in menopausal women. The proposed mechanism is smooth muscle relaxation on the clitoral cavernosal muscle and vaginal walls [37]. Overall, ginseng is well tolerated and causes minor gastrointestinal side effects. It can, however, interfere with anticoagulant medication and should be discontinued 1 week before surgery. Ginseng was shown to have estrogenic effects and thus should be avoided in those with hormone-sensitive cancers [38]. The optimal therapeutic dose has not been established.

#### Horny Goat Weed (*Epimedium*)

Horny goat weed, or epimedium, is an herb used in traditional Chinese medicine to treat fatigue, joint pain, and erectile dysfunction. The herb contains the active moiety icariin, which increases aromatase expression and estrogen biosynthesis [39]. Additionally, in vitro studies have demonstrated the herb is an inhibitor of phosphodiesterase-5, which supports its proposed efficacy for erectile dysfunction [40,41]. Despite these promising properties, there have been no large human trials to substantiate the use of epimedium for sexual dysfunction [42]. In addition, side effects, dosing, and toxicity have not been established [43].

#### Maca (*Lepidium meyenii*)

Maca is an Andean root vegetable used for fertility, sexual arousal, and the relief of hot flashes [44]. The herb has been given to Peruvian domestic animals since the precolonial era to increase breeding. Research in rodents has shown that maca effectively enhanced libido and improved erectile function after supplementation [45]. Human studies have shown promising results as well. There have been four well-designed RCTs looking at male and female sexual response using maca—three of those trials showed a positive

effect on sexual dysfunction in healthy menopausal women, healthy adult men, and men with erectile dysfunction. One trial did not show any positive benefit [46]. In addition, there has been one small study that showed maca benefits patients with SSRI-related low libido, and revealed a dose-related response [47]. Study doses ranged from 1.5 to 3 g/day. While the mechanism of action is not fully elucidated, maca contains phytosterols and phytoestrogens, which are thought to play a role. However, maca has not been found to directly alter estrogen or testosterone levels [48]. Maca is well tolerated and there are few side effects. However, more research is needed to determine the therapeutic dose and toxicity.

#### Potency Wood (Muiru Puama)

Potency wood is a Brazilian herb used for erectile dysfunction and low libido. The mechanism of action is unknown. There are few clinical studies on the efficacy of the herb. For instance, one small study looked at sexual satisfaction scores of pre- and postmenopausal women with low libido who were given a combination supplement containing potency wood and *Ginkgo biloba*. The study showed 65% of participants had a small but significant improvement in sexual satisfaction scores after supplementation. However, this study was small and lacked a control group [49]. Given the paucity of data, further research is needed before any clinical recommendations can be suggested [1].

#### Saw Palmetto

Saw palmetto, derived from the berry of a North American plant, has long been used in men's health for treatment of urinary tract problems and benign prostatic hyperplasia. Additionally, the extract has also been used to enhance male and female libido, although there are no studies to support its use. The proposed mechanism of action is through inhibition of 5-alpha-reductase, blocking conversion of testosterone to dihydrotestosterone, and through relaxation of lower urinary tract smooth muscle via antagonism of muscarinic receptors [50]. Given its anti-androgenic properties, saw palmetto should decrease libido, not enhance it [51]. Saw palmetto has been proven efficacious in the treatment of benign prostatic hyperplasia, but there are no studies to support the use of saw palmetto for sexual dysfunction.

#### *Tribulus terrestris*

*Tribulus terrestris* is an herb that grows in Asia, Europe, and Africa. Used for a variety of medical

ailments, it has most recently been marketed for enhancement of athletic performance, infertility, and libido. The herb has been found to have anti-inflammatory properties through COX-2 inhibition, and contains the active compound, protodioscin, which is converted to dehydroepiandrosterone (DHEA) [52]. A rodent study showed increased sperm production after *Tribulus* supplementation [53]. In a study of Brazilian females with sexual dysfunction, 90 days of supplementation with 250 mg of *Tribulus* caused a statistically significant increase in DHEA and increased sexual satisfaction scores on the FSFI [54]. Another randomized, double-blind, placebo-controlled trial assessed 7.5 mg/day of *Tribulus* in women with hypoactive sexual desire disorder and showed improved scores on the FSFI as well [55]. The herb was well tolerated and caused only minor gastrointestinal side effects. Optimal dosing has not been established.

#### Wild Yam

Extract of wild yams is purported to ease menopausal symptoms and augment sexual arousal in menopausal women. The extract, made into a cream and applied topically, contains the steroidal saponin diosgenin, which is thought to increase endogenous steroidogenesis [56]. One double-blind, placebo-controlled study of yam extract showed no significant impact on steroid hormones, and participants reported no significant improvement in menopausal symptoms in comparison to placebo [57]. Some wild yam creams claim to contain a natural source of progesterone; however, many of these products have been artificially augmented with synthetic progesterone during production [58]. The American College of Obstetricians and Gynecologists warns that the progesterone added to yam preparations is not bioavailable to humans, and thus any benefit the progesterone may have conferred, such as protection against endometrial cancer, is impeded [59]. There is no evidence of its efficacy in alleviating sexual dysfunction or menopausal symptoms, and thus this extract is not recommended.

#### Yohimbine

Yohimbine is derived from the bark and roots of an African evergreen plant. Yohimbine antagonizes the presynaptic alpha-2-adrenergic receptor, causing increased cholinergic and decreased adrenergic tone. The extract has long been used as an aphrodisiac and as treatment for psychogenic erectile dysfunction [60]. However, there are many

serious safety concerns and contraindications with this herb. Because yohimbine causes central adrenergic stimulation, side effects include hypertension, tachycardia, bronchospasm, palpitations, insomnia, anxiety, mania, shivering, sweating, nausea, flushing, and headaches [40]. The U.S. National Institute of Health cautions consumers about taking yohimbine if they suffer from schizophrenia, anxiety, depression, or posttraumatic stress disorder. Additionally, patients using monoamine oxidase inhibitors should not use yohimbine as the effects may be additive [61]. Due to the severe side effects and safer alternatives, yohimbine is not recommended.

### Vitamins and Minerals

While many essential vitamins and minerals, including vitamin B<sub>6</sub> and B<sub>12</sub>, vitamin D, vitamin E, magnesium, and zinc, are involved with hormone synthesis and sperm production, there are no human data to suggest that high-dose supplementation with any of these nutrients enhances sexual libido. Vitamin B<sub>6</sub> is needed for estrogen, testosterone, and neurotransmitter production. Vitamin B<sub>12</sub> is critical for DNA synthesis, energy metabolism, and proper nervous system response. Vitamin E is an antioxidant with vasodilatory properties that allows adequate blood supply to the sex organs. Magnesium is involved in sex hormone and neurotransmitter production. Zinc is essential for testicular development, testosterone production, and spermatogenesis. However, there is a paucity of data regarding effects of vitamin and mineral supplementation on sexual response. For example, one rodent study was able to show that zinc supplementation increased testosterone levels and certain measurable parameters of sexual response, such as penile thrusting and prolonging ejaculatory latency. However, the same study also showed an increase in prolactin levels after the zinc supplementation, which caused increased sedation and decreased libido [62]. While there is some research to support that vitamins and minerals are essential to normal sexual function, further RCTs are needed to determine if there is any benefit of supplementation for the purposes of libido enhancement.

### Selected Combination Products

#### Alura

Alura, previously sold under the name Viacreme, is a topical product applied to the vulva. It is marketed as a soft-tissue stimulant, which creates a

cooling sensation to enhance satisfaction. The product contains L-arginine and menthol. The L-arginine is converted to NO by NO synthase, which leads to vasodilation of the genital tissues. Menthol may facilitate absorption of L-arginine and cause increased vaginal lubrication [63]. There are no published data to confirm the efficacy of this product. The most common side effect is vaginal burning.

### ArginMax for Men and ArginMax for Women

ArginMax is a combination supplement containing an array of vitamins marketed toward women (A, B-complex, C, E), zinc, as well as L-arginine, Korean ginseng, Ginkgo, and Damiana leaf. The proposed mechanism of action is through enhancement of the NO pathway. L-arginine is a precursor of NO, which causes central to smooth muscle relaxation, vascular dilatation, and vaginal wall engorgement. One small double-blind, placebo-controlled study of 108 women showed improvement in sexual desire (70.6% in the ArginMax group vs. 41.9% in the placebo group), improved sex life satisfaction (73.5% in the ArginMax group vs. 37.2% in the placebo group), and increase in frequency of intercourse. In this study, the treatment group experienced increased lubrication, clitoral sensitivity, orgasm frequency, and sexual desire [64]. A follow-up study on ArginMax showed that the supplement had no estrogenic activity and thus its augmentation of vaginal blood flow was not from hormonal stimulation [65]. There has also been one small study to show ArginMax for Men improves erectile dysfunction, also through the NO pathway [66].

### Stronvivo

Stronvivo [67] is an Informed Choice certified nutritional supplement, composed of USP-verified, pharmaceutical grade ingredients, that was designed with the intention to improve the health of the endothelium, stimulate the production of nitric oxide, enhance circulation, boost energy, and with the intention to help inhibit platelet aggregation or adherence. The open label trial consisted of 60 adults (male = 51, female = 9), ages 30–84, with BMI 21–56. The patients were administered 6 capsules of Stronvivo daily for 90 days (which equaled a total daily intake of: 2,000 mg of L-arginine, 1,000 mg of L-citrulline, 1,000 mg of L-carnitine, 30 mg of zinc, and 400 mg of magnesium). This exploratory and preliminary study was intended to examine the effect

of Stronvivo supplementation on various subjective ratings of sexual functioning. Patients were assessed at four time points: baseline 30-day follow-up, 60-day follow-up and 90-day follow-up. The study measurements included: FSFI, IIEF, ADAM, and PHQ-9.

The mean scores on the subscales of the FSFI (i.e., Desire, Arousal, Lubrication, Orgasm, Satisfaction, Pain) demonstrated a linear improvement. The results were as follows: mean full-scale FSFI scores were at baseline  $M = 20.84$ ; 30-day  $M = 24.77$ ; 60-day  $M = 25.39$ ; and 90-day  $M = 29.33$ , with the biggest improvements shown in the domains of Desire (1.94), Arousal (1.47), Orgasm (1.42), and Lubrication (1.26). For the male participants, significant improvement was noted in terms of IIEF total scores from baseline ( $M = 43.65$ ) to 60 days ( $M = 52.40$ ). Finally, significant improvement in depressive symptoms as measured by the PHQ-9 was noted for males after 30 days and for females after 60 days on the supplement.

In this small pilot study, females reported improvements in all areas of sexual functioning, as well as significant improvements in subjective mood while taking Stronvivo. The male subjects noted an improved erectile function and sexual desire following initiation of Stronvivo. Further large scale randomized clinical trials are warranted to confirm this small initial study.

### Cannabis-Enhanced Products

Cannabis has been used for centuries for sexual enhancement. Either ingested orally or smoked, cannabis products have long been believed to enhance sexual intensity for men and women. Now that cannabis has become legal in some states for medical use, there is a growing market of commercially available products containing cannabis for sexual enhancement. For example, Foria is a topical sexual lubricant that combines coconut oil and cannabis, and is designed as a female sexual enhancer. However, there are no published studies to support claims of cannabis as a sexual stimulant, and thus these products cannot be recommended at this time.

### Hersynergy

Hersynergy is an oral supplement that contains B vitamins, folate, magnesium and zinc, as well as 300 mg fenugreek, marketed toward women. There are no published data on this specific product to prove its efficacy. However, there are data to support fenugreek's role as a libido enhancer. See section on "Fenugreek" for the data.

### Vaginal Tightening Products

There are multiple over-the-counter topical products, such as "18 Again" "China Shrink Cream," and "Liquid Virgin," designed to tighten the vagina and enhance sexual pleasure for both the user and her partner. These products contain a variety of ingredients. For example, "18 Again" contains Woodfordia, which is advertised as an astringent to contract the walls of the vagina, *Centella asiatica* for its vasodilatory properties, and Alum, an astringent to tighten the vaginal walls. There are no data to support any of these products and none are recommended.

### Zestra

Zestra feminine arousal oil is a message oil designed to enhance female arousal and orgasm after application to the clitoris and labia. There are no clinical studies in men. The product contains a blend of borage seed oil, evening primrose oil, angelica root extract, and coleus forskohlii extract. The product label states that the oil should be applied 5 minutes before intercourse and will cause a "tingling or rushing" sensation. The mechanism of action is through vasodilatation. The first published research on Zestra was a small, placebo-controlled study on women with and without female sexual arousal disorder (FSAD). The study showed that Zestra users experienced improved desire, arousal, and orgasm compared with placebo, as measured by multiple questionnaires. The study showed Zestra was equally effective in women with normal sexual functioning, FSAD, and in users of SSRIs [68]. A follow-up, double-blind, placebo-controlled study of 256 women with acquired mixed desire/interest/arousal/orgasm disorders showed mixed results. This study showed Zestra produced a greater improvement in desire and arousal, whereas placebo produced greater improvement in lubrication and pain, but those results were not significant. Questionnaires revealed Zestra improved some sexual satisfaction scores but not others. The primary side effect is mild-to-moderate genital burning, experienced by 14.6% of participants, and was the cause of 5% of study participants to withdraw from the clinical study [69]. Overall, the product is well tolerated, and there were no serious side effects or significant drug interactions reported.

### Summary of Findings

After review of the available data, research has supported the use of a select group of natural

sexual enhancers. While the data are still limited, Ginkgo, ginseng, maca, and Tribulus have promising data behind them. In addition, the commercially available products ArginMax and Zestra have limited data to support their use (Table 1).

## Conclusion

In the quest for sexual stamina and an intensified libido, natural sexual enhancers have been sought out for centuries. Whether it is because they are viewed as safer and more wholesome, or whether it is the convenience and privacy of purchasing without a prescription, natural sexual enhancers remain as popular today as they were in ancient times. While new research has partly elucidated the mechanism of action and safety concerns of many of these products, more research are needed to better understand the benefits, risks, and optimal dosing associated with the products discussed.

At this time, research has shown that the risks of certain products, such as yohimbine, Spanish fly, mad honey, and Bufo toad, far outweigh any benefit, and these products should be avoided. However, other aphrodisiacs, such as Ginkgo, ginseng, maca, and Tribulus, have early but promising data behind them. ArginMax and Zestra are commercially available products with limited, albeit promising benefits. Further

rigorous clinical trials are needed before mainstream practitioners can recommend any of these products.

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*Conflict of Interest:* Dr. Krychman is a medical consultant for Orimed Canada, which distributes Zestra.

## Statement of Authorship

### Category 1

- (a) **Conception and Design**  
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- (b) **Acquisition of Data**  
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- (c) **Analysis and Interpretation of Data**  
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### Category 2

- (a) **Drafting the Article**  
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- (b) **Revising It for Intellectual Content**  
Elizabeth West; Michael Krychman

### Category 3

- (a) **Final Approval of the Completed Article**  
Elizabeth West; Michael Krychman

**Table 1** Natural sexual enhancers with data supporting use

Natural treatment	Dysfunction addressed	Mechanism of action	Data in support of use
Ginkgo	SSRI-associated sexual dysfunction	Release of endothelium-derived relaxing factor and prostacyclin, causing vasodilatation	Limited data to support use in males and females
Ginseng	1. Erectile dysfunction 2. Sexual arousal in menopausal women	1. Nitric oxide (NO) release from the smooth muscle of the corpus cavernosum 2. Smooth muscle relaxation on the clitoral cavernosal muscle and vaginal walls	1. Use in males supported by 7 double-blind, placebo-controlled studies 2. Limited data to support use in women
Maca	Sexual arousal in males and females	Unknown, possibly through phytoestrogen	1. 4 RTCs to support use in males and females 2. Limited data to support use in SSRI-related low libido
Tribulus	Female hypoactive sexual desire disorder	Anti-inflammatory action vs. COX-2 inhibition, and active compound, protodioscin, converted to DHEA	Limited data to support use in females
ArginMax	1. Female sexual desire and orgasm 2. Erectile dysfunction	NO pathway: smooth muscle relaxation, vascular dilatation, and vaginal wall engorgement	1. Limited data to support use in females 2. Very limited data to support use in males
Zestra	Female sexual arousal disorder	Vasodilation	Limited data to support use in females

SSRI = selective serotonin reuptake inhibitors



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