A Review on Siddha Herbal Formulation Dhathu Bhusti Chooranam for the Management of Male Infertility

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Abstract: Male infertility is one of the most serious social stigma encountered in the developed countries contributing approximately to almost half of all cases of infertility. Although various modern treatments and medical technologies are steadily progressing in the present era, majority of the causes are obviously unknown and therefore still unable to put forth the specific solution for the problem. In addition the synthetic drug therapy employed to treat infertility is more complicated and heavily loaded with a multitude of side effects. The Siddha system of medicine has an enormous collection of herbal formulations for the management of male infertility. Humans of yester years were well known for their strength and vigor which probably was due to their lifestyle of regular consumption of herbs, pollution and stress free environment. This study was aimed at evaluating the scientific facts behind the traditional Siddha formulation Dhathu bhusti Chooranam which is exclusively indicated in the Siddha text Noigalukku Siddha Parigaram for spermatogenic action and for the management of infertility in males.

Key words: Siddha, Dhathu Bhusti Chooranam, Male infertility, spermatogenetic action

Introduction

In recent years, infertility is an emerging global problem of concern. Worldwide there are an estimated 48.5 million couples with infertility of which male infertility ranges from 2.5% to 12%. The various causes of increase in infertility are consumption of alcohol, drugs and tobacco, emotional stress, lifestyle disorders such as diabetes, hypertension and obesity, electromagnetic radiation, malnutrition and exposure to environmental pollution [1-2]. Though infertility in males is considered to be 30% idiopathic, the oxidative stress mediated by reactive oxygen species (ROS) is more commonly being recognized as a causative factor which may impair spermatogenesis and decreases the sperm quality, motility and morphology [3-5]. Another reason for decline in spermatogenesis has been attributed due to disruptions in hypotalamic-pituitary-gonadal (HPG) axis which is responsible for the complex interplay between the gonadotrophic hormones FSH, LH, and testosterone [6].

Method of Drug Preparation

Dhathu bhusti chooranam is a Siddha herbal formulation containing the ingredients Nilapanai Kizhangu (Curculigo orchioides), Boomi Sharkarai Kizhangu ((Ipomoea mauritiana), Poonai Kali (Mucuna pruriens), Salamisri (Orchis latifolia), Thaneer vittaan kizhangu (Asparagus racemosus). 120 gms of each of the above mentioned ingredients are to be taken and dried well. The dried pieces should be finely powdered and then sieved by fine cotton cloth. The indicated dosage regimen is 2 gms twice a day before food with Cow's milk. This formulation is precisely indicated for development and maturation of semen, strength and general vitality, impotence and nervine tonic [7].
The drugs used in Siddha medicine were identified and selected according to tridosha theory of Vatham, Pitham and Kabam which in turn is constituted by means of the universal components earth, water, fire, air and space (Panchabuthas). Depending upon the five elemental constitution they exist in six tastes namely Inippu (sweet), Pulippu (Sour), Uppu (Saline), Kaippu (Bitter), Karppu (Pungent) and Thuvarppu (Astringent). The idea of suvai (taste) attributes to the pharmacological properties of a drug and subsequently for the clinical usage of the medicine.

All the ingredients of the herbal formulation Dhathu Bhusti Chooranam possess Inippi Suvai (sweet taste). According to the Siddha theory of taste, the sweet taste is said to nourish the seven physical constituents (Udal Thathukkal) and gives pleasure to the mind and five senses. Semen is the seventh physical constituent which is mentioned as ‘sukkilam’ and therefore increase in the quality and quantity can be contributed by sweet taste. Moreover sweet taste is also said to pacify the vitiated pitha dosha which is responsible for the low quality sperms and decline in spermatogenesis [8]

Scientific evaluation of ingredients of Dhathu Busti Chooranam (DBC)

*Curculingo orchoides*

*C. orchoides* is a threatened perennial herb mainly found in the rocky slopes of peninsular India [9]. It is a stemless shrub with a tuberous root about 10cm. The rhizomes are fleshy and are commonly known as Goldeneye grass and Orchid palm grass. It is called as Kali musli in Hindi, Talamuli in Bengali, Nilappanai kilangu in Tamil and Nela tengu in Kannada. The plant is loaded with surplus phytochemicals which offer panacea to corporate illness. The rhizomes of this shrub are used as a ‘rasayana’ drug in Indian Ayurveda, Chinese medicines and other traditional treatment methods. The plant has increased biological activity against hyperglycemia or diabetes, cancer, infertility and hepatoxicity [10].

The rhizomes have a bitter taste and used in the traditional system of medicines as aphrodisiac, appetizer, reducing fever, calculi reduction in gallbladder, various skin infections, asthma, hepatitis, diarrhoea, wound infections, eye infections, and other various sexually transmitted diseases [11,12].
Sahoo et al., in 2014 demonstrated the aphrodiasiac potential of *C. orchoides* along with few other medicinal plants in a polyherbal formulation. There was a notable increase in mating behavior and performance of male Swiss Albino rats when treated with a polyherbal formulation containing *C. orchoides* [13]. Similar studies on the spermatogenetic efficacy like penile erection, mating performance, mount frequency and mount latency of the plant were carried by various researchers [14]. The entire plant is a repository of beneficial phytochemicals which are natural therapeutics. The rhizomes are rich in Saponins like Curculigenins A, B and C, Curculigasoponins A-F; Curculigosaponins and Yuccagenins. New phenolic glucosides and phenolic glycosides were isolated by various researchers [15-17]. About 8 Orcinal glycosides were reported by Wu et al. in 2005 and Many therapeutically efficient fatty acids like linolenic, palmitic, behenic, archedic, and oleic acids were isolated by Mehta et al., in 1980 [18,19].

**Ipomea mauritiana Jacq.**

*Ipomea mauritiana* Jacq. is basically a tropical shrub evenly distributed throughout Indian deciduous and evergreen forests [20]. The plant belongs to the family Convolvulaceae and is a key ingredient in various Ayurveda preparations. The plant is commonly called as giant potato and ‘palmate morning glory’. The Indian vernacular names are nilap pucani in Tamil, bhuchakra gadda in Telugu; bhumikumvali in Malayalam and bhuin kakharu in Sanskrit.

Different therapeutic compounds have their existence in different parts of *I. mauritiana* like terpenoids, taraxerol, taraxerol acetate, coumarins like scopotinin and 7-O-β-D glycopyranosyl scoleptin and various plant sterols like β-sitosterols, phenolic compounds like flavonoids, isoflavonoids, lignans, derivatives of cinnamic acids and tannins [21]. Sulaiman et al., isolated phenolic antioxidants like Caffeoyl glucose from mass spectroscopic studies [22]. Researchers in Ayurveda and Siddha have long claimed that the plant has substantial aphrodiasic activity [23]. More scientific evidence of the aphrodiasic capability of the shrub is a binding incumbent on the plant researchers.

**Mucuna pruriens**

*Mucuna pruriens* is a tropical climber indigenous to tropical countries like India, Central Africa, China and West Indies. It belongs to the typical bean family Fabaceae producing casket like pods holding seeds known as ‘mucuna beans’. The plant is commonly known as velvet beans, cowhage or buffalo beans. The plant has been used in traditional medicine all over the tropical world since ages. The vernacular names of *M. pruriens* in India are kiwachin in Hindi, khaj-kuiri in Malayalam, punaippidukkan in Tamil and Pilliadugi in Telugu. The protein content present in *M. pruriens* is comparatively higher (about 25-30%) when compared with other ‘counterpart’ pulses like soy bean, rice and lima bean [24]. The prickly stings on the pod is extremely itchy to human skin when comes in contact [25].

In Indian traditional system of medicine, the seeds of *M. pruriens* are used as potential drug to increase the quantity of semen and stimulate ejaculation and sexual performance [26]. Five different alkaloid bases were extracted from the plant and the spermatogenic enhancing activity of the plant has been attributed to these alkaloids. In addition, the presence of these alkaloids greatly augments the secretion of testosterone and increase in sperm count [27]. Ketkar et al., reported the
enhanced sexual competence of the lipid extract of *M. pruriens* over other conventional extracts like aqueous, methanolic, and ethanolic extracts [28]. Many other researchers have reported the aphrodisiac activities like increased mount frequency, latency, intermission frequency, intermission latency of *M. pruriens* along with other medicinal herbs in a polyherbal formulation [29].

*M. pruriens* and its major compound L-DOPA recuperates the induced male gamtogenic repair like changes in count and sperm motility, reduced ROS levels, degradation of mitochondrial membrane potential and apoptosis due to ethinyl estradiol in rat model [30]. The ethanol seed extract of *M. pruriens* greatly ameliorated the sexual related secondary complications like improved sexual behavior, libido, increased potency and increase in epididymal sperm count after 60 days of feeding with *M. pruriens* supplement. Administration of *M. pruriens* seeds augmented sperm count and motility in an infertile male group in a clinical setting study. The treatment corrected the level of total lipids, triglycerides, cholesterol, phospholipids, vitamin A, C and E, fructose in the seminal plasma of infertile male subjects [31]. Another study indicated the improvement of T, LH, dopamine, adrenaline, nor adrenaline and decreased levels of FSH and PRL in infertile male clinical subjects [32].

**Asparagus racemosus**

The species of Asparagus belonging to the family Liliaceae are natural inhabitants of the Himalayas. All the species of this family have rich constituency of vital biological substances like antioxidants, immunostimulants, anti-inflammatory, antipatotoxic, antibacterial, antioxytocic and aphrodisiac agents widely renowned for their medicinal properties. *Asparagus racemosus* with its bitter and sweet flavor is used in the treatment of dysentery, tumors, inflammation, biliousness, leprosy, epilepsy, and night blindness [33,34]. The reproductive parts contain therapeutically rich flavonoids like quercetin, rutin (2.5% dry basis), kaempferol, and hyperoside, and the leaves contain diosgenin and quercetin-3-glucuronide. Saponins which are called the foaming glucosides of plants are present abundantly in the roots and form the major bioactive constituent of the entire family *Asparagus*. The roots have long been used in traditional system as laxatives, tonic, aphrodisiac, galactagogue. They are also used to treat schistosomiasis, tuberculosis and other kidney and liver diseases. The vegetative parts of the plant possess therapeutically rich compounds like thiophene, thiazole, aldehyde, ketone vanillin, and asparagusic acid. The entire plant *A. racemosus* is rich in vitamins A, B₁, B₂, C, E, Mg, P, Ca, Fe, and folic acid. In addition the plant contains essential oils, asparagine, arginine, tyrosine, flavonoids (quercetin, and rutin), resin, and tannin. The isolation and spectral data of a new isoflavone, 8-methoxy-5, 6, 4'-trihydroxyisoflavone 7-O-beta-D-glucopyranoside (1), from the roots of *Asparagus racemosus* are reported [35]. They are also believed to promote fertility, reduce menstrual cramping, and increase lactation nursing mothers.

**Orchis latifolia**

This plant belongs to the family Orchidaceae. They grow on damp soil in the northern hilly slopes of the Himalaya at altitude of 2500-5000m. The orchid is commercially used as it yields nutritious and medically efficient flour called ‘salep’ which is popular in the Arabian countries. The entire plant is used in all traditional system of medicines. It is called salam in Hindi, munjatak in Sanskrit, calamiciri in Tamil and salamisri in Malayalam. The tubers are used to enhance sexual activity. The species contain about 50% of mucilage glucans, acetylised starch, 25% of glucomannans and 5-15% of proteins [36]. The genus name...
‘Orchis has its origin from the Greek word ‘opxic’, which means ‘testicle’. Hence this plant has been used since ages as a sexual stimulant and to treat infertility. Many species of this genus are used in different traditional medicines as anti rheumatic, anticancer, anti inflammatory, anti viral and to treat dysentery, diarrhea, pyrexia, cough, physical injuries and various stomach ailments. The extract of the plant is usually given to women post-delivery to treat general weakness and to increase regenerative fluids in the body.

Thakur and Dixit, studied on the efficacy of fructo oligosaccharide rich O. latifolia extract against streptozotocin and allozan induced sexual dysfunction in rats. The results claimed that diabetes induced sexual dysfunction can be greatly ameliorated by diabetes induced sexual dysfunction in rats. The results claimed that diabetes induced sexual dysfunction can be greatly ameliorated by diabetes induced sexual dysfunction in rats.


Avasthi et al., studied the antimicrobial activity of different fractions of methanolic extract of O. latifolia. They concluded that the n-hexane and ethyl acetate fractions were more active against many multi drug resistant strains like Candida albicans. In another study, the ethanolic extract of O. latifolia showed antibacterial activity against opportunistic bacteria like E.coli, P. aerogenosa, S. aureus and B. subtilis. In traditional system of medicine especially in Ayurveda and Siddha, the bark of the roots of the orchid is used to treat decreased sperm count, impotence and erectile dysfunction [39].

Animal studies on Dhathu busti Chooranam

The mounting behavior of Dhathu busti Chooranam was tested in adult Swiss male mice (25-35 gm). A dose-dependent improvement in sexual behavior was observed by an increase in mount frequency. The results ensure that the drug enhances the penile erection of male mice indicating its aphrodisiac action which may be beneficial in conditions such as erectile dysfunction (ED). The drug also showed increased neuronal responses in terms of alertness, visual pacing, reactivity and touch response in both doses of 100 mg and 200 mg indicating that the drug is a good nerve tonic. Biochemical analysis revealed the presence of calcium, magnesium, sodium, potassium, borate and reducing starch enriches the essential minerals and nutrients which assist in improving the quality of sperms and spermatogenesis [40].

Conclusion

Upon validating the Dhathu busti Chooranam it has been found scientifically that the phytoconstituents of all the ingredients have proven to enhance the quality and quantity of sperms and possess spermatogetic efficacy like penile erection, mating performance, mount frequency and mount latency besides having antioxidant action, nutritive and antimicrobial action and other pharmacological utilities. The Siddha literature analysis based on humoural and taste theory has revealed its ability to pacify the vitiated pitha dosham thereby enhancing the spermatogenesis. While preclinical animal studies on DBC has confirmed its aphrodisiac action, further clinical trials may be essential to provide evidence for the clinical efficacy of this time-tested herbal formulation in humans.

Reference

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