



Review Article

**SHUKRALA (SPERMATOGENIC) POTENTIALITY OF MADHYAMA PANCHAMOOLA- A REVIEW**

**Nagendra Chary.M<sup>1\*</sup>, Lalitha B.R<sup>2</sup>, T.Anil Kumar<sup>3</sup>**

\*<sup>1</sup>Ph.D Scholar, <sup>2</sup>Professor and HOD, Department of Dravyaguna Government Ayurveda Medical College, Bengaluru, Karnataka, India.

<sup>3</sup>Professor and HOD, Department of Medicine, M.S Ramaiah Medical College, Bengaluru, Karnataka, India.

**ABSTRACT**

Propagation of human race get affected by both male and female factors. Male infertility contributes 50% of total infertility. *Ksheenashukra* (Oligospermia) is one of the commonest conditions for male infertility caused by *Vata pitta dosha*. Ayurvedic approach to rectify pathology of *Ksheenashukra* is through *Vrushya* (Aphrodisiac), *Shukrajanaka*, (Spermatogenic) *Shukravardhaka* (enhancing Semen and Sperm), *Shukrapravataka* (improve the ejaculatory process) and *Shukrala* etc pharmacological activities. The drug which enhances *Shukra* (Semen and Sperm) is named as *Shukrala* (Spermatogenic) activity. *Madhyama panchamoola* a group of drugs comprising of *Bala* (*Sida cordifolia*), *Punarnava* (*Boerhavia diffusa*), *Eranda* (*Ricinus communis*), *Mudgaparni* (*Teramnus labialis*) and *Mashaparni* (*Vigna trilobata*). Review of literature reveals that each of these drugs has *Balya* (Strength promoter), *Vrushya*, *Rasayana* (Rejuvenation), *Jeevaniya* (Life promoting) and *Shukrajanana* (Spermatogenic) properties. *Madhyama panchamoola* as a group not had been evaluated for its potentiality as *Shukrala* but each of them individually proven for antioxidant, spermatogenic, antidiabetic and hepatoprotective activities. Phytoconstituents present in this viz., Ecdysterone, Boeravinone, Rotenoids, Octacosanol, Vitexin, Quercetin and Bergenin have been confirmed for spermatogenic activity. Reactive oxygen species identified as cause for male infertility. Hence antioxidant is used as a source of treatment. Components of *Madhyama panchamoola* in addition to antioxidant activity have other required pharmacological activities in the management of *Ksheenashukra*. This review upholds the compatibility ingredients of *Madhyama pancha moola* to be potential *Shukrala* combination.

**KEYWORDS:** *Madhyama panchamoola*, *Shukrala karma*, Antioxidants, Spermatogenic activity.

**INTRODUCTION**

Infertility as a medical and social problem has acquired global dimension, and its incidence is supposed to be increasing by day and every decade. It is affecting global population about 8-12%<sup>[1]</sup>. Low sperm count (Oligospermia) and poor sperm quality are responsible for male infertility in more than 90% of cases<sup>[2]</sup>. *Vrushya karma* has been described as *Shukra janana* meaning any drug which helps for spermatogenesis<sup>[3]</sup>. Drugs with *Guru*, *Snigdha guna*, *Madhura rasa*, *Brumhana*, *Balya* and *Harshana* activities said to have *Vrushya karma*<sup>[4]</sup>. *Madhyama panchamoola* is one of such combination having five drugs consisting of *Bala*, *Punarnava*, *Eranda*, *Mudgaparni* and *Mashaparni* mentioned for the first time by *Acharya Vagbhata* in *Astanga hrudaya*<sup>[5]</sup>. *Bala* is *Vrushya*<sup>[6]</sup>. *Punarnava* is *Rasayana*<sup>[7]</sup>. *Eranda moola* is drug of choice for *Vrushya* and *Vatahara* activities<sup>[8]</sup>. *Mudgaparni* and *Mashaparni* are grouped under *Jeevaniya* and *Shukrajanana gana*<sup>[9,10]</sup>. The members of *Madhyama panchamoola* are used in

various *Vrushya yogas* (Aphrodisiac formulations). The members of *Madhyama panchamoola* as a group not referred to as *Shukrala* in classics. Research updates are not available for this group till date. Therefore in this article an attempt is made to explore *Madhyama panchamoola* as a group for *Shukrala* activity.

**OBJECTIVES**

1. To explore the *Shukrala karma* of each drug in *Madhyama panchamoola*.
2. To establish *Shukrala karma* (Spermatogenic activity) of *Madhyama panchamoola*.

**MATERIAL AND METHODS**

Literary review of classical texts namely Charaka samhita, Sushruta samhita, Astanga hrudaya, Sharangadhara, Dhanvantari, Kaiyadeva nighantu, Data base on medicinal plants and conventional system of medicine.

### Madhyama Panchamoola

Categorization of *Dravyas* (Drugs) into smaller group based on morphology, property, action and parts used are listed in the texts. Group of five drugs under the head *Panchakas* like *Kaniyaka*, *Bruhat*, *Valli*, *Kantaka* and *Truna panchamoola*. The group of drugs in *Madhyama panchamoola* as mentioned by *Vagbhata* find their place as ingredients in *Bramha rasayana* explained by *Acharya Charaka*. Under the list of ingredients as one among *Panchamoolas*- '*Punarnavam shurpaparnau balamerandameva cha*' The commentator *Gangadhara* mentioned these as *Vallipanchamoola*.<sup>[11]</sup> Further *Acharya Vagbhata* had given the nomenclature as *Madhyama panchamoola* for this group and added *Kaphavatahara* and *Sara guna* properties. The commentator of *Astanga hrudaya Hemadri* in his commentary *Ayurveda Rasayana* he named *Madhyama panchamoola* as *Baladi panchamoola*.<sup>[12]</sup> Afterwards *Madhyama panchamoola* name continued by later authors of *Dhanvantari*, *Kaiyadeva nighantu* etc.

### Bala (*Sida cordifolia*)

*Bala* is country mallow belongs to *Malvaceae* family. It is an annual or perennial, short, erect grayish-green softly hairy or pubescent woody under shrub. Flower bisexual, light or sulphur yellow to cream white in colour. Its root contains ecdysone viz *sidasterone A* and *B*, *Ephedrine*, *Vasicine*, *Vasicinol*, *Vasicinone*,  $\beta$  *sitosterol*, *stigmasterol* and *N-Methyl tryptophan*. Its pharmacological actions include anti-inflammatory, hypoglycemic, immunostimulant, hepatoprotective, adaptogenic and antioxidant activities<sup>[13]</sup>. In vitro study of the aqueous extract of *Sida cordifolia* was significant in enhancement of sperm parameters<sup>[14]</sup>. Research formulation made from roots of *Sida cordifolia* and *Glycyrrhiza glabra* showed significant ( $p < 0.05$ ) therapeutic efficacy through enhancement in hormonal and seminal parameters validating its spermatogenesis effect without any toxic or adverse effects<sup>[15]</sup>.



Fig 1. Bala (*Sida cordifolia*)



Fig 2. Bala root

### Punarnava (*Boerhavia diffusa*)

It is a spreading hog weed, perennial, diffusely branched prostrate herb belongs to *Nyctaginaceae* family. Leaves ovate or oblong and

cordate long petioled, flowers red, pink or white in small umbrellas. Root has large tuberous cylindrical to narrowly fusiform, conical tapering brown or brownish grey in colour.<sup>[16]</sup> The root contains Alanine, Arginine, Aspartic acid, Glutamic acid. Flavonoid derivatives quercetin, kaempferol and retenoids Boeravinone and possess antioxidant property<sup>[17]</sup>. This plant rejuvenates liver, male reproductive system, aphrodisiac, increase quality and quantity of semen.<sup>[18]</sup> An experimental study revealed that *B.diffusa* leaf extract supplementation attenuates sodium fluoride (NaF) induced testicular impairment in rats.<sup>[19]</sup>



Fig 3. Punarnava (*Boerhavia diffusa*) Fig 4 Punarnava root

### Eranda (*Ricinus communis*)

Tall annuals, sometimes shrubby or tree like leaves are alternate, broad palmately 5-11 lobed, serrate, flowers monoecious, in terminal sub paniculate racemes. The roots are light weight, profusely branched, outer surface yellowish brown, and rough due to presence of longitudinal wrinkles, odourless and granular fracture. It contains inorganic material like Potassium, Calcium, Sodium, magnesium, Iron, Aluminium, Gallotannins, ricin triglyceride, 3- acetoxyl acid, stigmasterol, ricinine, methyl-3-dihydroxy benzoate, gallic acid, aleuritic acid, ethyl brevifolincarxylate, 9-hydroxytridecyl decosanote, lupeol, luteolin, palmitic acid, octacosanol and octadecane<sup>[20]</sup>. Roots are anti-diabetic anti-inflammatory and antioxidant activities<sup>[21]</sup>.



Fig 5 Eranda (*Ricinus communis*) Fig 6. Root

### Mudgaparni (*Vigna trilobata* Linn)

A diffuse prostrate or trailing herb belongs to family *Fabaceae*. Leaves 3 foliate, leaflets membranous, shallowly lobed, middle lobe is largest. Flowers yellow in colour. It has phytochemicals like Dalbergiodin, kievitone, phaseollidin and flavonoid glycosides viz., Quercetin, Kaempferol, Vitexin, Isovitexin, friedelin, epifriedelin, stigmasterol, and tannins. The fruit of this plant contains proteins, minerals, and vitamin K and C. The bean contains

methionine, tryptophan, and tyrocine and the seed protein bears lysine, valine, leucine and phenylalanine. It possesses hepatoprotective and antioxidant activities.<sup>[22]</sup>



Fig 7. *Mudgaparni (Vigna trilobata)* Fig 8. *Mudgaparni root Mashaparni (Teramnus labialis Spreng)*

A widely spreading twining herb, stems slender more or less hairy belongs to Fabaceae. Leaves 3-foliolate, flowers reddish. It has root with lateral roots occur in cylindrical, branched pieces, light brown to dark brown with longitudinal and transverse cracks lateral roots thin, smooth,

moderately woody fracture short and laminated.<sup>[23]</sup> It contains Crude protein, fat, nitrogen free extracts, the essential amino acid, lysine, leucine, isoleucin, arginine, valine, and histidine, minerals such as potassium, magnesium, calcium and phosphorus also phenols, tannins, L-DOPA, Hydrogen cyanide phytic acid, flavonol glycoside, vitexin, bergenin.<sup>[24]</sup> A comparative clinical study on efficacy of *Mashaparni* and *Kapikachhu* in Oligospermia has shown that both the drugs have equal effect in Oligospermia.<sup>[25]</sup>



Fig.9 *Mashaparni* Fig.10 *Mashaparni root*

**Table 1: Properties and pharmacological actions of *Madhyama panchamoola* drugs**

S.no	Name of the drug	Properties				
		Rasa	Guna	Veerya	Vipaka	Karma
1	<i>Bala</i>	<i>Madhura</i>	<i>Snigdha, Pichhila</i>	<i>Sheeta</i>	<i>Madhura</i>	<i>Vatapittashamaka, Brumhana, Balya, Shukrala, Ojovardhana</i> <sup>[26]</sup>
2	<i>Punarnava</i>	<i>Madhura Tikta</i>	<i>Laghu, Rooksha</i>	<i>Ushna</i>	<i>Madhura</i>	<i>Tridosahara, Deepana Anulomana, Vrushya Rasayana</i> <sup>[27]</sup>
3	<i>Eranda</i>	<i>Madhura</i>	<i>Snighda, Teekshna, Sukhma</i>	<i>Ushna</i>	<i>Madhura</i>	<i>Vatahara, Balya, Vrushya, Shukrashodhana</i> <sup>[28]</sup>
4	<i>Mudgaparni</i>	<i>Tikta Madhura</i>	<i>Laghu Rooksha</i>	<i>Sheeta</i>	<i>Madhura</i>	<i>Tridosahara, Deepana, Anulomana, Jeevaneeya Shukrala, Vrushya</i> <sup>[29]</sup>
5	<i>Mashaparni</i>	<i>Tikta Madhura</i>	<i>Laghu, Rooksha Snigdha</i>	<i>Sheeta</i>	<i>Madhura</i>	<i>Vata pitta shamaka Deepana, Anulomana Balya, Jeevaniya Shukrajanana</i> <sup>[30]</sup>

### **Shukrala Karma**

*Vajikarana* is composed of three fold actions; a) *Shukra janaka* b) *Shukra pravartaka* and c) *Shukra janaka, Pravartaka*.<sup>[31]</sup> *Vrushya* and *Vajikarana* terms are used for *Shukrala karma*.<sup>[32,33]</sup> *Vrushya* has been specified as *Shukra janaka* whereas *Vajikarana* has *Shukra pravartaka* actions.<sup>[34]</sup> According to *Acharya Sharangadhara*, *Shukrala karma* means the drug which increases the *Shukra* is called *Shukrala*.<sup>[35]</sup> In *Kaiyadeva nighantu* *Shukrala* is understood as *Shukra janana* which means spermatogenic activity.<sup>[36]</sup> *Shukrala* has varied activities, mainly comprise both *Shukra janaka* and *Pravartaka*.<sup>[37]</sup>

### **Antioxidant and Spermatogenesis**

Antioxidants are molecules that fight against free radicles. Molecule that contain unstable oxygen

can cause damage to cell are reactive oxygen species. High percentage of Reactive Oxygen Species (ROS) have been noticed in the semen samples of 25% to 40% of infertile men.<sup>[38]</sup> It damages the sperm plasma membrane that leads to loss of sperm motility and ability of sperm to fuse with oocytes resulting in infertility. Seminal oxidative stress is one of the main factors in pathogenesis of male infertility. Oxidative stress can be quantified by Malondialdehyde (MDA) and total antioxidant assay of the semen plasma. Antioxidants are most commonly used for oxidative stress-induced infertility. Clinical studies demonstrated that beneficial effect of oral antioxidant in male infertility.<sup>[39]</sup>

**Table 2: Bioactive active components with relevant research updates of *Madhyama panchamoola***

S.No	Name of drugs	Bioactive components	Pharmacological activities
1	<i>Bala (Sida cordifolia)</i>	Ecdysterone	Improves the sexual functions and sperm quality [40]
2	<i>Punarnava (Boerhaavia diffusa)</i>	Boeravinone B and G Rotenoids	Anti-stress activity, Antioxidant [41]
3	<i>Eranda (Ricinus communis)</i>	Octacosanol	Improves Volume, Sperm concentration, Motility, in rats [42]
4	<i>Mudgaparni (Vigna trilobata)</i>	Vitexin, Quercetin	Vitexin- Antioxidant, ameliorates sexual dysfunction and fertility impairments in male diabetic mice. Quercetin improves sperm morphology and functions [43,44]
5	<i>Mashaparni (Teramnus labialis)</i>	Vitexin, Bergenin	Bergenin-Antioxidant, Improves sperm concentration, diabetic testicular complications Reduce the sperm DNA Damage in Wistar albino rats[45]

## DISCUSSION

The ancient seers of Ayurveda have identified hundreds of pharmacological activities. Specific *Karma* mentioned in relation to *Shukravaha srotas* are *Shukrajanaka*, *Shukravardhaka*, *Shukraprada*, *Shukrashodhaka*, *Shukrastambhaka*, *Shukrarechaka* and *Shukrala* etc. The terms *Vajikarana*, *Vrushya* and *Shukrala* are often used synonymously based on their applicability each one has specific meaning.

*Vajikarana* is one amongst branches of Ayurveda, which comprises multi therapeutic modalities. *Vrushya* is the word indicating of pharmacological activities utilized in *Vajikarana* treatment. *Shukrala* is specific vital activity required in treating *Shukradusti*. *Shukrala* is having three fold activities namely *Shukra janaka*, *Shukra pravartaka* and *Shukra Janaka* and *Pravartaka*.

Drugs possessing these activities are named as *Shukrala* drugs. *Madhyama panchamoola* term given to group consisting of *Bala Punarnava*, *Eranda*, *Mudgaparni* and *Mashaparni*. All these drugs commonly having *Madhura rasa* and *Madhura vipaka*. *Bala*, *Mudgaparni* and *Mashaparni* are *Sheeta veerya* drugs where *Punarnava* and *Eranda* are *Ushna veerya*. *Bala*, *Eranda* and *Masha parni* are *Vatapittahara*, *Punarnava* and *Mudgaparni* are *Tridosahara*. These five drugs have action on *Shukravaha srotas* with *Eranda* has *Shukrashodaka* *Mashaparni* and *Mudgaparni* are *Shukrajanaka*. Except *Eranda* all four drugs are *Rasayana*. *Mudga parni*, *Mashaparni* and *Punarnava* have *Deepana* activity too.

*Dathu parimana* (metabolism) is the key factor in production of *Shukra* which depends upon *Agni*. The mental factors for *Shukrapravartana* influenced by *Vata Pitta dosha* and *Bala*. Thus *Shukrala* has sub pharmacological activities like *Deepana*, *Jeevaniya*, *Bhrumhana*, *Balya*, *Harshana*,

*Shukrajanana*, *Shukra shodhana* and *Tridosahara* and *Vatapitta shamaka* etc. Drugs in *Madhyama panchamoola* collectively have all these requisite pharmacological actions.

It is established that spermatogenesis requires antioxidants. These drugs are proven antioxidants and also these drugs rectify impairment of seminal parameter and libidinal functions. *Madhyama panchamoola* as a group can be a potential *Shukrala*.

## CONCLUSION

Drugs of *Madhyama panchamoola* individually potent and have proven effect for *Shukrala* and antioxidant activity. With the variant of additional pharmacological activities *Madhyama panchamoola* can be potential *Shukrala* combination.

## REFERENCES

1. Marcia C.Inhorn. Global infertility and globalization of new reproductive technologies; illustrations from Egypt. Social sciences & Medicine.2003; 56 (9): 1837-1851.
2. Ira D. Sharlip et al. Best practice policies for male infertility and sterility. 2002;77 (5): 873-882.
3. Vaidya Jadavji Trikamji Acharya. Sushruta samhita. (Sutrastana 46/102) Varanasi; Chaukambha Sanskrit Sansthan; 2002. p.223.
4. Vaidya Jadavji Trikamji Acharya. Charaka samhita (Chikitsastana2-4/36).Varanasi; Chaukambha Sanskrit Sansthan; 2004. p.397.
5. Vaidya Yadunandan Upadyaya. Ashtanga hrudaya (Sutrastana 6/161). Varanasi; Chaukamba Samskrit samsthana; 2003. p.66.
6. Dr.Jharkhandey ojha. Dhanvantari nighantu. Varanasi; Bhanarus hindu university; 1985.

7. Vaidya Yadunandan Upadyaya. Ashtanga hrudaya (Uttarastana 39/154). Varanasi; Chaukamba Samskrit samsthana; 2003. 605.
8. Vaidya Jadavji Trikamji Acharya. Charaka samhita (Sutrastana 25/40). Varanasi; Chaukambha Sanskrit Sansthan; 2004.p.131.
9. Vaidya Jadavji Trikamji Acharya. Charaka samhita (Sutrastana 4/1).Varanasi; Chaukambha Sanskrit Sansthan; 2004.p.32.
10. Vaidya Jadavji Trikamji Acharya. Charaka samhita (Sutrastana 4/ 19). Varanasi; Chaukambha Sanskrit Sansthan; 2004.p.33.
11. Vaidya Jadavji Trikamji Acharya.Charaka samhita (Chikitsastana 1/43). Varanasi; Chaukambha Sanskrit sansthan; 2004.p.378.
12. Vaidya Yadunandan Upadyaya. Ashtanga hrudaya (Sutrastana 6/161) Varanasi; Chaukamba Samskrit samsthana; 2003.p.66.
13. Database on medicinal plants used in Ayurveda. New Delhi; CCRAS. Vol 8. P.48.
14. Mrudu gupta, Saikat chowdhary, Sukumar manna. In vitro impact assessment of aqueous extract of Sida cordifolia Linn upon rat spermatozoa parameters. Asian Journal of Medicine and health. 2016;1 (2):1-10.
15. Mrudu gupta, Asim kumar mondal. Clinical evaluation of aphrodisiac activity of novel Ayurveda formulation for treatment of male sexual disorders. International journal Research in Medical sciences. (IJRMS).2020;8(7):2515-2523.
16. Kuldeep Rajpoot, R.N Mishra Boerhaavia diffusa roots (Punarnava moola) - review as Rasayana (Rejuvenator/ Anti-ageing); International Journal of Research in pharmaceutical and biomedical sciences. 2011; 2 (4): 1451-1460.
17. Pronate nayak, Thirunavoukkarasu. A review of the plant Boerhaavia diffusa its chemistry Pharmacology and therapeutical potential. The journal of phyto pharmacology 2016;5 (2):83-92.
18. Santhosh D et al. Punarnava a review. Res j pharma Bio Chem Sci (RJPBCS). 2011;2(4):427-436.
19. Shashi A, Khan I. Boerhavia diffusa L supplementation attenuates fluoride induced testicular Impairments in rats. Arch Anat Physiol. 2017; 2 (1) :27-35.
20. Z-N Tang et al. Chemical constituents from roots of ricinus communis. Chinese traditional and herbal drugs. 2012; 43 (1); 15-19.
21. Faheem Ahmed and Moshin Iqbal. Antioxidant of Ricinus communis. Organic and Medicinal Chemistry JPPublishers.2018; 5 (3);1-6.
22. Navpreet kaur et al. Phytochemical and pharmacological attributes of Phaseolus trilobus- A Major herbal ingredient of pharma products. Universities journal of Phytochemistry and Ayurvedic Heights. 2012; 1 (12):58-63.
23. Database on medicinal plants used in Ayurveda. New Delhi; CCRAS. Vol 8 p. 263.
24. Vishwanathan MB, Thangadurai D, Vendan KT, Ramesh N. Chemical analysis and nutritional assessment of Teramnus labialis. Plant Food Hum Nutr.1999; 54 (4) 345-52.
25. Praveen NB et al. A comparative clinical study on efficacy of Mashaparni and Kapikachu in Oligospermia. J Ayurveda Integr Med Sci 2018; 3 (4): 24-27.
26. G.S. Levekar. Database on medicinal plants used in Ayurveda. New Delhi; Central Council for Research in Ayurveda and Siddha. (CCRAS) Govt of India; 2007.Vol 8p.42.
27. G.S.Levekar. Database on medicinal plants used in Ayurveda. New Delhi; Central Council for Research in Ayurveda and Siddha. (CCRAS) Govt of India; 2007. Vol 8 p.360.
28. Database on medicinal plants used in Ayurveda. New Delhi; Central Council for Research in Ayurveda and Siddha. (CCRAS) Govt of India. Vol-4.P.122.
29. K.V.Billore, M.B.Yelne, T.J.Dennis and B.G. Chaudhari. Database on medicinal plants used in Ayurveda. New Delhi; Central Council for Research in Ayurveda and Siddha. (CCRAS) Govt of India.2004;Vol-6 p.237.
30. G.S Levekar. Database on medicinal plants used in Ayurveda. New Delhi; Central Council for Research in Ayurveda and Siddha. (CCRAS) Govt of India; 2007. Vol 8 p.263.
31. Vaidya Jadavji Trikamji Acharya. Sushruta samhita. (Chikitsa stana 26/6). Varanasi; Chaukambha Sanskrit Sansthan; 2002. p.417.
32. Vaidya Jadavji Trikamji Acharya. Sushruta samhita. (Sutra stana 45/132). Varanasi; Chaukambha Sanskrit Sansthan 2002.p.207.
33. Vaidya Jadavji Trikamji Acharya. Sushruta samhita. (Sutra stana 46/102). Varanasi; Chaukambha Sanskrit Sansthan; 2002.p.223.
34. Vaidya Jadavji Trikamji Acharya. Sushruta samhita. (Sutra stana 45/49). Varanasi; Chaukambha Sanskrit Sansthan ; 2002. p.201.
35. Shailaja srivastava. Sharngadhara samhita (Purva khanda 4/13). Varanasi: Chaukambha Orientalia. 2003 p.33.
36. Prof. Priyavrata Sharma. Kaiyadeva nighantu. Varanasi; Chaukambha orientalia; 1979.p.599

37. Vaidya Jadavji Trikamji Acharya. Charaka samhita (Sutra stana27/228). Varanasi; Chaukambha Sanskrit Sansthan; 2004. p.165
38. Marcel cocuzza et al; Clinical relevance of oxidative stress and sperm chromatin damage in Male infertility; an evidence based analysis; Int Braz j Urol 2007;33(5):603-21.
39. Ganeswar barik, Latha chaturvedula, Zachariah bobby. Role of oxidative stress and Antioxidant in male infertility; an interventional study. Journal of Human Reproductive sciences. 2019;12(3): 204-209.
40. LuR Mirzaev et al Effect of ecdystene on parameters of sexual functions under Experimental and clinical conditions Eksp Klin Farmakol. 2000; 63 (4): 35-7.
41. Verma A.,P., and L.V.K.Punarnava-A Natural Remedy by Ayurveda. International Journal of Pharmacy and Pharmaceutical Sciences, Vol. 6, no. 8, Aug. 2014, pp. 1-6.
42. J.W. Dickison. WS effect of octacosanol on non-seasonal supplementation in ovine. Journal of animal science. Volume 94, Issue suppl\_5, October 2016, Page 605.
43. Zhi –Meil, Ning liu, Ya ping jiang,Zie zheng.Vitexin alleviates stpetozotocin induced sexual dysfuntions and fertility impairment in male mice via modulating the hypothalamus pituitary gonadal axis. Chemical biological interactions. 2019 Jan 5;297:119-129.
44. Susheela Yelumalai et al. In vivo administration of quercetin ameliorates sperm oxidative stress, inflammation, preserve morphology and functions inn streptozotocin induced adult male diabetic rats. Archive Med Sci.2019;15(1);240-249.
45. Sansam sanjeev et al. Isolation characterization and therapeutic activity of bergenin for Marlberry (Ardisia colorata Roxb) leaf in diabetic testicular complications in wistar albino rats; Environ Sci Pollut Res Int. 2019;26(7):7082-7101.

**Cite this article as:**

Nagendra Chary.M, Lalitha B.R, T.Anil Kumar. Shukrala (Spermatogenic) Potentiality of Madhyama Panchamoola- A Review. International Journal of Ayurveda and Pharma Research. 2020;8 (12):25-30.

**Source of support: Nil, Conflict of interest: None Declared**

**\*Address for correspondence**

**Dr.M Nagendra Chary**

Ph.D Scholar,

Department of Dravyaguna,

Government Ayurveda Medical

College, Bengaluru, Karnataka, India

Email: [nagendrayush@gmail.com](mailto:nagendrayush@gmail.com)

Mob: 9731353737

Disclaimer: IJAPR is solely owned by Mahadev Publications - dedicated to publish quality research, while every effort has been taken to verify the accuracy of the content published in our Journal. IJAPR cannot accept any responsibility or liability for the articles content which are published. The views expressed in articles by our contributing authors are not necessarily those of IJAPR editor or editorial board members.