



ROLE OF KAYAKARPAM DRUGS IN THE MANAGEMENT OF MALE INFERTILITY: A REVIEW FROM THE ANNAMAYA KOSAM PERSPECTIVE

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ABSTRACT

Background: Male infertility is an increasing health concern worldwide with Siddha system of medicine offering a unique holistic approach through Kayakarpam (rejuvenation therapy) drugs. In Siddha philosophy, the human body is conceptualized through the Panchakosam theory, wherein Annamaya Kosam - the food-derived physical sheath - forms the structural and functional basis of the Udal Thathukkal (seven bodily constituents), the last of which, Sukkilam (semen/reproductive essence), directly governs fertility and reproductive competence in males.

Objective: To review and consolidate the classical Siddha literature on Kayakarpam drugs indicated for the management of male infertility (Sukkila Kuraivu), and to correlate their mode of action with the Annamaya Kosam concept of body nourishment. **Methodology:** A narrative review of classical Siddha literature (Agathiyar Gunavagadam, Theraiyar Gunavagadam, Yugi Vaidya Chinthamani, and related Kayakarpa treatises) was conducted, supplemented by contemporary pharmacological studies retrieved from PubMed, Google Scholar, and AYUSH research portals. Six Kayakarpam drugs indicated for Sukkila Kuraivu — Tribulus terrestris, Piper longum, Hybanthus enneaspermus, Nelumbo nucifera, Ficus benghalensis, and Solanum trilobatum — were identified and analyzed for phytochemical constituents, pharmacological actions, and mechanism of action, with findings interpreted through the Annamaya Kosam concept of Saptha Thathu Parinamam. **Results:** All six drugs showed antioxidant and aphrodisiac properties attributed to flavonoids, alkaloids, and saponins. Tribulus terrestris and Piper longum improved testosterone, sperm count, and motility; Hybanthus enneaspermus and Nelumbo nucifera enhanced libido and hormonal regulation; Ficus benghalensis and Solanum trilobatum protected spermatogenic tissue via antioxidant action. Findings align with classical Siddha concepts of thathu viruthi and sukkila dosha correction, though evidence remains largely preclinical. **Conclusion:** Kayakarpam drugs offer a promising, time-tested therapeutic avenue for male infertility management. Integrating the Annamaya Kosam perspective provides a strong theoretical framework validating traditional Siddha practice and warrants further clinical and pharmacological validation.

KEYWORDS: Kayakarpam, Male Infertility, Sukkilam, Annamaya Kosam, Siddha Medicine, Nerunjal (Tribulus terrestris), Thippili arisi (Piper longum), Orithazhthamarai (Hybanthus enneaspermus), Thamarai magarantha podi (Nelumbo nucifera), Aalampal (Ficus benghalensis) and Thuthuvalai poo (Solanum trilobatum).

INTRODUCTION

The global burden of male infertility has grown significantly over the past three decades, with an estimated 55 million cases and over 317,000 disability-

adjusted life years (DALYs) recorded globally by 2021. This rise reflects a broader crisis in reproductive health, driven by demographic shifts, environmental exposures, and lifestyle factors. Total global cases of male infertility

among reproductive-aged individuals increased by roughly 74.6% between 1990 and 2021. In Siddha system of medicine, Male infertility is described as Aan maladu. The causes may include sukkila Thodam (any defects in semen), hypoactive sexual desire disorder, asthenozoospermia, oligospermia, hypospermia and so on. Kayakarpam is a cornerstone of Siddha medicine that emphasizes rejuvenation, prevention of disease, healthy aging, longevity, and holistic wellness. By restoring tissue health, maintaining the balance of the three humors, and supporting immunity and reproductive function, it plays a significant role in preserving health and enhancing quality of life. The Panchakosam concept explains that the human being is composed of five interconnected sheaths (Kosangal) which extend from the physical body to the innermost state of consciousness. These are Annamayakosam, Pranamayakosam, Manomayakosam, Vijñanamayakosam, and Anandamayakosam.

Annamaya Kosam, the physical sheath nourished by food, encompasses all bodily structures, including the male reproductive system. According to traditional concepts, the quality of nourishment influences tissue development and reproductive vitality. According to Siddha physiology, the seven Udal Thathukkal are formed through a sequential process of tissue transformation (Saptha Thathu Parinamam): Saaram nourishes and transforms into Seneer, Seneer into Oon, Oon into Kozhuppu, Kozhuppu into Enbu, Enbu into Moolai, and finally Moolai gives rise to Sukkilam (or Suronitham in females). This seven-step cascade signifies the progressive refinement of nourishment, culminating in the formation of the reproductive tissue, which represents the highest level of tissue maturation and forms the physiological basis for fertility, vitality, and regeneration.” Impaired nutrition, poor lifestyle, and systemic disorders may adversely affect sperm production and fertility. Therefore, maintaining the health of the Annamaya Kosam through proper diet, rejuvenative therapies such as Kayakarpam, may support male reproductive health and fertility.

This review aims to explore the role of Kayakarpam drugs such as Nerunjil (*Tribulus terrestris*), Thippili arisi (*Piper longum*), Orithazhthamarai (*Hybanthus enneaspermus*), Thamarai magarantha podi (*Nelumbo nucifera*), Aalampal (*Ficus benghalensis*) and Thuthuvalai poo (*Solanum trilobatum*) in the management of male infertility through the perspective of Annamaya Kosam, highlighting the relationship between tissue nourishment, the formation of the Saptha Udal Thathukkal, and male reproductive health, while integrating classical Siddha principles with contemporary scientific evidence.

KAYAKARPAM

Kayakarpam is a unique aspect of the Siddha medicine system, focusing on rejuvenation and longevity. It embodies a holistic approach to health, integrating

various therapeutic methods that aim to maintain a balance of the body's energies — Vatha, Pitha, and Kapha. This science is believed to have been derived from the ancient Siddhars who achieved spiritual emancipation and shared their findings with humanity. The primary intention of Kayakarpam is to enhance overall health, vitality, and longevity through both medicinal and lifestyle practices.

மறுப்ப துடல்நோய் மருந்தென லாகும்
மறுப்ப துளநோய் மருந்தெனச் சாலும்
மறுப்ப தினிநோய் வாரா திருக்க
மறுப்பது சாவையு மருந்தென லாமே.

- திருமந்திரம்

In Thirumanthiram, it is stated that the Kayakarpam eradicates diseases, preserves youthfulness, delays senescence, and promotes longevity.

Principles of Kayakarpam

The term “Kayakarpam” signifies the ability to keep the body youthful and robust, metaphorically making it as strong as stone. This system combines herbal, mineral, and animal-based internal medicines. The practices of Kayakarpam aim to prevent common signs of aging and enhance life quality by addressing physical, psychological, and spiritual well-being. It emphasizes a disciplined lifestyle, including a strict dietary regimen while undergoing treatment, which includes avoiding sour, salty, or pungent foods alongside maintaining sexual abstinence, thereby fostering an environment conducive to rejuvenation.

Anti-Oxidant Properties of Kayakarpam

Antioxidants play a crucial role in Kayakarpam, functioning as protective agents that inhibit oxidation in the body. Oxidation can lead to the production of harmful free radicals, contributing to various chronic diseases and aging processes. Many herbs used in Kayakarpam, possess significant antioxidant properties. These natural substances not only help in reducing oxidative stress but also enhance the overall healing and rejuvenating qualities of the body. The application of yoga alongside Kayakarpam practices further fortifies these antioxidant benefits by reducing stress hormones and improving immune functions.

Health Benefits of Kayakarpam

Engagement in Kayakarpam practices correlates with an array of health benefits. It is known to promote a long and healthy life, improve cognitive functions, alleviate chronic illnesses, and enhance skin quality. The regimen thereby cultivates a youthful demeanor while providing physical strength and supporting the functionality of sense organs. The regular application of Kayakarpam medicines and practices—when administered under the guidance of experienced practitioners—can contribute to significant lifestyle improvements and longevity.

Kayakarpam medicines are generally advocated to take in the morning before food. Saint Sattamuni says that the Kayakarpam treatment should be taken in the age between 30 and 70, then only the man will find rejuvenated as feeling of young without disease. Above the age of 70, all the tissues and nerves will get impaired and beyond recuperation and will then hardly be possible.

While consuming the Kayakapa drugs, compatible diet is to be advocated ie. Saathviga unavu (Diet keeps the body and mind in pacified state). In general, vegetarian diet is advisable because this diet will enhance the potency of Kayakarpam. Some sort of diet to be restricted or added depending on various factors such as patients physique, potency of medicine, duration of drug consumption, environmental changes etc., Some sort of food things such as Salt, Tamarind, Mustard, Ginger, Meat, Fish, Ash pumpkin, Horse gram, Tobacco, Betel leaf should be avoided. Sexual abstinence is also advised. This is for the purpose of Rejuvenation.

MALE INFERTILITY IN MALES
Male infertility refers to a man's inability to produce viable sperm capable of fertilizing the female egg. Clinically, infertility is defined as the failure of a couple to conceive after one year of regular, unprotected intercourse, and male factors contribute to roughly 40% of such cases.

- Varicocele — abnormal dilation of the veins draining the testicle, the single most common cause, leading to reduced sperm production and impaired sperm quality.
- Abnormal sperm morphology — irregularities in sperm shape and size that compromise the sperm's ability to penetrate and fertilize the egg.
- Genetic and chromosomal abnormalities — underlying defects that can reduce sperm concentration and count.
- Poor sperm motility — sluggish or impaired sperm movement, limiting the sperm's ability to reach and penetrate the egg.
- Hormonal imbalance — particularly disturbances in testosterone or other reproductive hormones.
- Retrograde ejaculation — a condition in which semen fails to be expelled outward, preventing sperm from leaving the body.
- Psychological and neurological factors — emotional disturbances or spinal cord injury that can result in erectile dysfunction and secondary infertility.
- Erectile dysfunction (Impotence) — the inability to achieve or sustain an erection sufficient for intercourse, itself a major contributing cause of male infertility.

[illegible]

As per Siddha literature Agathiyar gunavagadam, it is described that the whole plant Nerunji increases libido.

Phytochemical constituents: saponin, flavonoids, alkaloids, kaempferol, furostenol.

Pharmacological actions: aphrodisiac (ref :A Review on Plants Used for Improvement of Sexual Performance and Virility – National institutes of health <https://pmc.ncbi.nlm.nih.gov>)

Mechanism of action: Improves plasma testosterone and spermatogenesis.

வாத சுரந்தணிக்கும் மாகபரோ
கந்தொலைக்கும்
தாதுவை வளர்ப்பிக்குஞ் சாற்று.

The Siddha literature Agathiyar gunavagadam describes that thippili arisi increases sperm count.

Phytochemical constituents: piperine, piperlongumine, other alkaloids.

Pharmacological actions: aphrodisiac (Ref: Toxicity studies in mice of common spices, Cinnamomum zeylanicum bark and Piper longum fruits – google scholar)

Mechanism of action: Increase in sperm motility and sperm count.

Traditional Siddha description,

தாதுவை யுண்டாக்குந் தனிமேகத்தைத்
தொலைக்கும் ஆதரவா மேனிக் கழுகுதருஞ்
- சீதம்போம்

சீரிதழ்த் தாமரைவாழ் செய்ய மடவனமே!

ஓரிதழ்த் தாமரையை யுண்

-அகத்தியர் குணவாகடம்

As per Siddha literature Agathiyar gunavagadam, it is described that whole plant promote spermatogenesis.

Phytochemical constituents: cyclotides, stigmasterol, flavonoids, tannins, terpenoids.

Pharmacological actions: Aphrodisiac (Ref : Du Q, Huang YH, Bajpai A, Frosig-Jorgensen M, Zhao G, Craik DJ. Evaluation of the in vivo aphrodisiac activity of a cyclotide extract from Hybanthus enneaspermus)

Mechanism of action: enhancing libido and facilitates erectile function.

4. THAMARAI MAGARANTHA PODI

Botanical name: *Nelumbo nucifera*

Traditional Siddha description: In Siddha Maruthuvam sirappu literature by Dr.R. Thiyagarajan, it is described that thamarai magarantha podi when eaten with sugar and honey in sunrise time, cures Nabunjagam (Impotency or hermaphrodite).

Phytochemical constituents: flavonoids, glycosides, isorhamnetin glycosides.

Pharmacological actions: aphrodisiac (Ref : A review of the important pharmacological activities of *Nelumbo nucifera*: A prodigious rhizome – International journal of biomedical and advanced research).

Mechanism of action: Hormonal regulation, antioxidant protection of sperm.

5. AALAMPAL

Botanical name: *Ficus benghalensis*

Traditional Siddha description

ஆலம்பால் மேக மறுத்தசையும்
பல்லிறுக்கும்

கோல முடிக்குக் குளிரச்சிதரும் –
ஞாலமதில்

மெத்தவுமே சுக்கிலத்தை விர்த்திசெய்யுந்
தப்பாமற்

சுத்த மதிமுகத்தாய்! சொல்.

-அகத்தியர் குணவாகடம்

The Siddha literature Agathiyar gunavagadam states that the tender aerial root extract from *Ficus benghalensis*

enhances the male reproductive function by supporting spermatogenesis and sperm motility.

Phytochemical constituents: flavonoids, kaempferol, Phenyl alanine, isoleucine, phytosterol, tannin, vitamin k, triterpenoids.

Pharmacological actions: antioxidant, anti-inflammatory.

Mechanism of action: Protection of sperm from oxidative damage.

6. THUTHUVALAI POO

Botanical name: *Solanum trilobatum*

Traditional Siddha description

புஷ்டியுண்டாந் தாதுவுமாம் பொங்கழகோ
டாற்றன்மிகும்

முட்ட நரைத்து முதிர்ந்தவனைக் – கட்டழகு
மாதுளத்தி னீங்காது வைத்திடவும்
எண்ணமுற்றால்

தூதுளத்தின் பூவுண்ணச் சொல்.

- □ □ □ □ □ குணவாகடம்

As per Siddha literature Theraiyar gunavagadam, it is described that whole plant promote spermatogenesis.

Phytochemical constituents: Alkaloids, flavonoids, Saponin, tannins, terpenoids, carotenoids

Pharmacological actions: antioxidant, anti-inflammatory.

Mechanism of action: Reduces oxidative stress supporting spermatogenic tissue.

KAYAKARPAM DRUG	BOTANICAL NAME	PHYTOCHEMICAL CONSTITUENTS	PHARMACOLOGICAL ACTION	MECHANISM OF ACTION (MALE INFERTILITY)	CLASSICAL SIDDHA REFERENCE
Nerunjil	<i>Tribulus terrestris</i>	Saponins, flavonoids, alkaloids, kaempferol, furostenol	Aphrodisiac	Improves plasma testosterone and spermatogenesis	Agathiyar Gunavagadam
Thippili arisi	<i>Piper longum</i>	Piperine, piperlongumine, other alkaloids	Aphrodisiac	Increases sperm motility and sperm count	Agathiyar Gunavagadam
Orithazhthamarai	<i>Hybanthus enneaspermus</i>	Cyclotides, stigmasterol, flavonoids, tannins, terpenoids	Aphrodisiac	Enhances libido and facilitates erectile function	Agathiyar Gunavagadam
Thamarai magarantha podi	<i>Nelumbo nucifera</i>	Flavonoids, glycosides, isorhamnetin glycosides	Aphrodisiac	Hormonal regulation, Antioxidant Protection of sperm	Siddha Maruthuvam Sirappu Dr. R. Thiyagarajan
Aalampal	<i>Ficus benghalensis</i>	Flavonoids, kaempferol, phenylalanine, isoleucine, phytosterol, tannin, vitamin k, triterpenoids	Antioxidant, inflammatory	anti- Protection of sperm from oxidative damage, Supports tissue nourishment	Agathiyar Gunavagadam
Thuthuvalai poo	<i>Solanum trilobatum</i>	Alkaloids, flavonoids, saponins, tannins, terpenoids, carotenoids	Antioxidant, inflammatory,	anti- Reduces oxidative stress supporting spermatogenic tissue	Theraiyar Gunavagadam

DISCUSSION

Male infertility remains a multifactorial condition, arising from the complex interplay of oxidative stress, hormonal imbalance, impaired spermatogenesis, chronic inflammation, and nutritional deficiencies. Within the Siddha framework, these pathological alterations can be interpreted as disturbances within the Annamaya Kosam, the physical sheath whose integrity depends on adequate nourishment and metabolic balance for the formation and maintenance of healthy reproductive organs.

The six Kayakarpam drugs reviewed here — Nerunjil (*Tribulus terrestris*), Thippili arisi (*Piper longum*), Orithazhthamarai (*Hybanthus enneaspermus*), Thamarai magarantha podi (*Nelumbo nucifera*), Aalampal (*Ficus benghalensis*) and Thuthuvalai poo (*Solanum trilobatum*)— collectively demonstrate pharmacological actions that converge on the core mechanisms underlying male infertility. Antioxidant constituents such as flavonoids, saponins, and phenolic compounds appear to mitigate oxidative damage to spermatozoa, while alkaloids like piperine and steroidal saponins in Nerunjil show androgenic and spermatogenic potential by supporting testosterone synthesis and improving sperm count and motility.

Notably, the convergence of classical Siddha attributions — such as thathu viruthi (thathu enhancement) and sukkila thodam correction — with modern pharmacological findings on testosterone modulation, sperm parameters, and antioxidant defence lends credibility to the traditional literature. This correlation suggests that Siddhars, through long empirical observation, identified therapeutic principles that modern science is now validating through mechanistic study.

However, most of the supporting evidence for these drugs derives from preclinical or in vitro studies, with limited human clinical trials specific to male infertility. Variability in formulation, dosage, and processing (suddhi/purification methods integral to Siddha pharmacy) further complicates direct extrapolation. Standardization of these Kayakarpam preparations, along with well-designed randomized controlled trials, is essential before their therapeutic claims can be validated in contemporary clinical practice.

CONCLUSION

This review highlights the therapeutic potential of Kayakarpam drugs in addressing male infertility through the lens of Annamaya Kosam. The reviewed herbs — Nerunjil (*Tribulus terrestris*), Thippili arisi (*Piper longum*), Orithazhthamarai (*Hybanthus enneaspermus*), Thamarai magarantha podi (*Nelumbo nucifera*), Aalampal (*Ficus benghalensis*) and Thuthuvalai poo (*Solanum trilobatum*) — exhibit antioxidant, aphrodisiac, androgenic, and spermatogenic properties that align closely with classical Siddha descriptions of thathu viruthi and sukkila thodam correction. The integration of traditional Siddha knowledge with emerging scientific

evidence offers a promising, holistic, and complementary approach to managing male infertility, particularly by restoring the physiological and nutritional integrity of the Annamaya Kosam. Nonetheless, further well-designed clinical trials with standardized formulations, appropriate dosage protocols, and long-term follow-up are essential to substantiate their efficacy and safety, and to facilitate the evidence-based integration of Kayakarpam into mainstream reproductive healthcare.

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