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SWADAMSHTRADI CHURNA, EXPLORING ITS POTENTIAL IN OLIGOSPERMIA

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ABSTRACT

Globally male infertility poses a significant health burden affecting millions of men with oligospermia being the most common and treatable cause. Oligozoospermia refers specifically to the condition where sperm concentration is below the lower reference limit of 15 million sperm/mL of ejaculate. In *Ayurveda*, oligospermia can be correlated with *Kshina Sukra*, one of the *ashtasukra dushti*. This condition occurs due to increased *vatapitha dosha* leading to qualitative and quantitative vitiation of *sukra dhathu* necessitating *sukravrdhikara chikitsa. Vajikarana*, a branch of *Ayurveda* focusing on *sukra vrddhikara chikitsa* offers diverse solutions for *Kshinasukra*, with *Swadamshtradi churna* being a prominent formulation. This formulation, consisting of *Swadamshtra, Ikshura, Masha, Athmaguptha beeja, Shatavari*, and *Kshira* as an *anupana*, addresses *dosha, dhatu, agni*, and *srotas* levels. With its predominance of *Madhura* and *Kitchit Tikta* rasa coupled with *Madhura vipaka* and *Guru Snigdha guna*, the *churna* effectively balances *Vatapitha dosha* and enhances *Sukradhathu.* Its subpharmacological actions such as *dipana, jeevaniya, brhmana, balya, harshana, sukra janana, sukrapravarthana*, and *vatapitha shamaka* properties contribute to its efficacy. This abstract reviews the therapeutic potential of *Swadamshtradi churna* providing insights into its mechanism of action, supported by pharmacological evidence, making it a promising treatment for oligospermia.

KEYWORDS: *Kshina Sukra*, Oligospermia, Infertility, *Swadamshtradi churna.*

INTRODUCTION

Every individual has a right to enjoy the optimal standard of physical and mental health including the freedom to make decisions regarding family planning. Yet infertility presents a significant obstacle in fulfilling these rights.[1] Infertility is a disease characterized by the failure to establish a clinical pregnancy after a year of regular, unprotected sexual intercourse,[2] affecting an estimated 72.4 million individuals globally.[3] Male Infertility is caused primarily by male factors encompassing: abnormal semen parameters or function; endocrine, genetic, anatomical, functional, or immunological abnormalities of the reproductive system; chronic illness; and sexual conditions incompatible with the ability to deposit semen in the vagina.[2] Approximately 40-50% of infertility cases in India are attributed to male factors, with sperm parameters being the predominant cause in around 2% of cases.[4] Oligospermia refers specifically to the condition where sperm concentration is below the lower reference limit of 15 million sperm/mL of ejaculate.[5] Modern lifestyle factors like mental stress, substance abuse, sedentary behaviors, environmental pollution, unhealthy dietary and clothing habits contribute to the rising prevalence of oligozoospermia.

As per *Ayurveda Samhithas Garbhotpadana* is a vital function of *Shukra dhatu* with *Apana Vayu* ensuring its proper expulsion. *Shuddhashukra*, denoting healthy semen, is characterized by *Dravata* (liquidity), *Bahalam* (thick), *Guru* (heavy), *Madhura* (sweet), *Snigdha*(unctuous), *Avisra* (without any putrid smell), *Picchila* (viscid), *Spatikabha* (crystalline), and *Taila kshoudra nibha* (consistency between sesame oil and honey).[6] Any deviation from these qualities may signal an imbalance in the *Sukravaha Srotas* resulting in infertility. Oligozoospermia can be correlated with *Kshina Shukra*, one of the *ashtasukradushti*[7] characterized by increased *Vata* and *Pitta Dosha*,[8] originates from the *Apana Vata* domain, leading to the qualitative and quantitative decrease of *sukra dhathu.*

Although Modern Medical Treatment has reached its peak with techniques like Medically Assisted Reproductive Technology (MART), in vitro fertilization, artificial insemination, and intracytoplasmic sperm injection, their acceptance in India remains limited. Despite notable advancements, these procedures face challenges, such as low success rates, largely unavailable, unaffordable, and limited accessibility across all socioeconomic groups.[9] Ayurvedic texts have described numerous aphrodisiacs drugs that are not only effective but also accessible to the common man. *Vajikarana*, a specialized branch of *Ayurveda*, extensively details the abnormalities of *Shukra Dhatu* and their treatment. This therapeutic approach,

promotes sexual health, treats male sexual disorders and improves fertility by nourishing reproductive organs, increasing sperm count and motility, and enhancing the viability of sperm for conception, thus ensuring the propagation of healthy future generations.[10] Moreover, the management of *Kshina Shukra* has been emphasized as *Upachaya* of *Shukra Dhatu*.[11] *Shukra Upachaya* can be achieved by two approaches, either tackling the associated *Dosha* i.e., *Vata* and *Pitta* or directly by *upachaya* of *Shukra* through the principles of *Samanya-Vishesha siddhanta* between the *dravya* and *Shukra*. *Swadamshtradi churna* exhibit qualities capable of addressing the *dosha* involved and also *Shukra upachaya guna*.

Mode of action of *vajikarana* drugs

Vajikarana therapy rejuvenates all seven *dhatus* restoring health and equilibrium while minimising *shukra* abnormalities and ensuring the birth of a healthy progeny. *Vajikarana dravyas* exert their effect by *Prabhava* (indefinable power). The absorption and action of *Vajikarana dravyas* are observed through two processes; *Ksheeradadhi Nyaya*, where successive *dhatus* are nourished, ultimately acting upon *Shukra Dhatu*, and *Khalekapota Nyaya*, directly nourishing *Shukra Dhatu*.

According to *Acharya Charaka*, substances categorized as *Vajikarana dravyas* possess certain qualities: *kinchitmadhura* (slightly sweet), *snigdha* (unctuous), *jivana* (restoratives), *brimhana* (which promotes anabolism), *guru* (heavy), *harshana*, (which cause joy),[12] *Sukrala dravyas*, on the other hand, exhibit characteristics *madhura* in *rasa*, *madhura* in *vipaka*, *shita* in *veerya*, and *guru-snigdha-pichila* in guna, contributing to their role in *sukravrdhi* due to their similarity to it. Additionally, *Kamottejaka dravyas*, which are *usna* in *veerya*, stimulate the nervous system of the reproductive system, primarily through the effect of *prabhava*.

Vajikarana dravyas are classified into the following types based on their specific actions[13,14]

1. *Shukrala / Shukrajanaka / Shura Vriddhikara/ Dehabalakara* – The drugs which facilitate and enhance the production of *Shukra Dhatu*. Examples are *Ashwagandha, Musali, Sarkara, Shatavari, Nagabala, Athmaguptha bija*. Based on *veerya, Shukrala* drugs can also be categorized into two types. i.e. *Ushna Virya Shukrala* and *Shita Virya Shukrala.*
2. *Shukra Shrutikara / Shukra Pravartaka/ Manobalakara* - Substances that induce the ejaculation of semen to the exterior of the body. e.g. Strychnos nux-vomica, Cannabis sativa, Myristica fragrans, Cassia occidentalis, Musk and Self-desire (*Sankalpa*-Psychological treatment)

3. *Shukra Shruti-vriddhikara / Shukra-Janaka-Pravartaka/ Dehamanobalkara* – The drugs having both generative (*Janaka)* and ejaculatory *(Pravartaka*) properties. Examples are *Dugda , Masha, Bhallathaka phala majja, Amalaki*

Male reproductive functions are governed by a complex interplay of neurochemicals, neuroendocrine axis modulation, and the actions of local mediators within reproductive tissues, facilitating both induction and inhibition processes.[15-17] The aphrodisiac may improve male reproductive functions possibly at three levels. (1)Herbs that act on the central or peripheral nervous system enhancing the responsiveness of male reproductive tissues. The neuronal regulation of male reproductive organs relies on a delicate balance of neurochemicals or neurotransmitters. Serotonin and dopamine are pivotal in controlling sexual behavior, with serotonin primarily exerting inhibitory effects and dopamine stimulating excitatory responses.[18] (2) Herbs which play a significant role in regulating nitric oxide levels thereby contributing to the treatment of erectile dysfunction. Nitric oxide (NO) serves as a vital endogenous mediator crucial for penile erection [19] and its synthesis via NO synthase primarily occurs in the brain structures involved in sexual behavior (olfactory bulb, amygdala, septal structures, supraoptic and paraventricular nuclei, etc.).[20,21] (3) Herbs which can positively modulate the Hypothalamic-Pituitary-Gonadal (HPG) axis, regulating key sex hormones like testosterone, LH, and FSH, along with interstitial hormones These effects optimize male reproductive function, support the development of secondary sexual organs and enhance male fertility.[22] *Vajikarana* also claims to have anti-stress, adaptogenic actions, easing anxiety associated with sexual desire and performance. Aphrodisiac substances not only enhance sexual performance and libido but also provide essential nutrients such as calcium, potassium, zinc, and magnesium crucial for supporting penile erection and overall well-being.[23]

Drug Review

Swadamshtradi churna described in *Ashtangahrdaya Utharasthana Vajeekaranavidhi* comprises powdered *Swadamshtra, Ikshura, Masha, Athmaguptha beeja*, and *Shathavari* combined with milk for optimal efficacy.[24]

Dose of administration: In classical texts, the recommended dosage for Choorna is mentioned as *Karsha* (6g)

Table No 1: *Swadamshtradi Churna* and Pharmacological Actions.

Sl.No	Drugs	Botanical Name	Parts used	Pharmacological Actions
1	***Swadamshtra***	Tribulus terrestris	Fruit	Diuretic, aphrodisiac, immunomodulatory, hepatoprotective, central nervous system activity, anti-inflammatory, Appetizer [25]
2	***Ikshura***	Asteracantha longifolia	Seed	Diuretic, aphrodisiac,[26] antioxidant, hepatoprotective activity
3	***Masha***	Vigna mungo	Seed	emollient, diuretic, nutritious, thermogenic, laxative, aphrodisiac appetizer [27]
4	***Athmaguptha***	Mucuna prurita	Seed	laxative, aphrodisiac androgenic, anti-inflammatory, antispasmodic, aphrodisiac, immune modulator, carminative[28]
5	***Shatavari***	Asparagus racemosus	Rhizome	emollient, cooling, aphrodisiac, diuretic, rejuvenating, antioxidant immune-modulatory[29]

Table No. 2: *Rasapanchaka* of *Swadamshtradi Churna.*

Drug	*Rasa*	*Guna*	*Veerya*	*Vipaka*	*Dosagnatha*	*Karma*
Swadamshtra[30]	*Madhura*	*Guru, Snigda*	*Sitha*	*Madhura*	*Vatapithasamak*	*Vrshya, mutrala, Deepana, pushtida*
Ikshura[31]	*Madhura*	*Guru, Snigda, pichila*	*Sitha*	*Madhura*	*Vatapitha shamak*	*Sukrashodana, vrshya, mutrala, anulomana*
Masha[32]	*Madhura*	*Guru, Snigda*	*Usna*	*Madhura*	*Vatashamak*	*Vrshya, sukrala balya, brhmana, sukravrdhvirekakrth, jeevaniya, mutrala*
Athmaguptha[33]	*Madhura, Tikta*	*Guru, Snigda*	*Usna*	*Madhura*	*Vatashamak*	*Vrshya, brhmana, balya,*
Satavari[34]	*Madhura, Tikta*	*Guru, Snigda*	*Sitha*	*Madhura*	*Vatapitha shamak*	*Vrsya, agni balavardhana, medh ya rasayana, sukrala, mutrala, balya*
Ksira	*Madhura*	*Guru, Snigda*	*sita*	*madhura*	*Vatapithasamak*	*Vrsya, Balya, ojasya*

Table No. 3: Chemical Constituents And Research Studies Conducted In the Drugs.

Drugs	Chemical constituents	Research studies
Swadamshtra	furostanol glycosides including protodioscin and protogracillin, furostanol, glycosides including protogracillin, flavonoids, flavonol glycosides, steroidal glycosides, steroidal saponins like protodioscin, furosteroidal saponins, sapogenins, furostanol glycosides, and alkaloids. Kaempferol, Tribuloside, terrestribisamide, Tribulusterine, hecogenin, terrestiamide,	Administration of T. terrestris to animals showed to improve plasma testosterone level and induced spermatogenesis. It increases sexual behavior evident through increase in mount frequency and intromission frequency, reduction in mount latency, intromission latency, and penile erection index as well as increase in prostate weight and intracavernosal pressure.[35] Tribulus is reported to contain

	xanthocine, fatty acid ester, Ferulic acid, Vanillin, B sitosterol, Proteins, Carbohydrate, Zn, Fe, Mg, Ca, K.[25]	protodioscin a steroidal saponin found in a number of plant species as acts by the release of nitric oxide in corpus cavernosum tissue, and also produces statistically significant increase in the levels of hormone testosterone, dihydrotesterone and dihydroepiandrosterone in animal studies. This event is related to nitric oxide and nitric oxide synthase pathway[36]
Ikshura	Asterol I, II, III, and IV, asteracanthine, asteracanthicine amino acids, histidine, lysine and phenyl-alanine. seed oil contain linoleic, oleic, stearic, palmitic and myristic acids, amino acids . Mineral elements Mn, Mg, Zn, Ca, Fe, Ni, Cr, Na, K, Al and Sr[26]	During a 4 week study on rats, administration of ethanolic extract of seeds shows androgenic effects and improved sexual behaviour. it also enhanced the histoarchitecture of testis and boost sperm count in epididymis while increasing testosterone level. The same study also reported a pronounced aphrodisiac effect.[37]
Masha	Flavonoids, isoflavonoids, phytoestrogens, phenolic acids, enzymes, fibers, starches, trypsin inhibitors, phytic acid, lectins, saponins, tocopherols. Protein and carbohydrates. Allantoin, glutathione, plant growth regulators, and lignin precursors are present in seeds. Contains genistein, kievitone, dalbergiodin, isoferreirin, eurenol, glycinol, hydrate, arbutin.[27]	In vivo study investigated the impact of alcoholic extracts of Vigna mungo Linn. seeds on general mating behavior, libido, and potency in male Wister albino rats. Results showed that the extract significantly increased mounting frequency, intromission frequency, decreased the mounting latency, intromission latency, post-ejaculatory interval, inter-intromission interval. and enhanced male reproductive organ weight, while also enhancing spermatogenesis, evidenced by elevated sperm count and improved testicular histopathology.[38]
Athmag uptha	nonprotein amino acid 3-(3,4 dihydroxyl phenyl)-L-alanine (L-Dopa) glutathione, lecithin, gallic acid, and beta-sitosterol. contain oils, including stearic, oleic, linoleic, and palmitic acids. proteins and amino acids are also found in *M. pruriens*, such as threonine, proline, tyrosine, phenylalanine, tryptophan, glutamic corrosive, aspartic corrosive, serine, lysine, histidine and arginine carbohydrate, fiber, and minerals, particularly potassium, magnesium, calcium, iron, sodium, phosphorus, copper, zinc and manganese.[28]	Alkaloids extracted from M. pruriens seeds were observed to stimulate spermatogenesis and increase the overall weight of the testicles and accessory glands in the male albino rat. The primary constituent of M. pruriens, L-DOPA, significantly contributes to its pro-spermatogenic properties.[39] improves male fertility by its action on thehypothalamus-pituitary-gonadal axis. A study on treatment withM. Pruriens significantly increased luteinizinghormone, serum testosterone, dopamine, adrenaline, and nor-adrenaline levels in infertilemen and reduce the levels of Follicle Stimulating Hormone (FSH) and Prolactine Hormone (PRL). Sperm count and motility were significantly improved in infertile men. it also corrects fructose levels counteracts oxidative stress induced lipid peroxidation in seminal vesicles and restored the levels of SOD, GSH, catalase and ascorbic acid in seminal plasma.[40]

Shatavari	Steroidal saponins, vitamins A, B1, B2, C, E, Mg, P, Ca, Fe, folic acid essential oils, arginine, asparagine, tyrosine, flavonoids (kaempferol, quercetin, rutin), resin, and tanninsteroidal glycosides (asparagosides), bitter glycosides, asparagines and flavonoids. diosgenin and other saponins such as shatavarin I,IV,V and VI-X were reported in roots.[29]	The aphrodisiac effect of hydro-alcoholic and aqueous extracts of Asparagus racemosus roots was assessed in male albino rats at doses of 200 and 400 mg/kg body weight. The hydroalcoholic extract showed stronger effect leading to increased mount and intromission frequency and reduced latency. Moreover, in vitro studies confirmed a significant rise in sperm count, indicating potential for treating oligospermia. Asparagus racemosus (Shatavari) significantly improved sexual behavior in male albino rats, potentially due to its testosterone-like effects, with possible involvement of nitric oxide-based interventions.[41]

DISCUSSION

The formulation *Swadamshtradi Churna*, as outlined in the *Ashtanga Hridaya's Vajikarana Vidhi*, comprises five key ingredients: *Swadamshtra, Ikshura, Masha, Athmaguptha*, and *Shathavari*, with *Ksira* used as the accompanying *anupana*. The mode of action of this *churna* can be comprehended by examining its effects at the level of *dosha, dhatu, agni* and *srotas.*

With a predominance of *Madhura* and *Kitchit Tikta rasa* coupled with *Madhura vipaka* and *Guru Snigdha guna*, the *churna* acts as a *Vatapitha shamaka* thereby increasing *Sukra dhathu* based on *Samanya-vishesha sidhantha*.

Dhathu parimana, dependent on *agni*, is pivotal in *Sukradhathu* production, with *Rasa* and *Sukra dhatu* being the primary *dhathus* involved in *Sukravahasrotodushti*. The *churna's Vatapithahara* and *Dipana properties*, along with *Ksira*, rectify vitiated *Pitha*, balances *agni*, and positively impact *Sukravaha srotas* and *Sukradhathu*. *Madhura rasa*, known for its *balya, prinana, jeevana, shareera sathmya, marutagna*, and *sukravardhana* properties, provides nourishment to the *saptha dhathus*, thereby increasing *Sukra dhathu*. Also the *Tiktha rasa* of *Athmaguptha, Shathavari*, and the *Usna veerya* of *Masha* and *Athmaguptha* enhances *Sukradhatu agni*, consequently increasing *Sukra dhathu*. Additionally, *Shita veerya dravyas* like *Swadamshtra, Ikshura*, and *Shatavari* act as *Sukrajanaka* or *Sukrala*, augmenting sperm count. *Mutrala* property of *Swadamshtra, Iksura, Masha, Shatavari* act as *srothoshodhakara* which corrects the *apana vata* vitiation and helps in proper ejaculation. Majority of the drugs in this churna are having antioxidant properties. oxidative stress is a significant factor in decreased sperm motility, highlighting the potential of antioxidant rich drugs to increase sperm quality by mitigating oxidative damage and enhancing seminal parameters and DNA

integrity.[42]

Anupana of *Swadamshtradi Churna* is *Godugdha* (milk) which is Nithyasevaniya dravya (advised to be used daily), *Shita, Brihmana, Viryavardhaka, Ojovardhaka, Shrama-Glani-Pipasahara* act as *Dhatu Pushtikaraka* (body tissue nourishing) and *sukrasruthivrdhikara* that reduces psychological stress and enhances sperm quality. *Sukrala* and *Vrsya dravya* exhibit subpharmacological activities including *dipana, jeevaniya, brhmana, balya, harshana, sukra janana, sukrapravarthana*, and *vatapitha shamaka* action. The constituents in the *Swadamshtradi churna* substantiate these attributes, making it a potent remedy for addressing male infertility.

CONCLUSION

Infertility presents a significant global challenge, affecting couples both socially and individually. The decline in seminal parameters is a pressing concern posing a threat to the continuity of the human species. Oligospermia, a leading cause of male infertility in India, can be correlated to *Kshinasukra* results from increased *Vata* and *Pitta dosha*, characterized by a decrease in the concentration of *Shukra* quantitatively as well as qualitatively. *Swadamshtradi Choorna* has a significant role in addressing oligospermia by enhancing seminal parameters as well as Sexual health associated with *Kshina Shukra*.

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