

Herbal Therapies for Male Sexual Health: A Comprehensive Review of Clinical Evidence and Mechanisms

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How to cite this paper: Zhu, S.J., Li, M.L. and Ring, H.Z. (2025) Herbal Therapies for Male Sexual Health: A Comprehensive Review of Clinical Evidence and Mechanisms. *Health*, 17, 1087-1100.
<https://doi.org/10.4236/health.2025.179071>

Received: August 20, 2025

Accepted: September 20, 2025

Published: September 23, 2025

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Abstract

Age-related sexual dysfunction and testosterone decline in men are common conditions that affect quality of life and well-being. Herbal therapies, particularly those rooted in Traditional Chinese Medicine (TCM), are gaining popularity as natural alternatives to hormone replacement therapy. This review synthesizes evidence from eight double-blind randomized controlled trials evaluating herbal interventions for male sexual health, including *Eurycoma longifolia* (Tongkat Ali), *Lepidium meyenii* (Maca), *Trigonella foenum-graecum* (Fenugreek/Testofen), and a multi-herb topical SS-cream. Findings suggest that these therapies improve sexual function through both hormone-related and hormone-independent mechanisms. Across studies, adverse events were mild and comparable to placebo. In addition to biomedical mechanisms—such as hypothalamic-pituitary-gonadal (HPG) axis support and nitric oxide (NO) signaling—these herbs align with TCM concepts of yang-tonification, kidney support, and essence nourishment, highlighting their potential as integrative options for male sexual health.

Keywords

Testosterone, Libido, TCM, Yang Tonic, Kidney Deficiency, Herbal Medicine, Male Sexual Health

1. Introduction

Male age-related sexual dysfunction and androgen decline represent common, multi-factorial conditions that significantly impact quality of life, interpersonal relationships, and long-term health outcomes. Large-scale epidemiologic inves-

tigations, including the Massachusetts Male Aging Study [1] and the Multinational Men's Attitudes to Life Events and Sexuality (MALES) study [2], have documented an age-dependent increase in prevalence. In parallel, clinical guidelines emphasize the need for comprehensive diagnosis and systematic risk stratification, given that erectile dysfunction shares common cardiometabolic risk factors and underlying pathophysiology with cardiovascular disease [3]-[6].

While testosterone replacement therapy (TRT) can effectively ameliorate symptoms in appropriately selected patients [4] [5], clinical contraindications, individual patient preferences, and extensive monitoring requirements substantially limit its broader application. These constraints have generated considerable interest in evidence-based botanical interventions as potential adjuncts or therapeutic alternatives. Recent systematic and narrative reviews have highlighted the therapeutic potential of ginseng [7] [8] and other bioactive phytochemicals [9] [10] for improving sexual function and overall vitality within contemporary integrative care frameworks [7]-[10].

Clinical evidence for specific botanical interventions continues to accumulate. RCTs have demonstrated improvements in libido, sexual function, or androgen-related symptoms with *Eurycoma longifolia* (Tongkat Ali) [11] [12], *Lepidium meyenii* (Maca) [13]-[15], standardized *Trigonella foenum-graecum* (Fenugreek) extracts [16] [17], and a topical multi-herb SS-cream formulation [18]. However, outcomes vary across preparations, dosages, and populations studied, underscoring the importance of evaluating each formulation within its validated clinical context [14] [15] [19]-[21].

The proposed biomedical mechanisms underlying these therapeutic effects, as elucidated in clinical investigations, encompass: 1) steroidogenic and hypothalamic-pituitary-gonadal (HPG) axis modulation, along with targeted enzyme inhibition [11] [12] [16] [17]; 2) nitric oxide (NO)-mediated pathways [13]; and 3) peripheral desensitization through local anesthetic activity [13]. These mechanistic frameworks provide a robust physiological foundation for systematically evaluating herbal interventions alongside established lifestyle modifications and conventional therapeutic approaches.

Traditional Chinese Medicine (TCM) provides a complementary, systems-based theoretical framework for understanding male sexual dysfunction. Within TCM paradigms, sexual dysfunction is conceptualized as reflecting underlying constitutional patterns, including kidney yang deficiency, depletion of jing (essence), or disharmony within the Liver-Heart-Kidney axis. Clinical assessment incorporates constitutional evaluation, tongue and pulse diagnosis, and comprehensive symptom pattern recognition to guide individualized, pattern-based therapeutic interventions [22] [23]. Several herbs in this review (*i.e.*, ginseng, angelica, cistanche, cinnamon) are traditionally classified as yang-tonifying or qi-supplementing agents, indicating that historical therapeutic uses align with contemporary scientific findings [18] [22]-[24].

This review synthesizes clinical evidence from eight RCTs on herbal interventions for male sexual health, including both single- and poly-herb preparations. The analysis evaluates their effects on serum testosterone, validated sexual function outcomes, and safety profiles. This review also examines the mechanistic foundations of interventions from both biomedical and TCM perspectives, offering an integrated understanding of how botanical agents may improve male sexual health outcomes [4] [5] [8]. By bridging traditional therapeutic frameworks with modern scientific evidence, this review aims to provide clinicians with guidance for the judicious incorporation of herbal therapies into the management of age-related sexual dysfunction in males.

2. Methodology

2.1. Study Selection and Inclusion Criteria

The eight clinical investigations incorporated in this systematic review were selected according to stringent methodological criteria. Inclusion criteria required: 1) randomized controlled trial (RCT) design; 2) enrollment of healthy adult male participants; 3) explicit documentation of male sexual health; 4) publication in peer-reviewed scientific journals.

Trials addressing different domains of male sexual dysfunction—including erectile dysfunction (ED), late-onset hypogonadism (LOH), and premature ejaculation (PE)—were included to capture the breadth of male sexual health conditions and their potential herbal interventions. This approach reflects the clinical reality that these conditions often co-occur and share overlapping pathophysiological mechanisms. The included studies evaluated diverse herbal interventions, encompassing *Eurycoma longifolia* (Tongkat Ali), *Lepidium meyenii* (Maca), *Trigonella foenum-graecum* (Fenugreek), and a topical multi-herb SS-cream formulation. Key design features, intervention dosages, sample characteristics, and study durations are summarized in **Table 1**.

Search Strategy: Literature searches were conducted across major biomedical databases, including PubMed/MEDLINE and Google Scholar. Representative keywords included: “herbal therapy”, “male sexual health”, “testosterone”, “erectile dysfunction”, “randomized controlled trial”, and combinations thereof. Date ranges extended from database inception through 2023.

2.2. Data Extraction and Analysis

From each study, we extracted data on study design, participant characteristics, intervention protocols, outcome measures, and adverse events. Primary outcomes included serum testosterone levels (total and free), validated symptom scales such as the aging male symptoms (AMS) questionnaire, the International Index of Erectile Function (IIEF-15), and the Derogatis Interview for Sexual Functioning-Self Report (DISF-SR), as well as libido questionnaires and intravaginal ejaculatory latency time (IELT). Secondary outcomes encompassed quality of life measures, additional hormonal parameters, and safety profiles.

Table 1. Study designs and population characteristics.

Study No.	Herb(s) Used	Sample Size	Design Type	Dosage & Duration	Age (years)	Ref
1	<i>Eurycoma longifolia</i> (Tongkat Ali)	45 men	DB-RCT, factorial	200 mg/d 6 months	Mean 62	[12]
2	<i>Eurycoma longifolia</i> (PHYSTA)	109 men	DB-RCT, parallel	200 mg/d 12 weeks	40 - 65	[11]
3	<i>Lepidium meyenii</i> (Maca)	57 men	DB-RCT, parallel	1.5 or 3.0 g/d 12 weeks	21 - 56	[14]
4	<i>Lepidium meyenii</i> (Maca)	8 men (cyclists)	DB-RCT, crossover	2 g/d 14 days	Mean 30	[15]
5	<i>Lepidium meyenii</i> (Maca)	80 men	DB-RCT, parallel	6 g/d 12 weeks	Mean 47	[13]
6	<i>Trigonella foenum-graecum</i> (Fenugreek/Testofen)	54 men	DB-RCT, parallel	600 mg/d 6 weeks	25 - 52	[16]
7	<i>Trigonella foenum-graecum</i> (Testofen)	111 men	DB-RCT, parallel	600 mg/d 12 weeks	Mean 44	[17]
8	SS-cream (9 TCM herbs*)	106 men	DB-RCT, parallel	6 Tx (including 1 Placebo) 1 - 2 times/wk	Mean 33	[18]

DB-RCT = Double-blind randomized controlled trial; TCM = Traditional Chinese Medicine; Tx = Treatment; mg/d = Milligrams per day; g/d = Grams per day; Ref = Reference. *SS-cream contains: *Panax ginseng*, *Angelica gigas*, *Cistanche deserticola*, *Zanthoxylum piperitum*, *Torilis japonica*, *Asarum sieboldii*, *Syzygium aromaticum*, *Cinnamomum cassia*, and *Bufo gargarizans*.

3. Efficacy and Mechanisms

Table 2 summarizes the intervention characteristics, dosing regimens, and key outcomes on testosterone and sexual function reported across the eight randomized controlled trials.

3.1. *Eurycoma longifolia* (Tongkat Ali)

Two pivotal randomized controlled trials have evaluated Tongkat Ali for male sexual health [11] [12]. In the first trial, Leitão *et al.* conducted a 6-month, double-blind, placebo-controlled trial with a 2 × 2 factorial design in 45 men with androgen deficiency of aging males. Tongkat Ali supplementation of 200 mg/day significantly increased total testosterone, with the combination of Tongkat Ali and exercise producing the most pronounced effects, including greater improvements in sexual desire and a 15% rise in total testosterone after six months [12]. Complementing these findings, Ismail *et al.* investigated PHYSTA, a standardized water extract of Tongkat Ali, in 109 healthy men aged 40 - 65 years over 12 weeks. Daily supplementation of 200 mg led to a 14% increase in libido scores, along with improvements in erectile function, quality-of-life measures, and fertility parameters, including a 44% increase in sperm motility and higher semen volume versus placebo. The extract was well tolerated, with adverse events comparable to placebo [11].

3.2. *Lepidium meyenii* (Maca)

Maca root has demonstrated consistent benefits across diverse populations. Gonzales *et al.* conducted a 12-week randomized controlled trial (RCT) in 57 healthy

Table 2. Intervention details and key outcomes.

Study No.	Herb(s) Used	Dosage & Duration	Testosterone Outcome	Sexual Function Outcome	Ref
1	<i>Eurycoma longifolia</i> (Tongkat Ali)	200 mg/day 6 months	↑ Total T [^]	↑ Erectile function ↑ Sexual desire	[12]
2	<i>Eurycoma longifolia</i> (PHYSTA)	200 mg/day 12 weeks	No change	↑ Libido scores ↑ Erectile function ↑ QoL	[11]
3	<i>Lepidium meyenii</i> (Maca)	1.5 or 3 g/day 12 weeks	No change	↑ Sexual desire	[14]
4	<i>Lepidium meyenii</i> (Maca)	2 g/day 14 days	Not measured	↑ Sexual desire inventory scores	[15]
5	<i>Lepidium meyenii</i> (Maca)	6 g/day 12 weeks	No change	↑ IIEF ↓ ADAM symptoms	[13]
6	<i>Trigonella foenum-graecum</i> (Fenugreek/Testofen)	600 mg/day 6 weeks	No change	↑ DISF-SR total ↑ Sexual arousal/cognition	[16]
7	<i>Trigonella foenum-graecum</i> (Testofen)	600 mg/day 12 weeks	↑ Total T ↑ Free T	↑ Morning erections ↑ Sexual activity frequency	[17]
8	SS-cream (9 herbs*)	6 Tx (including 1 Placebo) 1 - 2 times/wk	No change	↑ IELT ↑ Sexual satisfaction	[18]

↑ = Significant increase ($p < 0.05$); ↓ = Significant decrease ($p < 0.05$); Tx = Treatment; T = Testosterone; QoL = Quality of life; IIEF = International index of erectile function; ADAM = Androgen deficiency in the aging male; DISF-SR = Derogatis interview for sexual functioning-self report; IELT = Intravaginal ejaculatory latency time; Ref = Reference. [^]When combined with exercise training. *SS-cream contains: *Panax ginseng*, *Angelica gigas*, *Cistanche deserticola*, *Zanthoxylum piperitum*, *Torilis japonica*, *Asarum sieboldii*, *Syzygium aromaticum*, *Cinnamomum cassia*, and *Bufo gargarizans*.

men, testing two daily doses of Maca (1.5 g and 3.0 g) against placebo. Sexual desire increased significantly from week 8 onward, with a 40% rise in the 1.5 g group and a 42% rise in the 3.0 g group at week 12. By contrast, serum testosterone remained unchanged, suggesting androgen-independent mechanisms [14]. Similarly, Stone *et al.* reported that trained cyclists receiving 2 g/day for 14 days exhibited enhanced physical performance alongside significant gains in sexual desire inventory scores [15]. More recently, Shin *et al.* evaluated 6 g/day of gelatinized Maca in 80 men with late-onset hypogonadism over 12 weeks, observing a 3.2-point increase in the International Index of Erectile Function (IIEF), a reduction in Androgen Deficiency in the Aging Male (ADAM) symptoms from 73% to 51%, and improvements in prostate symptom scores, again without altering testosterone levels [13].

3.3. *Trigonella foenum-graecum* (Fenugreek)

Fenugreek extracts have shown promising results across two studies. First, Steels *et al.* tested Testofen (600 mg/day) in 54 healthy men over 6 weeks, reporting significant improvements in sexual cognition, arousal, orgasm, libido, and overall well-being, despite no measurable changes in testosterone [16]. Building on this, Rao *et al.* evaluated Testofen in 111 healthy aging men for 12 weeks. The interven-

tion significantly increased total testosterone (+12.7%) and free testosterone (+14.8%), while also reducing Aging Male Symptom scores, particularly in sexual and somatic domains. In addition, morning erection frequency and sexual activity levels improved compared to placebo [17].

3.4. SS-Cream (Nine-Herb Topical Formulation)

Choi *et al.* investigated SS-cream, a topical multi-herbal preparation containing nine traditional herbs such as *Ginseng Radix Alba* and *Angelicae Gigantis Radix*, in 106 men with lifelong premature ejaculation. In a double-blind, placebo-controlled parallel trial, the cream was applied 1 - 2 times per week, one hour before intercourse, and it extended intravaginal ejaculatory latency time from 1.37 minutes at baseline to 10.92 minutes after five effective treatments, which is an approximate eightfold increase. Notably, reported side effects were mild, localized, and transient, and overall tolerability was comparable to placebo [18].

3.5. Hypothesized Mechanisms to Be Validated

The therapeutic mechanisms proposed for these herbal interventions encompass multiple bioactive pathways, although many require direct experimental validation in future studies.

For *Eurycoma longifolia*, the therapeutic mechanisms are hypothesized to be mediated through multiple bioactive constituents with distinct but complementary modes of action. Eurypeptides (approximately 4.3 kDa) have been described as putative “phytoandrogens”, potentially facilitating enhanced testosterone biosynthesis in Leydig cells through direct steroidogenic stimulation [11]. Additionally, eurycomanone, a principal quassinoid compound, may exhibit aromatase inhibitory activity, thereby reducing peripheral conversion of testosterone to estradiol [12]. Phosphodiesterase (PDE)-linked mechanisms have been proposed in related phytochemicals (*i.e.*, icariin) rather than demonstrated for eurycomanone within the included trials [25]. These proposed mechanisms suggest a therapeutic profile that combines direct steroidogenic support with enzyme-level modulation, providing complementary pathways for maintaining physiological testosterone concentrations and optimizing sexual function parameters [11] [12]. However, these intermediary mediators were not directly assayed in the included trials.

For Maca, proposed mechanisms appear to involve androgen-independent pathways. Current hypotheses suggest fatty acid amide hydrolase (FAAH) inhibition within the central nervous system and modulation of nitric oxide synthase (NOS) activity as potential mechanisms [13] [14]. FAAH inhibition could theoretically potentiate endocannabinoid signaling cascades relevant to mood, stress response, and sexual behavior, whereas NOS modulation suggests a potential vascular influence on smooth muscle tone and NO-dependent processes [13] [15]. However, these intermediates were not assayed in the included trials, and the precise molecular pathways mediating Maca’s effects on libido and sexual function remain in-

completely characterized and require further investigation.

For fenugreek, the bioactivity is primarily attributed to steroidal saponins (notably furostanol glycosides), which are hypothesized to modulate androgen metabolism through specific enzymatic pathways. Specifically, partial inhibition of 5- α -reductase could theoretically attenuate the conversion of testosterone to dihydrotestosterone (DHT), whereas aromatase inhibition would limit peripheral conversion of testosterone to estradiol [17]. This dual enzymatic modulation would be expected to preserve circulating testosterone while enhancing androgen bioavailability. However, these enzymatic intermediates were not directly assayed in the included trials.

For SS-cream, the formulation is proposed to act through peripheral desensitization of penile sensory nerves, thereby raising the threshold for tactile stimulation and prolonging ejaculatory latency. Its polyherbal composition may provide bioactive compounds such as bufadienolides, bufosteroids, and eugenol, which could exert local anesthetic effects via sodium-channel blockade in sensory terminals [18]. This localized neural modulation would theoretically deliver therapeutic benefit while limiting systemic exposure. However, the clinical trial did not include mechanistic assays [18], and this mechanism should be viewed as explanatory context rather than direct evidence.

4. Safety Profile and Adverse Events

Table 3 provides a comprehensive overview of safety outcomes across the eight included clinical investigations.

Overall, herbal interventions demonstrated generally favorable tolerability, with adverse events typically mild and self-limiting. For instance, mild gastrointestinal discomfort was occasionally reported, particularly with fenugreek when taken without food [16]. Similarly, topical SS-cream produced localized burning in about 15% of participants, alongside other minor dermatological reactions that resolved spontaneously [18]. In the Tongkat Ali trials, scattered mild symptoms such as upper respiratory infections and myalgia occurred at rates comparable to placebo [11] [12]. Among aging men, fenugreek was occasionally associated with headaches and dizziness [17]. By contrast, Maca was consistently well tolerated, with rare mild gastrointestinal complaints and no evidence of endocrine disruption [13]-[15]. Importantly, no serious adverse events were linked to any intervention, and serum testosterone concentrations remained within normal physiological ranges even in trials showing significant increases [12] [17]. Moreover, laboratory markers, including liver function tests, prostate-specific antigen, and lipid profiles, remained stable throughout [11] [16] [17]. However, evidence is limited to interventions of 6 months or less, with little data on long-term safety beyond this timeframe. Additionally, potential herb-drug interactions require consideration, particularly for individuals taking concurrent medications such as anticoagulants, antidiabetic agents, or medications metabolized by cytochrome P450 enzymes. Fenugreek may enhance hypoglycemic effects of diabetes medications,

Table 3. Safety profile and adverse events.

Study No.	Herb(s) & Dosage	Adverse Events Reported	Safety Conclusion	Reference
1	<i>Eurycoma longifolia</i> (Tongkat Ali) 200 mg/d	None reported	Safety No AEs in the 6-month trial	[12]
2	<i>Eurycoma longifolia</i> (PHYSTA) 200 mg/d	URTI (n = 3) Body ache (n = 1) Conjunctivitis (n = 1) Minor symptoms (n = 6)	Well-tolerated AEs mild and likely unrelated Normal LFT, PSA	[11]
3	<i>Lepidium meyenii</i> (Maca) 1.5 g/d or 3.0 g/d	Not specified in the study	Safe No hormonal disruption was observed	[14]
4	<i>Lepidium meyenii</i> (Maca) 2 g/d	None reported	Safe in short-term use	[15]
5	<i>Lepidium meyenii</i> (Maca) 6 g/d	Mild GI disorders (n = 2)	Safe Beneficial effect on triglycerides	[13]
6	Fenugreek (Testofen) 600 mg/d	Stomach discomfort without food (n = 3)	Safe Preventable AEs with food intake	[16]
7	Fenugreek (Testofen) 600 mg/d	Headaches (n = 2) Dizziness (n = 1)	Safe in elderly Normal LFTs and lipids	[17]
8	SS-cream (9 herbs*) 1 - 2 times/week	Local burning (14.7%) Mild pain (3.8%) Transient ED (2.8%) Delayed ejaculation (3.8%)	Acceptable All AEs are local and transient	[18]

URTI = Upper respiratory tract infection; AEs = Adverse events; LFT = Liver function test; PSA = Prostate-specific antigen; GI = Gastrointestinal; ED = Erectile dysfunction. *SS-cream contains: *Panax ginseng*, *Angelica gigas*, *Cistanche deserticola*, *Zanthoxylum piperitum*, *Torilis japonica*, *Asarum sieboldii*, *Syzygium aromaticum*, *Cinnamomum cassia*, and *Bufo gargarizans*.

while some herbal compounds could theoretically modulate CYP450 enzyme activity, potentially altering drug metabolism. Therefore, caution is advised for individuals taking concurrent medications, and clinical monitoring may be warranted.

5. Traditional Chinese Medicine Perspective

In TCM, sexual vitality is governed by the Kidney system, a functional network responsible for reproduction, growth, and the storage of essence (jing). Sexual dysfunction is commonly attributed to patterns such as Kidney yang deficiency, jing depletion, and disharmony among the Liver-Heart-Kidney axis, presenting as symptom clusters that can include impotence, low libido, fatigue, cold extremities, and frequent urination. Diagnosis integrates constitution with tongue and pulse findings to guide pattern differentiation and treatment principles, typically warming and tonifying Kidney yang, nourishing jing, harmonizing the Liver-Heart-Kidney, and promoting qi and blood. The herbs examined in this review align with classic TCM categories (Table 4), reflecting convergence between traditional doctrine and contemporary hypotheses [22] [23] [26] [27].

Table 4. TCM syndrome patterns in sexual dysfunction.

TCM Pattern	Clinical Manifestations	Herbs	Treatment Principle	Reference
Kidney Yang Deficiency	Erectile dysfunction; low libido; cold extremities; fatigue	Epimedium	Warm and tonify kidney yang.	[24] [28]
Liver Qi Stagnation	Erectile dysfunction; low sexual desire, stress-related	Tribulus Ginkgo	Soothe liver, regulate Qi	[24] [29]-[31]
Qi and Blood Deficiency	Erectile dysfunction; fatigue	Ginseng	Tonify Qi and blood	[8] [32]
Blood Stasis	Erectile dysfunction; low sexual desire	Ginkgo	Activate blood, remove stasis	[29] [33]

6. Integrated Mechanistic Model

An integrative framework permits interpretation of trial findings within TCM paradigms while avoiding claims of mechanistic equivalence. As an orienting schematic, **Figure 1** illustrates this model, juxtaposing biomedical priorities with the corresponding TCM priorities [4] [22] [23]. Within this context, interventions associated with higher circulating testosterone, specifically fenugreek in aging men and Tongkat Ali when combined with structured exercise, are directionally consistent with TCM strategies to tonify Kidney yang [12] [17] [22] [26] [27]. Conversely, agents that improved sexual function without altering testosterone, including Maca across randomized trials and the topical SS-cream, suggest androgen-independent or peripheral modulation and can be discussed conceptually in terms of nourishing essence (jing) or regulating qi and blood. However, such pattern attributions were not tested within these studies [13]-[15] [18] [22] [27]. Moreover, the included trials did not assay specific intermediates (*i.e.*, nitric-oxide-mediated vasodilation). Therefore, any cross-walk between biomedical pathways and TCM categories should be regarded as interpretive rather than evidentiary [13]-[15] [18].



Figure 1. Comparison of biomedical and TCM principles. Biomedical priorities are adapted from contemporary endocrinology guidance [4]; TCM priorities reflect pattern-based diagnostics and treatment principles [22] [23].

7. Discussion

The evidence synthesized here supports the efficacy of selected herbal interventions for male sexual health via complementary pathways. Specifically, fenugreek (Testofen) increased total and free testosterone and improved sexual activity indices in aging men, indicating an androgen-dependent effect [17]. In parallel, *Eu-*

Eurycoma longifolia improved erectile function and sexual desire, with testosterone elevations observed when combined with structured exercise in men with ADAM [12]. By contrast, a standardized water extract (PHYSTA) enhanced libido and erectile function without altering testosterone, suggesting potential utility when baseline hormones are within normal ranges [11]. Consistently, Maca increased sexual desire and ameliorated late-onset hypogonadism symptoms without changing testosterone, consistent with androgen-independent mechanisms [13]-[15]. Moreover, for lifelong premature ejaculation, a topical SS-cream markedly prolonged intravaginal ejaculatory latency, consistent with a targeted peripheral, desensitizing approach [18].

7.1. Clinical Implications

In aging men prioritizing androgen augmentation, fenugreek (Testofen) may be considered, given its observed increases in total and free testosterone and sexual activity measures [17]. *Eurycoma longifolia* can be deployed to address erectile function and sexual desire. Evidence from a factorial RCT suggests greater benefit when combined with structured exercise in men with ADAM [12], whereas PHYSTA may be useful when hormone levels are within the normal range [11]. Maca offers an androgen-sparing option when the goal is to improve sexual desire or LOH symptoms without altering testosterone [13]-[15]. For subjects with lifelong premature ejaculation, topical SS-cream provides a non-systemic alternative with clinically meaningful gains in latency and local, transient adverse effects [18] (Table 3). Clinicians should monitor clinical outcomes and routine laboratory parameters and should avoid extrapolating efficacy or safety beyond the studied durations.

7.2. Safety

Safety was generally favorable across intervention periods of 6 - 24 weeks. Reported adverse events were primarily mild and transient: 1) stomach discomfort with fenugreek when taken without food and occasional headache/dizziness in aging men [16] [17]; 2) local burning (~15%) and other minor local reactions with SS-cream that resolved spontaneously [18]; and 3) rare, mild gastrointestinal complaints with Maca, with hormonal profiles remaining stable [13]-[15]. In the Tongkat Ali trials, scattered mild symptoms occurred at rates comparable to placebo, and where assessed, laboratory parameters remained stable [11] [12]. No serious adverse events were attributed to any intervention.

7.3. Limitations and Future Directions

Key limitations across the included trials encompass modest sample sizes, heterogeneity of herbal preparations and dosing regimens, short- to medium-term follow-up periods, and limited mechanistic assessment (Table 1). Trial quality considerations, including these factors, influence the strength of evidence and require caution when interpreting clinical implications. The heterogeneity of outcome do-

mains (erectile dysfunction, hypogonadism, premature ejaculation) reflects the breadth of male sexual dysfunction but limits direct comparisons across interventions. To address these gaps, future research should prioritize adequately powered, multi-center randomized controlled trials that employ standardized herbal extracts, adhere to Consolidated Standards of Reporting Trials (CONSORT) guidelines, and extend follow-up beyond 12 months to establish therapeutic durability and detect rare adverse events. Comparative-effectiveness study designs incorporating head-to-head comparisons with conventional therapies and dose-response or factorial methodologies should be prioritized.

Beyond study design, future studies should integrate prespecified mechanistic and pharmacokinetic endpoints, including comprehensive androgen panels, semen parameters, endothelial function, nitric-oxide pathway surrogates, and local absorption with sensory metrics for topical agents such as SS-cream. Moreover, investigations should evaluate combination herbal formulas with planned statistical interaction analyses. In addition, stratifying participants by baseline androgen status, age, body mass index (BMI), physical activity, and health status will facilitate the identification of optimal responder subgroups. Finally, to minimize nutritional confounding and address tolerability, protocols should standardize daily energy and nutrient intake.

In parallel, informed by emerging literature on mind-body interconnections and immune-neuroendocrine regulatory mechanisms [34]-[37], pragmatic clinical studies may investigate adjunctive stress-reduction interventions, meditation practices, or structured movement therapies administered alongside herbal interventions. Such integrative research should be explicitly framed as hypothesis-generating to guide subsequent confirmatory trials.

8. Conclusions

Evidence from eight double-blind randomized controlled trials indicates that select herbal interventions can meaningfully improve male sexual health outcomes, with generally favorable short- to medium-term safety profiles. These effects span both androgen-dependent mechanisms—such as hormonal modulation and HPG axis stimulation—and androgen-independent pathways, including neuroendocrine and vascular signaling.

Beyond their biomedical actions, many of these herbs resonate with Traditional Chinese Medicine (TCM) principles, such as tonifying Kidney yang, nourishing essence (jing), and regulating qi and blood. This convergence highlights the potential for herbal therapies to serve not only as alternatives to hormone replacement therapy but also as bridges between conventional endocrinology and traditional systems-based approaches.

For clinical practice, these interventions offer personalized alternatives to hormone replacement therapy, supporting an integrative East-West approach to male sexual dysfunction. Clinicians should monitor clinical outcomes and laboratory markers. Future research requires multi-center trials with standardized preparations,

extended follow-up, and integrated mechanistic and pattern-based endpoints to establish definitive practice guidelines.

As part of a comprehensive integrative care model, these herbal therapies bridge traditional wisdom with modern scientific rigor, providing holistic, evidence-informed options for male sexual health.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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